

Southern Regional Model United Nations, Atlanta 2012

From Crisis to Opportunity: Chartering a Path Forward for Global Self-Sustainability

November 15-17, 2012 - Atlanta, GA

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Dear Delegates,

It is my pleasure to welcome you to the United Nations Development Programme (UNDP) of the Twenty-Third Southern Regional Model United Nations (SRMUN). My name is Trey Sylvester and I will be serving as your Director along with my Assistant Director, Monique Atherley. It is our hope that this document will be a comprehensive starting point for your conference preparations. Monique and I in concert with Director-General Cortney Moshier, have labored to build a clear and concise Background Guide that while providing delegates with in-depth information does not depart from coherency.

As you read further in the Committee History, the UNDP serves as a global development network of the United Nations and works with Member States and other bodies to meet and exceed the Millennium Development Goals while achieving a sustainable future for the world. This committee will continue to work to ensure that mandate through a number of topics selected by SRMUN, which are:

- I. Measuring the Economic Impact of Alternative Energy Projects in the Developing World
- II. Examining the Efficacy of International Agreements on Local Environmental Viability
- III. Redefining the Relationship between Marine Sustainability and Economic Development.

With this agenda in mind, it is vital to understand the importance of the UNDP and similar organizations in designing effective policy and developing sustainable capacity that meets local and national needs.

Every delegation must submit a position paper that addresses each of the topics listed above and only those listed above. These papers should adhere to SRMUN's guidelines on position paper format and style which can be found on the SRMUN website (srmun.org). The position paper objective is to convince and persuade delegations in the UNDP that your recommendations on each topic represent the best possible courses of action to address the agenda. Taking the objective of position papers into account, a proper position paper should also provide insight into your country's position, history, and statement of goals for the topic. Finally, each position paper should also take into consideration how the committee should address the issue as a whole.

Since your position paper should do everything listed above, it is an excellent opportunity to give the committee leadership an idea of what you expect to do in committee. We all expect well-written position papers that will serve as a foundation for an excellent conference and fully developed debate. While your country's position is what you represent, please remember that you may also want to research the opposing side of contentious issues, and address it in your position paper, as this can prove positive to your knowledge in committee. If you have questions about the details of the position papers, please visit the SRMUN website (www.srmun.org) or email your director and assistant directors at the address listed below. **Please note that all position papers MUST be submitted by October 26, 2012 by 11:59 PM EST using the submission system on the SRMUN website.**

Monique and I are delighted to serve as your staff this year. With the Millennium Development Goals reaching their deadline and the world on an economic precipice, the UNDP's mission has become even more pressing. We expect every delegate to come in with an informed and open mind that is ready to engage your fellow delegates. We are looking forward to meeting all of you in committee. If you have any issues, questions, or comments, then we invite you to contact us via the cool little hyperlinks beneath our names and we will be happy to answer your inquiries.

We wish you the best in preparing and welcome again to the United Nations Development Programme!

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Committee History of the United Nations Development Programme

The United Nations (UN) was established in 1945 with goals of peace building and humanitarian assistance.¹ In 1965, in the Twentieth Session of the General Assembly, A/RES/20/2029² yielded the United Nations Development Programme (UNDP). A/RES/20/2029 consolidated the United Nations Expanded Programme of Technical Assistance (1949) and the United Nations Special Fund (1958).³ As an organization, UNDP's goal is to be "...an organization advocating for change and connecting Member States to knowledge, experience, and resources to help people build a better life".⁴ The United Nations Development Programme is currently one of eleven funds and programs under the General Assembly in the UN system.⁵ On the ground in 177 nations, UNDP serves as the UN's global development network, and assists Member States with responses to development related issues.

Committed to bridging the gap of development, the United Nations Development Programme stands as the largest provider of grants for human development worldwide. As a Programme, its initiatives currently focus on democratic governance, poverty reduction, crisis prevention & recovery, environment & energy, and combating HIV/AIDS.⁶ UNDP is on the forefront of global development initiatives and collaboration and is an active partner in achieving the Millennium Development Goals (MDGs).⁷ Using Human Development Reports (HDR) since 1990, the UNDP provides tangible evidence on disparities and influences the change of policies across the global community.⁸ HDRs are independent reports commissioned by the UNDP that originally intended to put "people back at the center of the development process in terms of economic debate, policy and advocacy".⁹ The UNDP aims to empower Member States to be self-sustainable through providing information to develop strong foundations and frameworks. The UNDP guides Member States with policy advice, advocacy, promoting communication and networking, and ways to strengthen capacity.¹⁰

Governed by an Administrator, UNDP is broken down into five regional offices that communicate with Member States on a local level.¹¹ The current Administrator Helen Clark, former Prime Minister of New Zealand, is the first female Administrator of the organization.¹² The UNDP reports and provides recommendations to the Economic and Social Council (ECOSOC), as per its establishing resolution.¹³ The UNDP believes heavily in accountability and transparency.¹⁴ UNDP has its own Offices of Audit and Investigations, Evaluation, and Program and Operations Policies and Procedures.¹⁵ These offices are responsible for conducting internal audits, evaluating initiatives, and maintaining protocol in making decisions, respectively.¹⁶ In its Forty-Eighth Session in 1993, the General Assembly issued A/RES/48/162,

¹ United Nations. UN at Glance. <http://www.un.org/en/aboutun/index.shtml>

² United Nations. Resolutions Adopted During its the Twentieth Session. <http://www.un.org/documents/ga/res/20/ares20.htm>

³ United Nations Development Program. Frequently Asked Questions.

http://www.beta.undp.org/content/undp/en/home/operations/about_us/frequently_askedquestions.html

⁴ United Nations Development Programme. About Us.

http://www.beta.undp.org/content/undp/en/home/operations/about_us.html

⁵ United Nations. Structure and Organization. http://www.un.org/en/aboutun/structure/org_chart.shtml

⁶ Ibid.

⁷ United Nations. Development. http://www.un.org/Overview/uninbrief/dev_assistance.shtml

⁸ United Nations Development Programme. Human Development Reports - United Nations Development Programme.

<http://hdr.undp.org/en/humandev/>

⁹ United Nations Development Programme. History of the Human Development Report.

<http://hdr.undp.org/en/humandev/reports/>

¹⁰ United Nations Development Programme. The UN and UNDP in Brussels.

http://www.undp.org/eu/democratic_governance.shtml

¹¹ United Nations Development Programme. Organizational Chart. <http://www.undp.org/about/chart.shtml>

¹² United Nations Development Programme. Biography - Helen Clark, UNDP Administrator.

<http://www.beta.undp.org/content/undp/en/home/operations/leadership/administrator/biography.html>

¹³ United Nations. Resolutions Adopted During its the Twentieth Session. <http://www.un.org/documents/ga/res/20/ares20.htm>

¹⁴ United Nations Development Programme. Accountability.

<http://www.beta.undp.org/content/undp/en/home/operations/accountability/overview.html>

¹⁵ Ibid.

¹⁶ Ibid.

regarding UN Reform and organizational restructuring.¹⁷ A/RES/48/162 (1993) established the United Nations Development Programme Executive Board, with membership of Member States on a rotating basis.¹⁸ The Executive Board of UNDP is responsible for the oversight of activities carried out by the United Nations Population Fund (UNFPA) and United Nations Office of Project Services (UNOPS) in accordance to the UN Charter.¹⁹ Currently, the Executive Board meets each year for two regular sessions and one annual session.²⁰

The United Nations Development Programme has 128 Member States receiving support for democratic governance and 60 Member States receiving election assistance. Further, 95% of UNDP's partners consider the organization to be a "critical partner" in contributing to the MDGs. In addition, there are 103 Member States receiving support from the United Nations Development Programme for anti-corruption efforts.²¹ In their empowerment efforts, the UNDP consistently promotes the empowerment of women, capacity development, and human rights in all endeavors.²² The UNDP works closely with the United Nations Volunteers (UNV) organization, an organization that works to increase volunteerism throughout Member States. UNV also advocates for the rights and recognition of volunteers. UNV reports to the UNDP Executive Board, who represents them globally.²³

The United Nations Development Programme also serves "as the fund administrator" for the entire United Nations System.²⁴ After the successful partnership of the United Nations Development Group Iraq Trust Fund (UNDG ITF) and other Multi-Partner Trust Funds (MPTFs) that UNDP administered, the Multi-Partner Trust Fund Office (MPTF Office) was developed.²⁵ Through its MPTF Office, the UNDP often serves as an Administrative Agent for pass-through fund management and fund distribution.²⁶

The United Nations Development Programme further manages the United Nations Capital Development Fund (UNCDF).²⁷ UNCDF is a development fund that "offers a unique combination of investment capital, capacity building and technical advisory services to promote microfinance and local development in the Least Developed Countries (LDCs)".²⁸ In addition, the UNDP has two funds of its own to manage which promote gender equality and crisis recovery. The UNDP Gender Thematic Trust Fund (GTTF) has "funded projects in over sixty-five countries and has received almost ten million dollars, with 70% of this work being done in Africa".²⁹ A tool in crisis response and preparedness, the UNDP's Crisis Prevention and Recovery Thematic Trust Fund (CPR TTF or the Fund) assists Member States with recovery efforts after disastrous events. CPR TTF has dispersed more than one billion dollars and benefited more than 100 countries.³⁰

The UNDP is the main coordinator within the United Nations Development Group (UNDG) – a subsidy designed to work more effectively in addressing the development needs of Member States.³¹ UNDG is an entity consisting of thirty-two UN related funds, programs, agencies, departments, and offices that are great

¹⁷ NGO Committee on Education. United Nations A/RES/48/162. <http://www.un-documents.net/a48r162.htm>

¹⁸ United Nations Development Programme. Information note about the Executive Board. http://www.beta.undp.org/content/undp/en/home/operations/executive_board/information_noteontheexecutiveboard.html

¹⁹ Ibid.

²⁰ Ibid.

²¹ Ibid.

²² United Nations Development Programme. About Us. <http://www.undp.org/about/index.shtml>

²³ United Nations Volunteers. About Us. <http://www.unv.org/about-us.html>

²⁴ United Nations Development Programme. UNDP and the UN. http://www.beta.undp.org/content/undp/en/home/ourwork/partners/united_nations.html

²⁵ United Nations Development Programme. About MPTF Office. <http://mdtf.undp.org/overview/office>

²⁶ Ibid.

²⁷ United Nations. Structure and Organization. http://www.un.org/en/aboutun/structure/org_chart.shtml

²⁸ United Nations Capital Development Fund. About UNCDF. http://uncdf.org/english/about_uncdf/

²⁹ United Nations Development Programme. Gender Thematic Trust Fund. <http://www.beta.undp.org/content/undp/en/home/ourwork/womenempowerment/ttf.html>

³⁰ United Nations Development Programme. Crisis Prevention & Recovery. <http://www.beta.undp.org/content/undp/en/home/ourwork/crisispreventionandrecovery/overview.html>

³¹ United Nations Development Group. About the UNDG. <http://www.undg.org/index.cfm?P=2>

stakeholders in development.³² The two organizations share the same Administrator/Chairperson. Additionally, the UNDP is also a member of the Rule of Law Coordination and Resource Group.³³ This Group is responsible for working with Member States to uphold the rule of law as referenced in S/2004/616, its guiding resolution. Additionally, the Group provides activities that “support the development, promotion and implementation of international norms and standards in most fields of international law”.³⁴ Furthermore, the Rule of Law Coordination and Resource Group highlight important aspects of the UN Rule of Law and best practices to date.³⁵

The current members of the United Nations Development Programme include:

ANTIGUA & BARBUDA, ARGENTINA, AUSTRALIA, BANGLADESH, BELARUS, BRAZIL, BURKINA FASO, CAMEROON, CANADA, CHINA, CZECH REPUBLIC, DEMOCRATIC REPUBLIC OF CONGO, DENMARK, DJIBOUTI, EL SALVADOR, ESTONIA, GREECE, INDIA, INDONESIA, ISRAEL, ITALY, JAPAN, LIBERIA, MOROCCO, NICARAGUA, NORWAY, PAKISTAN, QATAR, REPUBLIC OF KOREA, RUSSIAN FEDERATION, RWANDA, SOUTH AFRICA, SWEDEN, SWITZERLAND, UNITED STATES

I: Measuring the Economic Impact of Alternative Energy Projects in the Developing World

“Energy is central to everything we do – from powering our economies to achieving the Millennium Development Goals... from combating climate change to underpinning global security.”
-United Nations Secretary-General Ban Ki-Moon³⁶

Involvement and Actors

In the nineteenth and twentieth centuries, the Member States we today know as developed, industrialized on a veritable flood of easily obtained fossil fuels.³⁷ At a comparable level of development, industrialized Member States had access to oil at twenty-two USD per barrel as opposed to the current price that exceeds one hundred per barrel at adjusted 2010 values.³⁸ In that era, absent the regulatory bodies and international agreements that now govern businesses, the early powers became rich and technologically advanced while the environment suffered. Today, the winners of the race to industrialization and the leaders of the world economy are forced to deal with the ramifications of their mistreatment and create alternatives. This led the UN to the creation of modern climate standards and the United Nations Development Programme's (UNDP) mission to assist developing Member States with modernizing while maintaining a commitment to environmental sustainability.³⁹ This commitment must begin with energy, and recent data shows a formula that, without intervention, cannot translate to economic development.⁴⁰ According to the UNDP's 2011 Human Development Report (HDR), one point five billion people lack access to electricity and 2.5 billion rely on traditional biomass for heating and cooking.⁴¹ International Energy Agency figures show that ninety-five percent of this population lives within either sub-Saharan Africa or South Asia.⁴² It is not a coincidence that these developing states are also the home of the greatest wealth inequalities and

³² Ibid.

³³ United Nations. United Nations and the Rule of Law. <http://www.un.org/en/ruleoflaw/>

³⁴ Ibid.

³⁵ Ibid.

³⁶ Remarks to World Future Energy Summit Opening. UN News Centre.
http://www.un.org/apps/news/infocus/speeches/search_full.asp?statID=1431

³⁷ Oil Strategy in World War II. Oil 150. <http://www.oil150.com/essays/2007/08/oil-strategy-in-world-war-ii>

³⁸ 2011 World Energy Outlook. International Energy Organization. October 2011

³⁹ Overview. UNDP. <http://www.undp.org/content/undp/en/home/ourwork/overview.html>

⁴⁰ 2011 Human Development Report. United Nations Development Programme. 2011

⁴¹ Ibid.

⁴² 2011 World Energy Outlook. International Energy Organization. October 2011

widespread multidimensional poverty.⁴³ Reliable electricity is a key requirement in building the infrastructure necessary to boost national economic potential and to increase citizen quality of life.⁴⁴ It is for this reason that the UNDP recognizes the construction and improvement of power generation facilities as a key step in the accomplishment of all of the Millennium Development Goals (MDG).⁴⁵ The problem, specifically in developing nations, is that an investment in future energy infrastructure means diverting funds from other economic projects.⁴⁶ Beyond that, a government faces a choice between traditional fossil fuel plants and the often far more costly plants utilizing renewable energy. This situation can be further complicated when new construction transitions away from strong generating interests, notably when governments themselves have ownership. The World Bank and International Monetary Fund (IMF) are the primary sources of loans and aid when a Member State is seeking funds for a project that may exceed its means.⁴⁷ The World Bank focuses on providing loans to qualifying governments while the IMF coordinates controlled disbursements of aid and economic guidance to Member States in which it can provide stability.⁴⁸ In 1991, the World Bank saw a need for a dedicated body that would bring a global focus to purely national projects and be in a position to provide the additional funding the refocus would require.⁴⁹ To this end, the World Bank, UNDP, and United Nations Environment Program (UNEP), created the Global Environment Facility (GEF) and collaborated as its implementers. The GEF, while originally a body within the World Bank, transitioned to being an independently administered fund in 1994 following the Rio Earth Summit.⁵⁰ This restructuring allowed deeper cooperation to arise with developing nations by making them equal partners in project building. The GEF's performance made it the largest public financier of environmental projects and the UN's primary mechanism on numerous international treaties.⁵¹ The GEF though is only a financial body and thus relies on the UNDP to provide the expertise and ground support necessary to make projects a success. With the Secretary-General's declaration of 2012 as the International Year of Sustainable Energy for All, the UNDP-GEF partnership turns an even greater focus on extending universal access of energy to the poor while making modern sustainable energy sources safer and more easily available.⁵²

Wind Turbines

Wind energy is the fastest growing alternative energy source in the past decade, driven by a near revolution in technology that has dramatically reduced its price.⁵³ In the period of 1995-2006, global wind capacity rose by an average of twenty percent per year. This rose to nearly thirty percent annually by 2010 with developing Member States taking over as the major construction market as established buyers weighed economic uncertainty in the developed world.⁵⁴ Wind turbines are major investments, at US construction prices; they cost about 2,100,000 USD per megawatt (MW) of capacity.⁵⁵ One of the primary wind turbine units used can produce 1.5 MW, but more advanced models can generate higher wattage in the same conditions.⁵⁶ This means that when the wind is at optimal speed, twenty-seven to fifty-six miles per hour

⁴³ *Human Development Report 2010*. The Real Wealth of Nations: Pathways to Human Development.

http://hdr.undp.org/en/media/HDR_2010_EN_Complete_reprint.pdf

⁴⁴ Research and Innovation. European Commission. http://ec.europa.eu/research/energy/intro_en.htm

⁴⁵ Sustainable Energy. United Nations Development Programme.

http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/focus_areas/sustainable-energy.html

⁴⁶ Ministerial Meeting and Expert Roundtable. Organization for Economic Co-Operation and Development.

<http://www.oecd.org/dataoecd/18/45/49232265.pdf>

⁴⁷ About us. World Bank.

<http://web.worldbank.org/WBSITE/EXTERNAL/EXTABOUTUS/0,,pagePK:50004410~piPK:36602~theSitePK:29708,00.html>

⁴⁸ About the IMF. IMF. <http://www.imf.org/external/about/whatwedo.htm>

⁴⁹ What is the GEF. Global Environment Facility. <http://www.thegef.org/gef/whatisgef>

⁵⁰ Ibid.

⁵¹ Ibid.

⁵² Sustainable Energy. United Nations Development Programme.

http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/focus_areas/sustainable-energy.html

⁵³ *Promotion of Wind Energy*. UNDP-GEF. May 2008

⁵⁴ *Renewables Global Status Report 2011*. REN21. August 2011

⁵⁵ *CRS Report for Congress Power Plants: Characteristics and Costs*. Congressional Research Service. November 13, 2008

⁵⁶ FAQ-Output. National Wind Watch. <http://www.wind-watch.org/faq-output.php>

(mph), the turbine will generate at a rate of 1.5 MW per hour (MW/h). These figures represent maximum capacity, but the capacity factor (CF) represents real world output.⁵⁷ CF is the maximum output of a generator over time divided by its actual output for the same period. The United States sees an average of all turbine CF's of nearly thirty percent, but Europe's turbines see only thirteen percent.⁵⁸ Using a CF approximation, it becomes possible to calculate an approximation of energy output of wind turbines for a year assuming the facilities are always switched on to the grid. A one point five MW unit operating for twenty-four hours a day for 365 days a year, at a CF of twenty-five percent, will generate 3,285 MW/h or 3,285,000 kilowatt hours (kW/h).⁵⁹ However, this figure is marred by some of the realities of power generation grids. Small wind generators in rural areas or for private homes utilize sophisticated battery systems for storing the energy due to the wind being intermittent, but larger on grid wind turbines tie directly in and thus other power sources must balance their output to avoid overloads or gaps.⁶⁰ In practice, this means that Member States interested in large wind farms must have the generating capacity to replace the wind turbines in the grid when they are not producing electricity. Despite growing interest from less developed nations, as of 2006 seventy-five percent of existing turbines were located in just five Member States.⁶¹ Considering construction costs, maintenance, and capacity drop offs, units produced on average at a cost of 0.04 USD per kW/h with annual operating costs of approximately 42,000 per MW.⁶² These prices rose in 2007 to an average of 0.06 USD for onshore platforms and 0.10 USD for offshore platforms in the one to five MW range.⁶³ Despite the competitive costs of wind generated electricity, wind still only accounted for approximately one percent of global energy production in 2010.⁶⁴ However, this also marked a new milestone for developing nations who reached fifty gigawatts of installed wind turbines. This places wind energy as the second largest source of renewable power behind hydroelectric facilities despite some of the complication associated with on-grid generation.⁶⁵

As of 2008, the UNDP and GEF planned fourteen and completed one project targeted at wind energy.⁶⁶ These are located in diverse areas around the globe, but the GEF has carefully planned investments only in Member States that present good candidates for committing to successful wind production. The first indicator in planning is the cost of domestic energy consumption.⁶⁷ For example, a project implemented in Pakistan is reasonable in spite of marginal wind resources due to the 0.52 USD per kW/h cost of electricity. In a South African project, excellent wind resources offset a 0.02 USD per kW/h cost due to strong coal reserves. The degree of privatization in the domestic energy sector can have a major impact on a Member State's willingness to seek energy upgrades.⁶⁸ Specifically, a public administered power system has little desire to invest in new technologies when it possesses a monopoly on production. The UNDP projects primarily focus on supporting on-grid power production as opposed to adding electricity to isolated rural areas. In order to be economically feasible, successful projects must include elements of public policy reform to boost interest and profitability of wind turbines.⁶⁹ All projects incorporate small test farms following extensive wind assessments and domestic market promotion. Larger projects, where the test farms have been successful, may incorporate a more commercial representative second farm.⁷⁰ In South Africa, where the initial goal is complete, the small test facility is to serve as an evaluation of the wind energy as a viable investment after 2013. A larger facility is a future investment for when the price of wind energy falls to become competitive with coal. Similarly, Pakistan as one of the newest Member States agreements hopes to evaluate the technology as a self-sustaining and profitable alternative to expensive

⁵⁷ Ibid.

⁵⁸ Ibid.

⁵⁹ FAQ-Output. National Wind Watch. <http://www.wind-watch.org/faq-output.php>

⁶⁰ Ibid.

⁶¹ *Promotion of Wind Energy*. UNDP-GEF. May 2008

⁶² *CRS Report for Congress Power Plants: Characteristics and Costs*. Congressional Research Service. November 13, 2008

⁶³ *Promotion of New and Renewable Sources of Energy*. The United Nations General Assembly. 7 August 2007

⁶⁴ *Renewables Global Status Report 2011*. REN21. August 2011

⁶⁵ Ibid.

⁶⁶ *Promotion of Wind Energy*. UNDP-GEF. May 2008

⁶⁷ Ibid.

⁶⁸ Ibid.

⁶⁹ Ibid.

⁷⁰ Ibid.

energy imports.⁷¹ Despite being early in the plan, Pakistan shows a major commitment to altering public policy to make renewable energy more cost effective. Existing projects range in cost from 1 to 124 million, determined by the size and scope of the test farms planned, with the GEF providing an average of two million in funds with the rest co-financed with the host Member State.⁷²

The UNDP and GEF are learning the lessons from these projects; plans for the future envision specifically tailoring objectives to the host Member State. The public policy environment, public sector expertise, and degree of market freedom all change the structure of wind energy mechanisms. These mechanisms fall into three major categories.⁷³ Feed-in laws give wind energy producers guaranteed access to the grid and power companies or government utilities are required to buy this electricity at its minimum published price or an agreed upon premium. This system provides the greatest results in Member States that: lack a strong free market, have little utilities competition, possess free established wind farms, and where the government does have a great deal of expertise in wind energy.⁷⁴ The government must also commit to long term contracts that allow wind producer to recover start-up costs while incorporating cost-recovery for national utility monopolies.⁷⁵ Tender systems are a variation on the feed-in law where Member State governments establish a bidding process for new renewable energy construction and choose a winner based on future energy cost. The electricity itself sells in the same contract system as with feed in laws. The system, being similar to feed-in, is useful in similar circumstances but can used to greater effect when governments have greater understanding of wind energy or when significant wind farms already exist.⁷⁶ Successful implementation will utilize large contracts to make it economically feasible while maintaining a government commitment to penalties in the case of unmet goals. Quota systems are a newer response that sets minimum requirements on the percentage of a utility's electricity that must come from renewable sources, but offer alternatives, such as obligation buy-outs, that renewable producers receive in lieu of production contracts. Quotas perform most adequately in Member States with strong free markets and domestic energy competition. Governments must commit to long-term objectives that are achievable and be prepared to enforce penalties that are higher than compliance costs.⁷⁷ Wind energy, when combined with effective public policy and a realistic appreciation of available technology, offers a viable supplement to existing power grids.

Biomass and Bio-fuels

The most common form of biomass generation is in combined heat and power (CHP) facility.⁷⁸ This model captures heat produced as a by-product and re-uses it to increase the efficiency of generation. Aside from the re-use, a biomass CHP plant operates by heating water to produce steam, which runs through a turbine to produce electricity.⁷⁹ The process of using solid combustion material also gives a biomass plant greater control over the amount of steam produced and offers several different levels of electrical production. This makes such plants a valuable balancing tool for other renewable energy sources such as wind with its variable production.⁸⁰ Industrial applications show a capability to increase efficiency by thirty-five percent when using on site feedstock. Feedstocks, in terms of biomass electrical generation, refer to the most energy rich sources of combustion for the turbine.⁸¹ These include wood waste, crop residue, and biogas produced by either manure or urban waste treatment. In practice, factories who process biomass feed stocks to supply a large proportion of their own energy needs and in some case return energy to the grid.⁸² Ideal situations in developing Member States could see public-private partnerships with cities or rural area providing fuel for industrial manufacturing that not only creates jobs but also provides energy for the grid

⁷¹ Ibid.

⁷² *Promotion of Wind Energy*. UNDP-GEF. May 2008

⁷³ Ibid.

⁷⁴ Ibid.

⁷⁵ Ibid.

⁷⁶ Ibid.

⁷⁷ Ibid.

⁷⁸ *Biomass Combined Heat and Power Catalog of Technologies Part I*. US EPA. September 2007

⁷⁹ Ibid.

⁸⁰ Ibid.

⁸¹ Ibid.

⁸² Ibid.

while decreasing business costs. Using approximations based on data from the United States (US), the largest operator of biomass plants, it becomes possible to calculate performance and efficiency and make basic predictions on developing world applications.⁸³ Assuming a cost of two USD for one million British Thermal Units' worth of biomass material and a grid electrical cost of seven US cents; a plant processing 600 tons of fuel a day will operate at 71% efficiency and is capable of generating from 5.6 to 15.5 MW of power. A plant of this size would have an initial cost of twenty-nine million USD but would recover ten percent of its investment costs per year at seven US cents utility prices.⁸⁴ This figure is in money saved when an industry offsets its draw from the grid, which would raise with the cost of domestic electricity at a rate 441,500 USD per US cent for a plant at a 5.6 MW production level. The energy itself is at a cost of between eight and ten US cents per kW/h depending on generator setting.⁸⁵ These figures are for the stoker boiler process which is the more traditional and cost effective method. Newer processes, such as the fluidized bed and gasification, have dramatically lower emissions of sulfur and nitrogen oxides and capable of processing a wider assortment of wastes.⁸⁶ Gasification is the newest process of the three and can process traditional wood wastes as well as different types of sewage sludge. Expansion of markets for these plants is a primary goal of UNDP-GEF broad objectives.⁸⁷ These facilities can add ten to twenty million USD onto the price of comparable stoker boilers and at the same time, limit the maximum output due to more complicated fuel preparation.⁸⁸ Use of existing stoker boiler plant and employing co-firing in coal facilities is a logical first step. Co-firing is the process of adding biomass to existing generators alongside their primary fuel. This reduces the amount of fossil fuels burned reducing cost and air emissions.⁸⁹ Longer-term goals would see relaxing of the economic and public policy barriers that make gasification techniques not viable in many developing Member States.

UNDP-GEF project portfolio includes a large number of biomass projects ranging from modernization of biomass use in Sri Lanka to the promotion of jatropha oil as a bio fuel in Mali.⁹⁰ Beginning in 2000, the UNDP undertook a series of projects in Eastern Europe that serve as guideposts for contemporary project and policy design.⁹¹ The plan saw increasing local heat generation with modern wood fuels in: Belarus, Latvia, Poland, Slovakia, and Slovenia. If a self-sustaining domestic market for biomass production and consumption arises, then heat costs for rural areas fall markedly. Initially, the UNDP was unable to generate results due to longer than expected start up periods, this in turn caused many private partners to lose interest and pull out.⁹² Additionally, a few cases saw national government partners disappear as elections carried out supporting politicians and new policy objectives came into play. The disappearance of co-financing budgets required a reassessment of goals, but the strict nature of GEF grants led to a paralysis until mid-term reviews.⁹³ Dynamic action following the review allowed teams to accomplish many of the originally planned objectives, but at reduced scale and impact on domestic markets. This led to an extensive review of how to maximize future UNDP-GEF operations in biomass energy propagation.⁹⁴ New grant proposals include much more rigorous planning for scenarios that might occur which allow greater flexibility within the operations phase. Additionally, UNDP teams place greater emphasis on realistic partner expectations and incorporate an understanding that commitment at the feasibility study phase is not a guarantee of future partner performance.⁹⁵ The effect of these policy changes appears in one of the newest approved GEF projects. The Member State of Sri Lanka imports a high percentage of its energy in the form of fuel wood and petroleum.⁹⁶ Forty-seven percent of total energy produced is via biomass, but

⁸³ Ibid.

⁸⁴ Ibid.

⁸⁵ Ibid.

⁸⁶ *Biomass Combined Heat and Power Catalog of Technologies Part 5*. US EPA. September 2007

⁸⁷ *Promoting Sustainable Biomass Energy Production and Modern Bio-Energy Technology in Sri Lanka*. GEF. 19 April 2012

⁸⁸ *Biomass Combined Heat and Power Catalog of Technologies Part 5*. US EPA. September 2007

⁸⁹ Ibid.

⁹⁰ *Promoting Sustainable Biomass Energy Production and Modern Bio-Energy Technology in Sri Lanka*. GEF. 19 April 2012

⁹¹ *Opportunities for Biomass Energy Programmes – Experiences & Lessons Learned by UNDP in Europe & the CIS*. UNDP. 6 March 2007

⁹² Ibid

⁹³ Ibid

⁹⁴ Ibid.

⁹⁵ Ibid.

⁹⁶ *Promoting Sustainable Biomass Energy Production and Modern Bio-Energy Technology in Sri Lanka*. GEF. 19 April 2012

the tea industry consuming forty-two percent of all fuel wood soaks up this energy capacity. The goal of UNDP's project is to increase domestic wood production dramatically by promoting the planting of several species of fuel wood within coconut crops.⁹⁷ It is the hope that this process employed on even a small percentage of Sri Lanka's coconut lands, will produce an upsurge in fuel supply. The construction of gasification biomass generators will provide a new demand for the wood to balance the new supply.⁹⁸ When the project ends, it should create a vacuum for new biomass businesses. This project faced rigorous review for years by both the GEF and UNDP to make sure it had an answer for every possible complication that might arise.⁹⁹

All forms of biomass used for electrical generation accounted for approximately twelve percent of world output.¹⁰⁰ Biomass electricity has the capability: to reduce reliance on fossil fuels, provide an alternative to typical waste management solutions, reducing emissions, and provide a boost to local economies.¹⁰¹ Perhaps even more promising is the willingness that developing nations are showing in accepting biomass power generation.¹⁰² The Developing world reached an installed capacity twenty-five gigawatts. This is part due to many African Member States already having existing plant capacity and their interest in expanding due to the success of the Kyoto protocol mechanism.¹⁰³ It is a technology that requires no real leaps, with the exception of gasification systems, and is compatible with traditional energy production when co-firing is employed.¹⁰⁴ Biomass provides novel solutions to waste disposal in Member States with limited territory and high-energy costs. (Supercritical carbon capture for a new sentence)

Survey of Other Renewables

Solar

Solar power production is in the form of either photovoltaic (PV) or solar thermal.¹⁰⁵ PV functions by wiring a number of conductive cells together in a module.¹⁰⁶ These cells create release electrons in the form electricity when struck by the photons in light. Utility scale applications are becoming common in developed Member States but remain rare within developing states, only Mali and Thailand, due to costs, though these continue to fall.¹⁰⁷ Additionally, PV's have the lowest CF of any utility scale power generator at only twenty-one percent.¹⁰⁸ Construction costs are 5,782,000 USD per MW with operations at only 11,926 USD per MW due to a lack of fuel needs. In contrast, solar thermal generators began function in the 1970's and proved themselves with long operation without technological leaps.¹⁰⁹ They collect radiant heat to produce steam for turbine operation. Parabolic solar thermal troughs increase the efficiency of existing coal and natural gas plants by providing non-fuel heat input into the system.¹¹⁰ Solar thermals can also be around a central tower, where the mirrored heat is focuses to power steam turbines within the center tower. Construction for troughs is 2,836,000 USD per MW and operations are 57,941 per MW due to the need to repair and clean the mirror surface for maximum output.¹¹¹

Geothermal

Modern Geothermal plants are either flash steam plants or binary facilities.¹¹² Flash steam is the most

⁹⁷ Ibid.

⁹⁸ Ibid.

⁹⁹ Ibid.

¹⁰⁰ *Promotion of New and Renewable Sources of Energy*. The United Nations General Assembly. 7 August 2007

¹⁰¹ Ibid.

¹⁰² *Renewables Global Status Report 2011*. REN21. August 2011

¹⁰³ Ibid.

¹⁰⁴ Ibid.

¹⁰⁵ Ibid.

¹⁰⁶ How do Photovoltaics work. NASA. <http://science.nasa.gov/science-news/science-at-nasa/2002/solarcells/>

¹⁰⁷ *Renewables Global Status Report 2011*. REN21. August 2011

¹⁰⁸ *CRS Report for Congress Power Plants: Characteristics and Costs*. Congressional Research Service. November 13,2008

¹⁰⁹ Solar Parabolic Trough. Solar Paces. http://www.solarpaces.org/CSP_Technology/docs/solar_trough.pdf

¹¹⁰ Ibid.

¹¹¹ *CRS Report for Congress Power Plants: Characteristics and Costs*. Congressional Research Service. November 13,2008

¹¹² Geothermal. US Energy Information Administration. http://www.eia.gov/kids/energy.cfm?page=geothermal_home-basics-k.cfm

common, where the steam from the reservoir directly turns the turbine.¹¹³ The binary generator transfers heat from the steam or water to another substance that in its gas form turns the turbine. Both require temperatures between 300 and 700 degrees Fahrenheit in order to function but are extremely efficient with CF's of ninety percent.¹¹⁴ When expended, the steam flows back into the earth to be reused.¹¹⁵ The plant produces one percent of the carbon dioxide found in fossil fuel emissions and scrubbers remove ninety percent of the hydrogen sulfide, which occurs naturally in geothermal steam. Due to the temperature requirements, very few Member States have the ability to install geothermal plants. A notable exception is Kenya, whose position on the Great Rift Valley gives it ample geothermal resources. Construction and operations costs are quite high at 2,836,000 and 168,011 USD per MW respectively for binary plants.¹¹⁶ Additionally, geothermal plants suffer from high world demand for deep drilling rigs, which typically focus on oil exploration.¹¹⁷

Hydroelectric

Hydroelectric dams are the number one source of renewable energy on the globe and account for sixteen percent of all electrical generation in 2010 and seventy-six percent of renewable generation in 2011.¹¹⁸ Larger projects can generate from 100 to the 18,000 MW range depending on the water source in question.¹¹⁹ This technology is currently the cheapest at three to five US cents per kW/h with ninety plus percent efficiency but costs and size vary widely based on the project. These projects often fall outside the construction capabilities of developing nations. Filling this void is small hydropower, which ranges from one to ten MW and achieves kW/h costs of five to twelve US cents.¹²⁰ These small hydro projects are the focus of current grant and development loans because they are realistic projects with quicker returns. However, these projects also contain the possibility of domestic displacement and international tension with neighbors, especially in areas of water scarcity. Hydroelectric dams produce large reservoirs that may submerge villages and cultural sites requiring resettlement. This is the case with China's massive three gorges dam, which is sinking several major cities, archeological sites, and incalculable numbers of villages.¹²¹ International tensions can arise because of the control that the dam's Member State gains over downstream water resources.¹²² During a drought or crisis, it may be preferable to hold the reservoir for domestic irrigation and drinking water, or as a threat. Environmentally speaking, dams also seriously disturb fish migration patterns and river ecosystems unless due thought is given to ways to minimize impact.¹²³

Survey of Fossil Fuel Plants

In 2007, despite economic incentives fossils fuels continue to account for the majority of energy generation in developing Member States.¹²⁴ Africa possessed 128 gigawatts (GW) of installed fossil fuel plants that produced 615 terawatts (TW) of electricity with Asia installing 1792 GW and generating 5095 TW.¹²⁵ In Africa, this breaks down into coal for forty-seven percent, natural gas for twenty-eight percent, and oil for eleven percent of this energy; while developing Asia, reported numbers of sixty-nine, nine, and four percent for fuels respectively. Fossil fuel facilities attain CF's between seventy-five and ninety percent versus

¹¹³ Ibid.

¹¹⁴ *CRS Report for Congress Power Plants: Characteristics and Costs*. Congressional Research Service. November 13, 2008

¹¹⁵ Geothermal. US Energy Information Administration. http://www.eia.gov/kids/energy.cfm?page=geothermal_home-basics-k.cfm

¹¹⁶ *CRS Report for Congress Power Plants: Characteristics and Costs*. Congressional Research Service. November 13, 2008

¹¹⁷ Geothermal. US Energy Information Administration. http://www.eia.gov/kids/energy.cfm?page=geothermal_home-basics-k.cfm

¹¹⁸ *Renewables Global Status Report 2011*. REN21. August 2011

¹¹⁹ *Promotion of New and Renewable Sources of Energy*. The United Nations General Assembly. 7 August 2007

¹²⁰ Ibid.

¹²¹ "Three Gorges dam's social impact." BBC news. <http://news.bbc.co.uk/2/hi/asia-pacific/5000198.stm>

¹²² "Egypt, Ethiopia mull Nile dams dispute." UPI. http://www.upi.com/Business_News/Energy-Resources/2011/09/23/Egypt-Ethiopia-mull-Nile-dams-dispute/UPI-28691316789638/

¹²³ *Ecosystem Impacts of Large Dams*. UNEP. 2001

¹²⁴ *World Energy Outlook 2007*. IEA. 2007

¹²⁵ *World Energy Outlook 2009*. IEA. 2009

renewables like solar and wind, which are variable in operation.¹²⁶ Developing economies invest heavily in these traditional staples of power generation, in fact, fossil fuels retain the largest share of world energy production despite massive investment in renewable.

In Member States with adequate reserves, such as China and the US, coal is a key component of the energy equation; the comparatively low cost of domestic acquisition offsets a lower energy density compared to other fuels. In discussing coal-fueled power plants, the two main combustion types are pulverized and integrated gasification.¹²⁷ Integrated Gasification Combined Cycle (IGCC) plants convert coal to a syngas before combustion. This adds significantly to construction and operations costs at 3.4 million and 39 thousand USD per MW respectively, but offers lower emissions and slight efficiency gains.¹²⁸ The major advantage is the capability to isolate and remove carbon dioxide more efficiently and cheaply by processing syngas prior to firing. However, improvements in traditional pulverized plants raise questions on whether the cost justifies the benefits.¹²⁹ Plants take about four years for construction with slightly more time being required for syngas facilities with their more sophisticated equipment. Pulverized coal facilities operate by igniting air and a fine powder of coal in a boiler.¹³⁰ The operating requirements and sophistication of these boilers versus other plant types represents the largest cost component of coal generator construction 2,481,000 USD per MW but offers low operations costs of 28,100 USD per MW.¹³¹ US coal plants average 600 MWs and thus represent capital investments of one point four eight billion USD. Water turns to steam as it runs along the boiler, which rotates a turbine for electricity.¹³² Newer plants, supercriticalized coal, heat and pressurize water beyond its ability to differentiate itself between gas and liquid states, or critical point. A heat engine, such as a boiler, determines its efficiency by measuring the difference in energy between the heat source and the sink, or turbine acted on.¹³³ Operating with water in a supercritical state allows it to carry more energy without generating waste heat, which increases plant efficiency. In this case, a typical coal boiler would have thirty-nine percent efficiency, supercriticality raises this to forty-five percent.¹³⁴ This technology in the Clean Coal Initiative envisions capturing carbon dioxide, a major coal emission, from plant exhausts, converting it to supercriticality, and injecting it into oil fields to improve yields.¹³⁵ However, this does not negate coal's indirect costs. Coal power generation: emits soot, mercury, carbon dioxide, sulfur dioxide, and nitrates. These emissions can bond with water in the air and produce acid rain and ozone at ground level.¹³⁶ Commercially available technology can remove ninety-five to ninety-nine percent of sulfur dioxide and soot, ninety percent of mercury, and high amounts of nitrates in pulverizing plants at a cost one to three percent of output and a sixteen percent increase to construction price. This reduces sulfur emissions to point one six and nitrates to point zero five pounds per MMBtu.¹³⁷ Current carbon dioxide control technology, amine scrubbing, consumes thirty to forty percent of plant output and changes cost to 3,953,000 45,564 USD per MW or a sixty-one percent increase to construction and a doubling to operations respectively. The cost reduces carbon output to twenty pounds per MMBtu.¹³⁸ IGCC plants remove portions of these pollutants automatically as part of the syngas process reducing them by ninety percent; however, they retain equal carbon dioxide emissions and a cost 4,774,000 per MW and increase operations costs to 46,464 per MW with carbon controls.

Natural gas is the second largest, but growing, source for fossil fuel electrical generators.¹³⁹ The Natural Gas Combined Cycle (NGCC) facility is the newest and most efficient model of gas fired generator. These

¹²⁶ *CRS Report for Congress Power Plants: Characteristics and Costs.* Congressional Research Service. November 13,2008

¹²⁷ *Ibid.*

¹²⁸ *Ibid.*

¹²⁹ *Ibid.*

¹³⁰ *Ibid.*

¹³¹ *Ibid.*

¹³² *Ibid.*

¹³³ What is a Supercritical Fluid? Future Chem Tech.

<http://www.futurechemtech.com/data/What%20is%20a%20Supercritical%20Fluid.pdf>

¹³⁴ *CRS Report for Congress Power Plants: Characteristics and Costs.* Congressional Research Service. November 13,2008

¹³⁵ *Ibid.*

¹³⁶ *Ibid.*

¹³⁷ *Ibid.*

¹³⁸ *Ibid.*

¹³⁹ *Ibid.*

plants are essentially jet engines on a utility scale. The liquefied gas fires through the engine to produce electricity but a combined cycle approach then takes over.¹⁴⁰ This means capturing the waste heat to produce steam that will in turn produce extra electricity leading to greater efficiency. When compared with coal plants, natural gas has much greater fuel costs but the greater efficiency and greater energy density partially offsets this fact.¹⁴¹ Construction costs are 1,186,000 USD per MW or 2,342,000 with carbon controls installed. Ton by ton, liquefied natural gas contains twice the energy as an average variety of coal.¹⁴² Additionally, natural gas plants have the capability to run at different generating levels, thus operating as valuable balancing tools for a grid incorporating renewable.¹⁴³ Building these facilities is fast, cheap, and has a relatively low environmental footprint. Increasing opposition to coal plants is leading to an increasing reliance on NGCC.¹⁴⁴ Despite fuel costs now accounting for half of operations costs and growing, NGCC can sell electricity at lower prices than all but geothermal sources. Emissions from natural gas plants are one of their most attractive qualities. There is no soot and no sulfur dioxide output.¹⁴⁵ Nitrates are half of pulverized coal plants but are themselves double the emissions from syngas gas generators. Finally, carbon dioxide output is half that of coal plants with scrubbers actually adding fifteen percent efficiency to plants.¹⁴⁶

Oil accounts for a small percentage of western power generation but many areas of the developing world still use it. In 2008, Asia imported ten million barrels of oil and Africa bought three million barrels for electrical production.¹⁴⁷ Liquid fuel generators attempt to compensate for the high cost of fuel by making construction quick and cheap.¹⁴⁸ Additionally, some liquid fuel generators are capable of consuming many different fuel types from traditional fossil fuels to renewable ethanol and biodiesel. This makes an oil generator facility more attractive to a Member State who needs increased generating capacity in an under-served area quickly. Brazil, a Member State that derives eighty-five percent of its power from hydroelectricity, invests heavily in liquid fuel plants to act as support capacity.¹⁴⁹ This is also cost-effective in Member States that offer domestic oil subsidies. This is when a government spends a portion of the budget to bring down the consumer price of oil and petroleum products.¹⁵⁰ Major oil producing Member States such as Iran, Russia and Saudi Arabia, spend large portions of their government budgets on reducing the costs of domestic fossil fuels.¹⁵¹ Iran, in 2010, spent \$80 USD on consumer price reduction placing it in the number one slot. This is an unsustainable position and Iran is weaning its population of these while investing in renewables.¹⁵²

Case study Kenya: The Desperate Need for Energy

Kenya is the most industrialized Member State in East Africa and is the second most popular choice behind South Africa for corporations locating in Africa but it has serious energy woes.¹⁵³ It posted a 2011 GDP of 36.1 billion USD with a per capita income of 1,700 USD.¹⁵⁴ The national debt is 48 percent of GDP. 75 percent of its workforce labors in agriculture, which accounts for 19 percent of GDP.¹⁵⁵ Urban populations serve an ever-growing industrial capacity that includes an oil refinery, textiles, and limited metal

¹⁴⁰ CRS Report for Congress Power Plants: Characteristics and Costs. Congressional Research Service. November 13, 2008

¹⁴¹ Ibid.

¹⁴² Natural Gas and Coal Measurements and Conversions. Ag Decision Maker.

<http://www.extension.iastate.edu/agdm/wholefarm/pdf/c6-89.pdf>

¹⁴³ CRS Report for Congress Power Plants: Characteristics and Costs. Congressional Research Service. November 13, 2008

¹⁴⁴ Ibid.

¹⁴⁵ Ibid.

¹⁴⁶ Ibid.

¹⁴⁷ World Energy Outlook 2009. IEA. 2009

¹⁴⁸ Wartsila dual-fuel power plants. Wartsila power solutions. <http://www.wartsila.com/en/power-plants/smart-power-generation/dual-fuel-power-plants>

¹⁴⁹ Energy. Brazil-Works. <http://www.brazil-works.com/p/energy.html>

¹⁵⁰ Fossil-Fuel Subsidies. Institute for Energy Research. <http://www.instituteforenergyresearch.org/2011/11/23/iea-review-shows-many-developing-countries-subsidize-fossil-fuel-consumption-creating-artificially-lower-prices/>

¹⁵¹ Ibid.

¹⁵² Ibid.

¹⁵³ The World Fact book: Kenya. US CIA. <https://www.cia.gov/library/publications/the-world-factbook/geos/ke.html#top>

¹⁵⁴ Ibid.

¹⁵⁵ Ibid.

production. Unemployment is at forty percent with a full fifty percent of the population living below the poverty line.¹⁵⁶ Twenty-two percent of the nation is urbanized and only eighteen percent or one point three million receive electricity. Kenya has the second highest electricity costs in all of Africa for its approximately 1289 MW.¹⁵⁷ The Energy ministry controls all energy exploration and discovery, while the partially private Kenya Power controls transmission and sale of power to consumers. The government fully funds the energy ministry and has feed-in tariffs to encourage local generation.¹⁵⁸ Strain, waste, and theft, both physical and electrical, result in a fifteen percent loss rate annually. Over fifty percent of energy comes from a combination of hydroelectric dams, the largest portion and some dating back to the 1930's, and geothermal plants within the Olkaria complex, an area of volcanic activity within the Great Rift Valley.¹⁵⁹ The rest of the supplies are a petroleum installation on the coast, imports from Uganda, or industrial level biomass.

The specific problem facing Kenya is that the high reliance on the hydropower facilities and insufficient emergency back-up capacity makes the grid extremely susceptible to drought when water flow falls below generating levels.¹⁶⁰ This causes rolling blackouts with significant economic impacts. In 2006, the loss of some hydropower facilities, 8.3 percent of generation, caused blackouts exceeding twelve hours at a time resulting in a nearly two percent reduction in annual GDP.¹⁶¹ Expansions are underway for both hydropower and the much more reliable geothermal, 1,832 MW by 2016, as well as encouraging local production to take strain off the grid, but demand consistently grows at an equal or greater rate.¹⁶² The government is reaching maximum construction rates, and in response is undertaking a policy of energy efficiency to curve industrial and government demand.¹⁶³ Incentives are also in place to encourage industries to spread their energy use away from peak demand hours. However, in late 2011 Kenya announced the beginning of power rationing due to delays in power plant construction, climate change in water resources, and higher than expected demand.¹⁶⁴ In part, because of these continuing challenges, the World Bank selected Kenya as a pilot nation in the Scaling up Renewable Energy Program in Low Income Countries Program (SREP).¹⁶⁵ Under SREP, Kenya is eligible for fifty million, with sixty million in reserve, for renewable projects. Kenya decided to invest in Lake Turkana's untapped wind resources.¹⁶⁶ Over the next, few years 365 wind turbines will be emplaced that will sell energy at rates equal to geothermal plants. While these do not represent true capacity increases, it is a valuable stopgap against the seasonal inconsistencies of domestic hydropower. Kenya is already feeling the pressure of global recession, and the need for power rationing is exacerbating the economic situation.¹⁶⁷ These difficulties make Kenya less attractive to international investors, a sorely need resource in Kenya's bid for development.

Case Study Argentina: The End of an Era?

Argentina is the eighth largest fossil fuels exporter in the world and the largest natural gas exporter in South America, but the wells are drying up.¹⁶⁸ It posted a 2011 GDP of 435.2 billion USD with a per capita

¹⁵⁶ Ibid.

¹⁵⁷ *Energy Efficiency in Kenya*. Kenya Power and Lighting Co. 29 June 2009

¹⁵⁸ Ibid.

¹⁵⁹ "Innovation and Diversification Are Key for Kenya's Renewable Energy Industry." Renewable Energy World.com <http://www.renewableenergyworld.com/rea/news/article/2012/02/innovation-and-diversification-are-key-for-kenyas-renewable-energy-industry>

¹⁶⁰ "Climate Change and Energy Security in East and Horn of Africa." Energy, Environment, and Development Network for Africa. http://www.afrepren.org/Pubs/Occasional_Papers/pdfs/OP33.pdf

¹⁶¹ Ibid.

¹⁶² Current Projects. KenGen. <http://www.kengen.co.ke/index.php?page=business&subpage=current>

¹⁶³ *Energy Efficiency in Kenya*. Kenya Power and Lighting Co. 29 June 2009

¹⁶⁴ Press Briefs July 26, 2011. KenGen. <http://www.kengen.co.ke/documents/Tuesday%20July%2026%202011.pdf>

¹⁶⁵ "Kenyan Wind Farm, Africa's Largest, to Produce Lowest Cost Electricity." CleanTechnica.com. <http://cleantechnica.com/2012/03/25/kenyan-wind-farm-africas-largest-to-produce-lowest-cost-electricity/>

¹⁶⁶ Ibid.

¹⁶⁷ "Kenyan's Feel Recession Pain." People's Daily Online. <http://english.peopledaily.com.cn/90777/7572666.html>

¹⁶⁸ An Energy Overview of Argentina. US Department of Energy. http://www.geni.org/globalenergy/library/national_energy_grid/argentina/energy_overview_of_argentina.shtml

income of 17,400 USD.¹⁶⁹ The national debt is forty-two point nine percent of GDP. Seventy-two percent of its workforce labors in the service industry, which accounts for fifty-nine point two of GDP.¹⁷⁰ Urban populations serve the in petrochemicals, metallurgy, and food processing industries for domestic agriculture exports. Unemployment is at seven point two percent with thirty percent of the population living below the poverty line.¹⁷¹ An impressive ninety-two percent of the nation is urbanized and annual power consumption rates of 104.7 billion kW/h. Fossil fuels drive the Argentinian economy with crude oil exports totaling thirty-five point eight million barrels and domestic life dominated by the use of natural gas.¹⁷² Over sixty percent of electrical production is natural gas thermal plants with hydroelectricity and nuclear filling the remaining demand.

Argentina's resource riches have been a staple of its economy for the last 100 years, but following dizzying political and military infighting and a complete default on foreign debt the Member State has an addiction it can no longer afford.¹⁷³ Energy demand continues to rise steadily fuelled by artificially cheap domestic prices. Price ceilings, implemented following the debt default, caused Argentina to fall eighty percent behind its neighbors and the globe in fossil fuel prices.¹⁷⁴ Now the wells are showing a natural slowing but consumption continues to rise. The national government is offering incentives for new wells to earn double price for the first few years of their life.¹⁷⁵ Furthering the problem is the fact that Argentina disconnected from further loans when it defaulted.¹⁷⁶ Continuing arbitration prevented the acquisition of additional capital for infrastructure development. This was the situation when an Argentine government, desperate for funds, nationalized the largest oil company, Spanish owned, YPF citing a failure to explore new resources.¹⁷⁷ This may solve temporary revenue issues but does not completely solve the consumption problem. Argentina needs for the fuel to flow and for that, foreign companies must develop the significant remaining fossil fuel reserves including recently discovered shale oil and deep natural gas in Patagonia.¹⁷⁸ However, the nationalization of YPF makes companies nervous and hesitant to invest in a financially risky proposition. Argentina is familiar with renewable energy and its benefits. Its hydroelectric and Patagonian wind farms promise to complement its bio-diesel industry, the largest in South America.¹⁷⁹ Nevertheless, the allure of international oil export prices and an energy grid built around natural gas may make renewable energy unfeasible to an Argentina with bills to pay.

Conclusion

Developing states face difficult questions on how to build a sustainable energy future. The options available often depend on what renewable resource a Member State has available. Hydroelectricity and geothermal are wonderful but they are often unavailable. Wind energy is cheap to build but requires capacity back up and grid balancing against intermittent generation. Biomass is available in many different forms but utility scale generation requires market development for fuel sources. Finally, the fossil fuels themselves may often play a part in planning. Most Member States have existing generator capacity of these types and in some cases even have lucrative mining industries built around them. While the environmental impact is very real, the short-term economic benefits or penalties are equally real. Fortunately, the lessons learned by the UNDP in past missions will serve as valuable tools as it aims to assist Member States and NGO's in designing policies and building markets for domestic renewable energy production. Three billion people lack electricity and clean cooking fuels and it is the UNDP mission to help this growing need on a budget smaller than last year.

¹⁶⁹ The World Fact Book: Argentina. US CIA. <https://www.cia.gov/library/publications/the-world-factbook/geos/ar.html>

¹⁷⁰ Ibid.

¹⁷¹ Ibid.

¹⁷² Independent Statistics & Analysis: US Energy Information Administration. Argentina. <http://www.eia.gov/countries/cab.cfm?fips=AR>

¹⁷³ Ibid.

¹⁷⁴ Ibid.

¹⁷⁵ Ibid.

¹⁷⁶ "Argentina's Energy Industry." The Economist. <http://www.economist.com/node/21553070>

¹⁷⁷ Ibid.

¹⁷⁸ Ibid.

¹⁷⁹ Independent Statistics & Analysis: US Energy Information Administration. Argentina. <http://www.eia.gov/countries/cab.cfm?fips=AR>

Committee Directive

This Background Guide (BGG) attempts to give delegates the minimum amount of expertise in power plant engineering and realities to be able to discuss the topic effectively. Even so, this is an extremely technical document. Well-prepared delegates will have explored the additional resources within the Technical Appendix Guide (TAG). Additionally the TAG includes a table on energy types and their relevant costs and outputs.

In considering this issue, it is easy to focus on the details of specific types of renewable energy and on the idea that renewables are always the solution. However, the UNDP must weigh not simply sustainable energy but sustainable development as a whole. It must design policies and initiatives to address both renewable states such as Kenya and fossil-fueled ones as is the case in Argentina. Moreover, it must weigh environmental policy objectives against the unique economic and humanitarian needs of developing nations.

Questions to consider:

- What is the UNDP's objective in energy sector development?
- Do energy, environmental, and economic questions have an order of precedence?
- Do environmental concerns supersede humanitarian pursuits?
- Are current environmental rules fair to developing Member States with poor renewable resources?
- Is fossil fuel energy production indispensable prior to universal energy access?
- Do developing Member States have a right to violate rules for economic growth?
- Is the UNDP limited to renewable options when investing in developing Member States?
- How, if at all, can an energy sector be transitioned away from fossil fuels without economic disruption?
- What, if any, future do fossil fuels have in global energy grids?

II: Examining the Efficacy of International Agreements on Local Environmental Viability

Introduction

In an ever-changing global environment, the need to address issues of environmental security is prevalent. Environmental concerns rose to the forefront of the international agenda during the 1960s to yield multiple bilateral and multilateral agreements.¹⁸⁰ The implementation of a system of Environmental Governance provides Member States support and collaborate with the standards and a framework needed to ensure that securing the environment is a collaborative effort. Environmental Governance is a multi-pronged approach using local capacity building to promote policy. Basic components of International Environmental Governance include the use of intergovernmental organizations, establishing and enforcing a framework of international environmental law, and establishing financing mechanisms.¹⁸¹ Intergovernmental organizations are designed to identify and promote items that should be on the "...international agenda that will protect the environment and promote sustainable development."¹⁸² International Environmental Law offers accountability in these efforts through "...legally binding agreements among Member States to take joint action on different environmental problems, with each nation responsible for action within its own territory."¹⁸³ In addition, financing mechanisms serve to "supplement national efforts toward sustainable

¹⁸⁰ United Nations Environment Programme. Negotiating International Environmental Agreements. www.unep.org/pdfs/cv01chsp.pdf

¹⁸¹ World Resources Institute. World Resources 2002-2004. Chapter 7. International environmental governance <http://www.wri.org/publication/content/8542>

¹⁸² Ibid.

¹⁸³ Ibid.

development in poorer countries, support the UN agencies and treaty secretariats that coordinate and carry out environmental efforts, and build capacity to carry out treaty commitments.”¹⁸⁴

According to the United Nations Environmental Programme (UNEP),

“Environmental Governance comprises the rules, practices, policies and institutions that shape how humans interact with the environment. Good environmental governance takes into account the role of all actors that impact the environment. From governments to NGOs, the private sector and civil society, cooperation is critical to achieving effective governance that can help us move towards a more sustainable future.”¹⁸⁵

Various bodies in the United Nations system have stake in the environmental governance process. In particular, the UNEP, the Commission on Sustainable Development (CSD) and UNDP work in different aspects of the governance process.¹⁸⁶ UNEP serves as the primary environmental agency in the UN system, and focuses on all environmental topics from governance to the role of environment in conflict situations.¹⁸⁷ As an organization, UNEP’s mandate is to “to be the leading global environmental authority that sets the global environmental agenda, that promotes the coherent implementation of the environmental dimensions of sustainability, and that serves as an authoritative advocate for the global environment.”¹⁸⁸ CSD monitors progress on Agenda 21, a document on Sustainable Development yielded at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992.¹⁸⁹ CSD is also responsible for “...the review the Rio Declaration on Environment and Development and providing policy guidance to follow up at local, national, regional and international levels of the Johannesburg Plan of Implementation (JPOI).”¹⁹⁰ UNDP’s role in environmental governance is to further efforts of sustainable development through capacity building in order to achieve the Millennium Development Goals.”¹⁹¹

In the governance process, “...the negotiation of Multilateral Environmental Agreements (MEAs) plays an important role in promoting the integration of the environment and development through established framework.”¹⁹² Early MEAs focused on the depletion of natural resources, and later expanded and increased in intentionality to focus on topics such as biodiversity and climate.¹⁹³ In 1992, one of the greatest examples of global environmental progress occurred at the UNCED. UNCED, or the Earth Summit, yielded the UN Convention on Climate Change (UNFCCC), examining the effects on climate and the atmosphere, and Convention on Biological Diversity (CBD), focusing on agriculture, forestry, fishery, land use, and nature conservation.¹⁹⁴ Accomplishing this feat set the stage for other regional and international MEAs in the Convention to Combat Desertification (1994) and the Convention on Cooperation for the Protection and Sustainable Use of the Danube River (1994). However, in spite of the progress and developments in law and governance made as a global community to salvage environment, there are limited results to show achievement in reaching agreed upon goals.”¹⁹⁵

¹⁸⁴ World Resources Institute. World Resources 2002-2004. Chapter 7. International environmental governance <http://www.wri.org/publication/content/8542>

¹⁸⁵ United Nations Environment Programme. UNEP and Environmental Governance at a Glance. www.unep.org/pdf/brochures/EnvironmentalGovernance.pdf

¹⁸⁶ World Resources Institute. World Resources 2002-2004. Chapter 7. International environmental governance <http://www.wri.org/publication/content/8542>

¹⁸⁷ United Nations Environment Programme. From Conflict to Peacebuilding: The Role of Natural Resources and the Environment. http://www.unep.org/pdf/pcdmb_policy_01.pdf

¹⁸⁸ United Nations Environment Programme. Natural Allies. http://www.unep.org/PDF/Natural_Allies_en/Natural_Allies_chapter1_eng.pdf

¹⁸⁹ World Resources Institute. World Resources 2002-2004. Chapter 7. International environmental governance <http://www.wri.org/publication/content/8542>

¹⁹⁰ The United Nations. About the UN Commission on Sustainable Development (CSD). http://www.un.org/esa/dsd/csd/csd_aboutcsd.shtml

¹⁹¹ Ibid.

¹⁹² United Nations Environment Programme. Negotiating International Environmental Agreements. www.unep.org/pdfs/cv01chsp.pdf

¹⁹³ Ibid.

¹⁹⁴ Ibid.

¹⁹⁵ United Nations Environment Programme. About the World Congress. <http://www.unep.org/delc/worldcongress/about.asp>

Background

There are a wide-range of environmental policies created highlighting various environmental concerns, such as climate control, pollution, and dumping. In 1985, the Vienna Convention for the Protection of the Ozone Layer was adopted, and entered into enforcement on in 1988.¹⁹⁶ The Vienna Convention stands as a framework convention to provide a framework to protect the ozone layer.¹⁹⁷ This Convention desired to “promote cooperation by means of systematic observations, research and information exchange on the effects of human activities on the ozone layer, and to adopt legislative or administrative measures against these activities.”¹⁹⁸ The Vienna Convention also became the first document of its kind to achieve universal ratification in 2009.¹⁹⁹ Its protocol, the Montreal Protocol on Substances that Deplete the Ozone Layer, agreed upon in 1987 and entered into enforcement in 1989, with the intent of reducing production and consumption of substances that deplete the ozone to decrease their presence in the surrounding atmosphere.²⁰⁰ The Protocol has been amended many times and Parties meet on an annual basis to reevaluate decisions on implementation.²⁰¹ Both documents are “the most widely ratified treaties in United Nations history, and have enabled reductions of over 97% of all global consumption of controlled ozone depleting substances.”²⁰²

The United Nations Framework Convention on Climate Change (UNFCCC) in 1992 aimed to “limit average global temperature increases and the resulting climate change and to cope with whatever impacts were inevitable.”²⁰³ The emission reductions found in the Convention identified as inappropriate in 1995; led to efforts to respond to this issue and yielded the Kyoto Protocol.²⁰⁴ , which “sets targets for 37 industrialized countries and the European community for reducing greenhouse gas (GHG) emissions.”²⁰⁵ This Protocol is linked to the UNFCCC in addressing the effects of climate change, but differs as it requires developed Member States to stabilize GHG emissions, while the Convention only encourages them to do so.²⁰⁶ Under Kyoto, adopted in Kyoto, Japan in 1997 and entered into force in 2005, Member States “must meet their targets primarily through national measures”; market-based mechanisms are offered as an additional way to attain targets.²⁰⁷ The Kyoto three market-based mechanisms are “Emissions trading – known as ‘the carbon market’, Clean development mechanism (CDM), and Joint implementation (JI).”²⁰⁸ Member State’s actual emissions have to be monitored with accurate records and all trades executed kept; this is done through “registry systems that track and record transactions including an international transaction log to verify that transactions are consistent with Parties maintained by the UN Climate Change Secretariat.”²⁰⁹

As the effects of environmental governance were changing, two other agreements were developed to address desertification and water use. The 1994 UN Convention to Combat Desertification (UNCCD) identified and developed a definition of desertification – “land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities.”²¹⁰ The

¹⁹⁶ United Nations Environment Programme Ozone Secretariat. The Vienna Convention for the Protection of the Ozone Layer. http://ozone.unep.org/new_site/en/vienna_convention.php

¹⁹⁷ Ibid.

¹⁹⁸ Ibid.

¹⁹⁹ Ibid.

²⁰⁰ United Nations Environment Programme Ozone Secretariat. The Montreal Protocol on Substances that Deplete the Ozone Layer. http://ozone.unep.org/new_site/en/montreal_protocol.php

²⁰¹ Ibid.

²⁰² United Nations Environment Programme Ozone Secretariat. The Vienna Convention for the protection of the Ozone Layer and its Montreal Protocol on substances that deplete the Ozone Layer. http://ozone.unep.org/new_site/en/index.php

²⁰³ United Nations Framework Convention on Climate Change. http://unfccc.int/essential_background/items/6031.php

²⁰⁴ Ibid.

²⁰⁵ United Nations Framework Convention on Climate Change. Kyoto Protocol. http://unfccc.int/kyoto_protocol/items/2830.php

²⁰⁶ Ibid.

²⁰⁷ Ibid.

²⁰⁸ Ibid.

²⁰⁹ United Nations Framework Convention on Climate Change. Kyoto Protocol. http://unfccc.int/kyoto_protocol/items/2830.php

²¹⁰ Economic and Social Commission for Asia and the Pacific (ESCAP). International Agreements on Desertification. http://www.unescap.org/drpad/vc/orientation/legal/3_desert.htm

Convention also states the causes of desertification are “complex interactions among physical, biological, social, cultural and economic factors.”²¹¹ The four principles of the UNCCD include:

- “Binding parties to ensure participation of populations and local communities in the design and implementation of programs to combat desertification;
- The improvement of cooperation and coordination at sub-regional, regional and international levels on the basis of a spirit of solidarity and partnership;
- Extending the concept of partnership to relationships within the affected countries and , in doing so re-emphasizes the importance of ensuring the participation of local communities; and
- The Convention stresses the consideration of the special needs of affected developing countries.”²¹²

In response to the severe effects of recurrent droughts in the Sahel, the UNDP created its Drylands Development Center (DDC) that originated in 1973 as the United Nations Sudano-Sahelian Office (UNSO).²¹³ This Office provided an array of drought relief services for years.²¹⁴ After UNCCD was adopted, UNSO “provided support to affected countries under the "Urgent Action for Africa", a Resolution adopted by the UN General Assembly to speed up the implementation of the new Convention.”²¹⁵ UNSO changed its mandate to a global charge in 1995 to assist all affected by desertification and drought.²¹⁶

The Convention on Cooperation for the Protection and Sustainable Use of the River Danube (Danube River Protection Convention) (1994) is the “overall legal instrument for cooperation and transboundary water management in the Danube River Basin.”²¹⁷ The Convention was “signed by eleven of the Danube Riparian States – Austria, Bulgaria, Croatia, the Czech Republic, Germany, Hungary, Moldova, Romania, Slovakia, Slovenia and Ukraine.”²¹⁸ The goal of Danube River Protection Convention (DRPC) is to “ensure that surface waters and groundwater within the Danube River Basin are managed and used sustainably and equitably.”²¹⁹ Some of the DPRC focuses are “the conservation, improvement and rational use of surface waters and groundwater, and measures to reduce the pollution loads entering the Black Sea from sources in the Danube River Basin.”²²⁰

Projects and Initiatives

There are many initiatives executed in response to the concern of the efficacy of Environmental Governance. These responses range from collaboration between intergovernmental organizations, to funding sources, and goals and benchmarks set for the global community. However, although there are a variety of efforts established, there is no centralized global entity to track the various aspects needed for governance to be effective.

Environment and the Millennium Development Goals

Environmental stability and security are links to achieving the Millennium Development Goals (MDGs). In addition to MDG7, “to ensure environmental sustainability”, target nine of the eighteen MDG Targets calls to “integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources.”²²¹ Listed indicators for the progress of this goal and target include measuring the proportion of land area covered by forest, the ratio of area protected to maintain biological

²¹¹ Ibid.

²¹² Ibid.

²¹³ United Nations Development Programme. Drylands Development Centre – Our History. <http://web.undp.org/drylands/history.html>

²¹⁴ Ibid.

²¹⁵ Ibid.

²¹⁶ Ibid.

²¹⁷ International Commission for the Protection of the Danube River. The Convention Danube River Protection Convention. <http://www.icpdr.org/icpdr-pages/drpc.htm>

²¹⁸ Ibid.

²¹⁹ Ibid.

²²⁰ Ibid.

²²¹ UN Millenium Project. Goals, targets and indicators. <http://www.unmillenniumproject.org/goals/gti.htm>

diversity to surface area, energy use, carbon dioxide emissions per capita, and the consumption of ozone-depleting CFCs, and proportion of population using solid fuels.²²² These indicators are gauged through the assistance of other UN bodies such as UNEP, the Ozone Secretariat, the World Health Organization (WHO), the Food and Agricultural Organization (FAO), and the World Bank (WB).²²³

UNDP and UNEP

Working to ensure environmental sustainability and meeting the MDGs, UNDP has one of the largest energy and environment portfolios.²²⁴ The Programme has “worked to build capacity at the country level and has carried out significant work in water governance, sustainable land management, the conservation and sustainable use of biodiversity, and the reduction of greenhouse gases.”²²⁵ UNDP has “mobilized over \$7 Billion US Dollars through more than 10,000 large and small-scale projects and in partnership with other UN organizations, governments, NGOs, civil society organizations, and the private sector.”²²⁶ The UNDP’s biodiversity portfolio “includes numerous projects funded by the Global Environment Facility (GEF) and the GEF Small Grants Programme (SGP), the Equator Initiative, and the International Climate Initiative.”²²⁷ UNDP also assists in “biodiversity management through various environmental programs including the Poverty Environment Initiative and the UN-REDD Programme.”²²⁸

The UNEP has an “Environmental Governance sub-programme that promotes informed environmental decision-making to enhance global and regional environmental cooperation and governance.”²²⁹ This sub-programme focuses on “strengthening global, regional, national and local environmental governance to address agreed environmental priorities.”²³⁰ Its four goals are “international cooperation to achieve agreed environmental priorities, national development planning to influence regional and national development policies, using sound science for decision-making, and providing technical assistance in international policy setting.”²³¹

Organizations are also finding ways to actively engage and recognize sustainable efforts. For instance, the Equator Initiative “brings together the United Nations, governments, civil society, businesses and grassroots organizations to recognize and advance local sustainable development solutions for people, nature and resilient communities.”²³² This initiative does so through the “recognition of successful local and indigenous environmental initiatives and creating opportunities and platforms to share knowledge and good practice.”²³³ The Equator Initiative addresses the completion of goals through three aspects.²³⁴ Their Equator Prize, awarded biennially, recognizes and advances local sustainable development solutions for people, nature and resilient communities.²³⁵ Additionally, their Equator Dialogues are “an ongoing series of community-driven meetings and exchanges that provide opportunities for people to share experiences, develop capacities, and influence policy.”²³⁶ Finally, their Equator Knowledge is a “research, documentation and learning program focused on local best practice in sustainable development.”²³⁷

²²² Ibid.

²²³ Ibid.

²²⁴ United Nations Development Programme. The Sustainable Difference: Energy and Environment to Achieve the MDGs. <http://web.undp.org/energyandenvironment/sustainabledifference/PDFs/SustainableDiffIntro.pdf>

²²⁵ Ibid.

²²⁶ Ibid.

²²⁷ United Nations Development Programme. Ecosystems and Biodiversity.

http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/focus_areas/ecosystems_and_biodiversity

²²⁸ Ibid.

²²⁹ United Nations Environment Programme. UNEP and Environmental Governance at a Glance.

www.unep.org/pdf/brochures/EnvironmentalGovernance.pdf

²³⁰ Ibid.

²³¹ Ibid.

²³² The Equator Initiative. What We Do.

http://www.equatorinitiative.org/index.php?option=com_content&view=article&id=47&Itemid=682

²³³ Ibid.

²³⁴ Ibid.

²³⁵ Ibid.

²³⁶ Ibid.

²³⁷ Ibid.

Funding Mechanisms

In order to achieve the end goals desired by MEAs, projects, or campaigns, there are multiple funding resources specifically for environmental need. Collectively, UNDP and UNEP have instituted a Poverty and Environment Initiative (PEI) that focuses on addressing the connections between poverty and environment in relation to development and finances.²³⁸ PEI partners at the local level with “the policy and budget decision makers for Member States, as well as other stakeholders at the national and nongovernmental organizational level and the poverty, governance and environment units of the UNDP Country Offices.”²³⁹ As economies depend on environmental natural resources to thrive, encouraging movement toward “environmentally sustainable natural resource management will place the global community in a stronger position to achieve the goals of poverty reduction and economic growth.”²⁴⁰ PEI’s aim is to share “poverty reduction strategies and other planning and budgeting processes”, as well as to demonstrate to governments and donors the “value of providing the longer-term support needed for a sustained increase in investments and capacity building to reach development goals.”²⁴¹ Furthermore, the PEI also provides “assistance to governments financially and technically to set up analytical, institutional and capacity strengthening programmes”.²⁴² This assistance promotes institutional change through increasing the understanding of environmental sustainability.²⁴³ PEI has a three-component programmatic approach to achieve its goals. First, PEI desires to “find the entry points and making the economic case, based on country-specific evidence; this sets the stage for mainstreaming.”²⁴⁴ PEI then looks at “mainstreaming poverty-environment linkages into policy processes, focusing on integrating poverty-environment linkages into an ongoing policy process, such as a poverty reduction strategy paper (PRSP), and subnational development plan or sector strategy.”²⁴⁵ Finally, PEI calls for “meeting the implementation challenge, to ensure the sustainability of PEI efforts by integrating poverty-environment linkages into budgeting, implementation and monitoring processes.”²⁴⁶

The Global Environment Facility (GEF) connects “182 countries with international institutions, civil society organizations, and the private sector to address global environmental issues while supporting national sustainable development initiatives.”²⁴⁷ The GEF serves as “the largest public funder of environmental projects and provides grants for projects related to biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants.”²⁴⁸ The GEF funds many environmental agreements including the Convention on Biological Diversity (CBD), United Nations Framework Convention on Climate Change (UNFCCC), Stockholm Convention on Persistent Organic Pollutants (POPs), and UN Convention to Combat Desertification (UNCCD).²⁴⁹ The GEF also assists with economies in transition with their implementation of the Montreal Protocol on Substances That Deplete the Ozone Layer (MP).²⁵⁰ The UNDP, the UNEP, and the WB were the first partners to implement GEF projects.²⁵¹ The World Bank has “served as the Trustee of the GEF Trust Fund and provided administrative services since 1994.”²⁵² The GEF is currently an independent organization, and this change aided “the involvement of developing countries in the decision-making process and in implementation of

²³⁸ United Nations Environment Programme. UNEP and Environmental Governance at a Glance.

www.unep.org/pdf/brochres/EnvironmentalGovernance.pdf

²³⁹ Ibid.

²⁴⁰ United Nations Development Programme and United Nations Environment Programme. PEI Annual Progress Report 2010: “Scaling-Up the UNDP-UNEP Poverty-Environment Initiative”, October 2011.

http://www.unpei.org/component/docman/doc_download/286-pei-annual-progress-report-2010-executive-summary.html

²⁴¹ Ibid.

²⁴² Ibid.

²⁴³ Ibid.

²⁴⁴ Ibid.

²⁴⁵ Ibid.

²⁴⁶ Ibid.

²⁴⁷ Global Environment Facility. About GEF. <http://www.thegef.org/gef/whatisgef>

²⁴⁸ Ibid.

²⁴⁹ Ibid.

²⁵⁰ Ibid.

²⁵¹ Ibid.

²⁵² Ibid.

the projects.”²⁵³ The GEF has “provided \$10.5 billion in grants and leveraging \$51 billion in co-financing for over 2,700 projects in over 165 countries since 1991.”²⁵⁴ The GEF Small Grants Programme (SGP) has allowed the GEF to expand and make “more than 14,000 small grants directly to civil society and community based organizations, totaling \$634 million.”²⁵⁵

The United Nations Collaborative initiative on Reducing Emissions from Deforestation and forest Degradation (REDD), on the other hand, is actual program that also provides funding.²⁵⁶ UN-REDD is “purposed to assist developing nations in preparing and implementing national REDD+ strategies, and builds on the convening power and expertise of FAO, UNDP and UNEP.”²⁵⁷ UN-REDD supports forty-two partner countries over Latin America, Africa, and Asia.²⁵⁸ Sixteen of these nations receive support for National Programme activities.²⁵⁹ UN-REDD Programme’s Policy Board has “approved a total of US\$59.3 million for National Programmes in these 16 partner countries to date.”²⁶⁰ Reducing Emissions from Deforestation and Forest Degradation (REDD) “creates a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development.”²⁶¹ The updated “REDD+” also covers “conservation, sustainable management of forests and enhancement of forest carbon stocks.”²⁶²

Case Study – REDD+ in Burkina Faso, West Africa

In Burkina Faso, emerging industrialism constrains environmental viability with the use of intensive agricultural practices among farmers in the region, industrial mining, and increase population. The sub-Saharan region, which is vulnerable to soil degradation and desertification, threatens sustainability in an economy highly dependent upon the availability and quality of natural resources, including, land water and forests.²⁶³ The transition from traditional management practices of agroforestry to commercial with its use of material inputs, threatens an already volatile landscape. In just two decades, Burkina Faso lost close to 1.2 million hectares of its forest cover.²⁶⁴ When economic sustainability and environmental regulation to protect natural resources failed, Burkina Faso, member of the Forest Investment Program (FIP) joined the REDD+ program, by implementing management practices to reduce carbon emissions as stated in the United Nations Collaborative initiative on Reducing Emissions from Deforestation and Forest Degradation program (REDD).²⁶⁵

90 percent of the country’s labor force depends on farming; and environmental risks associated with shifts from traditional agricultural practices to emerging farming trends creates a socioeconomic disparity.²⁶⁶ Farmers who utilize new practices have access to key institutions for financing, whereas poorer farmers are

²⁵³ Ibid.

²⁵⁴ Ibid.

²⁵⁵ Ibid.

²⁵⁶ The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries. About UN-REDD. <http://www.un-redd.org/AboutUNREDDProgramme/tabid/583/Default.aspx>

²⁵⁷ Ibid.

²⁵⁸ Ibid.

²⁵⁹ Ibid.

²⁶⁰ Ibid.

²⁶¹ Ibid.

²⁶² Ibid.

²⁶³ Gray, L. C. 2005, What Kind of Intensification? Agricultural Practice, Soil Fertility and Socioeconomic Differentiation in Rural Burkina Faso *The Geographical Journal* 171(1) 70-82 retrieved from <http://www.jstor.org/stable/3451388>

²⁶⁴ Burkina Faso Ministry of Environmental and Sustainable Development (2011) *FIP Forest Investment Plan FIP/Burkina Faso* retrieved from http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/PIF_Burkina_EN_15_May.pdf

²⁶⁵ UN-REDD Program *About the UN-REDD Program* retrieved from <http://www.un-redd.org/AboutUNREDDProgramme/tabid/583/Default.aspx>

²⁶⁶ Gray, L. C. 2005, What Kind of Intensification? Agricultural Practice, Soil Fertility and Socioeconomic Differentiation in Rural Burkina Faso *The Geographical Journal* 171(1) 70-82 retrieved from <http://www.jstor.org/stable/3451388>

less involved in commercial agriculture and most farming crops meet household needs.²⁶⁷ The lack of access to financing institutions for poorer farmers further increases the disparity of socioeconomic differentiation and significant consequences on their livelihood.²⁶⁸ Seasonal drought creates a risk of either wealth or debt; most farmers are not able to sustain such risks. Commercial agricultural practices are “often associated with landscape changes, as farmers convert forest to farmland fewer trees remain in the field, resulting in low soil fertility levels.”²⁶⁹ The lack of seasonal rainfall creates a risk of either wealth or debt, a risk most farmers are not able to endure. In the cotton industry, wealthy farmers use manure to mitigate low soil fertility yet this input method further reduces organic matter levels among farmers who are able to produce high crop yield and those falling prey to climate change.²⁷⁰

Industrial mining poses the greatest threat to environmental viability in Burkina Faso. Since the early 1970s, intensive industrial mining became evident as migrants began digging for gold. By 2006, three industrial gold mines were constructed in Tarparko, Kalsaka, and Youga.²⁷¹ In March of 2007, two more gold mines were in the production process in Inata and Guiro. Soon after, Zinc and Manganese mines opened, and the issuance of over three-thousand exploration permits were given to mining companies.²⁷²

In 2008, with accelerated degradation due to intensive capital use, the government made a commitment to environmental viability seeking implementation initiatives to reduce greenhouse gas emissions from deforestation and degradation and promote improved sustainable management forests and protection of carbon reservoirs.²⁷³ As a member of the Forest Investment Program (FIP), the government has developed a tier step process to prepare for REDD+ by establishing systems for organizational control, implementation, and consultation, which can be a significant contribution to reaching UN Framework Convention on Climate Change objective in reducing greenhouse gas emissions.²⁷⁴ The REDD + program will integrate social and environmental considerations and ensure sustainable development. The country has implemented a 30-month preparedness initiative phase designed by the FIP with financing provided by Luxemburg to begin to implement governmental policy that facilitates environmental viability.²⁷⁵ As part of the FIP investment plan Burkina Faso has strengthen forest governance where central decisions concerning forest governance still reside with the national government, some decentralization will reside with local governments and civil society organizations.²⁷⁶ Using this approach of forestry governance will promote coordination, transparency, and incentives to sustainable management practices. Another part of the tier process in Burkina Faso focuses on minimizing a growing population on the environment by regulation population, application of the national land tenure system, promotion of agricultural intensification related policies, and promotion of fast growing trees in plantation and sustainable land management practices.²⁷⁷ These approaches will aim at reducing deforestation, protect forest reserves and allow for reforestation and rehabilitation of forest reserves. Under the REDD+ program for Burkina Faso, the government began a process of preparation for production in different sectors and at the same time developed the National Agricultural Investment Program within the NEPAD (New Partnership for Africa’s

²⁶⁷ Ibid.

²⁶⁸ Ibid.

²⁶⁹ Ibid.

²⁷⁰ Ibid.

²⁷¹ Integrated Framework *Burkina Faso The challenge of Export diversification For a landlocked country Diagnostic trade integration study* retrieved from http://www.enhancedif.org/documents/DTIS%20english%20documents/english/BurkinaFaso_DTIS_Report_e_Sep07%20.pdf

²⁷² Ibid.

²⁷³ Burkina Faso Ministry of Environmental and Sustainable Development (2011) *FIP Forest Investment Plan FIP/Burkina Faso* retrieved from http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/PIF_Burkina_EN_15_May.pdf

²⁷⁴ Ibid.

²⁷⁵ Ibid.

²⁷⁶ Ibid.

²⁷⁷ Burkina Faso Ministry of Environmental and Sustainable Development (2011) *FIP Forest Investment Plan FIP/Burkina Faso* http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/PIF_Burkina_EN_15_May.pdf

Development) framework.²⁷⁸ The socioeconomic reforms in Burkina Faso will prevent deforestation and degradation of woodlands and protect carbon stocks through innovative compensation programs.

Assessments

Most importantly, there is assessment currently conducted to determine what efficacy is in Environmental Governance. The Global Environment Outlook (GEO) from UNEP and the UN Millennium Ecosystem Assessment are listed as “non-governmental assessment processes and inter-organizational networking.”²⁷⁹ The Global Environment Outlook (GEO) is a “system of integrated environmental assessments that builds capacity for conducting for reporting on the state, trends and outlooks of the environment.”²⁸⁰ For example, the GEO+5 Report has three parts that include analyzing:

“the state and trends of the global environment in relation to key internationally agreed goals such as Millennium Development Goals (MDGs), prioritizing a varying number of environmental themes per region and selected internationally agreed goals, and identifying possible options for action to transition towards sustainable development including.”²⁸¹

On the other hand, The Millennium Ecosystem Assessment (MA), “conducted from 2001 to 2005, had the objective of assessing the consequences of ecosystem change for human well-being and the scientific basis for action needed to enhance the conservation and sustainable usage.”²⁸² Furthermore, under their Environmental Governance sub-programme, UNEP has budgeted to implement assessment in the form of outlooks, alerts and indicator reports with execution regionally, sub regionally, and thematically.²⁸³

Conclusion

A United Nations University report states that, “The development of strong and clear complementarities and compatibilities between different international regimes and bodies of international law will both help to create, and reflect, a balance between the three pillars (economic, social, and environmental) of sustainable development.”²⁸⁴ Although there have been multiple routes taken towards efficient Environmental Governance, we have still not reached a common path as a global community. As we build capacity at the local level, there is still a gap of standardized accountability and assessment in the implementation of MEAs. Although our community has made strides and met some of our goals, we are still missing some key areas, especially in regards to ensuring sanitary conditions or protecting forestry. As there are many invested entities in the Environmental Governance process, we as a global community need to continue to work to evaluate how we make goals and that ensure they within reach for both developing and developed Member States alike.

Committee Directive

The World Resources Institute acknowledges that “internal UN assessments have concluded that the (governance) system is fragmented” due to the variety of policy-making organizations and supporting entities with little coordination or cross-communication between them.²⁸⁵ The intentions of Environmental

²⁷⁸ Ibid.

²⁷⁹ Gemmill, B and Abimbola Bamidele-Izu. The Role of NGOs and Civil Society in Global Environmental Governance. <http://environment.research.yale.edu/documents/downloads/a-g/gemmill.pdf>

²⁸⁰ United Nations Environment Programme. About GEO. <http://www.unep.org/geo/About.asp>

²⁸¹ United Nations Environment Programme. Global Environment Outlook (GEO)-5 Assessment Summary for Policy Makers. http://www.unep.org/geo/pdfs/GEO5_SPM_English.pdf

²⁸² Millennium Ecosystem Assessment. <http://www.millenniumassessment.org/en/About.html>

²⁸³ United Nations Environment Programme. UNEP and Environmental Governance at a Glance. www.unep.org/pdf/brochures/EnvironmentalGovernance.pdf

²⁸⁴ United Nations University – Institute of Advanced Studies. International Environmental Governance. <http://www.ias.unu.edu/binaries/NYPrepComReport3.pdf>

²⁸⁵ World Resources Institute. World Resources 2002-2004. Chapter 7. International environmental governance <http://www.wri.org/publication/content/8542>

Governance is to be a collaborative activity between policy makers and constituents, offering many opportunities for local capacity to be built and ownership taken on its implementation and completion. With that in mind: What structure of accountability can regional bodies and their constituencies develop to ensure that Member States are meeting set upon environmental goals and markers? What overlapping agreements, programs, or initiatives need to be reevaluated for their efficiency? What role do different organizations play in the drafting of agreements? What is an important thought when the UN is seeing program budget shrinkage with increasing responsibility? Do local citizens care? If not, how can we make them part of the process? How can we make their efforts matter? How can Member States use local capacity building to resolve the gap of accountability and standardization? What best practices can be adapted and replicated to assist with local environmental viability?

III: Redefining the Relationship between Marine Sustainability and Economic Development

“We stress the importance of the conservation and sustainable use of the oceans and seas and of their resources for sustainable development, including through their contributions to poverty eradication, sustained economic growth, food security and creation of sustainable livelihoods and decent work, while at the same time protecting biodiversity and the marine environment and addressing the impacts of climate change”

-Rio+20 Outcome Document, 22 June, 2012²⁸⁶

Introduction

The United Nations Conference on Sustainable Development (Rio+20), which occurred in Rio de Janeiro, Brazil this past summer, was an assessment of world progress in the twenty years since the groundbreaking 1992 United Nations Conference on Environment and Development (Rio Earth Summit).²⁸⁷ Among the issues highlighted in the Rio+20 outcome document is the necessity of properly managing marine ecosystems for the purposes of conservation and as a sustainable resource for economic development.²⁸⁸ These ecosystems are in large part found in the world’s oceans, which themselves account for approximately 71 percent of the planet’s surface.²⁸⁹ Moreover, they constitute 97 percent of the world’s water.²⁹⁰ The reality of these figures is that over 80 percent of United Nations (UN) Member States have oceanic coastlines, with the broad economic rights and environmental responsibilities that entails.²⁹¹ However, these immensely important biological structures rely on relatively fragile balances, which can easily be disturbed by either pollution or overharvesting.²⁹²

International law rests primarily on the backs of two documents. The United Nations Conference on the Law of the Sea (UNCLOS) and its follow on document, the Food and Agriculture Organization of the United Nations (FAO) Code of Conduct for Responsible Fisheries (CCRF).²⁹³ UNCLOS developed over three conferences, and forms the broad rules and practices that govern modern oceans. The CCRF built upon biological conservationism in the form of providing guidelines for national policy concerning marine

²⁸⁶ *The Future We Want*. Rio+20. <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N12/381/64/PDF/N1238164.pdf?OpenElement>

²⁸⁷ About Rio+20. Rio+20. <http://www.uncsd2012.org/about.html>

²⁸⁸ *The Future We Want*. Rio+20. <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N12/381/64/PDF/N1238164.pdf?OpenElement>

²⁸⁹ Geography of the World’s Oceans. About.com. <http://geography.about.com/od/locateplacesworldwide/tp/fiveoceans.htm>

²⁹⁰ Water and Ocean Governance. UNDP. http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/focus_areas/water_and_ocean_governance.html

²⁹¹ Coastline. Countries of the World. <http://www.listofcountriesoftheworld.com/coastline.html>

²⁹² Environment. European Commission. http://ec.europa.eu/environment/marine/index_en.htm

²⁹³ Background to UNCLOS. UNEP. <http://www.continentalshelf.org/about/1143.aspx>

environments.²⁹⁴ UN resolutions and Member State policy must operate within these nearly universal legal parameters of the international stage

Resources found in the world's oceans, while renewable, will not last forever, and require maintenance in order to contribute to future economic development.²⁹⁵ The environment from which they originate adversely affects the sustainability of these marine resources. Effectively keeping pace with the global use of marine resources requires proper maintenance of the ocean's ecosystems, including but not limited to marine litter and pollution, is required.²⁹⁶ The rapid growth aquaculture has recently seen brings with it a range of environmental challenges and has forced both governments and industry to attempt to find balance between economic growth and long-term marine sustainability.²⁹⁷ With such high quantities of non-degradable litter in marine environments, the United Nations Environment Programme (UNEP) launched the Regional Seas Programme in 1974 in order to combat the rapidly increasing degradation of the ocean and its coastlines.²⁹⁸ Furthermore, the Rio+20's outcome document also makes an ecosystem management and sustainable aquaculture a necessity for upholding development goals.²⁹⁹

The United Nations Development Programme works to "assists member states to achieve equitable allocation of resources, develop capacities, and implement integrated approaches to water resources management through adaptive water governance."³⁰⁰ UNDP also "promotes and facilitates equitable access to water and sanitation services as a fundamental contribution to enhancing human development."³⁰¹ UNDP and the GEF are "working with the Ocean Governance Program to improve oceans management and sustain livelihoods at the local, national, regional and global scales through effective oceans governance."³⁰² This work is in collaboration with "other UN agencies, international financial institutions and regional fisheries organizations."³⁰³ Additionally, the UNDP/GEF Large Marine Ecosystems Program "supports ecosystem-based approaches to fisheries and other resource management in over ten of the world's Large Marine Ecosystems, where eighty-five percent of the world's fish catch derives."³⁰⁴ Furthermore through its "Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) program, UNDP has pioneered best practices in integrated coastal management and is supporting twelve East Asian countries in the rapid up scaling of these efforts".³⁰⁵ UNDP is also working with "the International Maritime Organization (IMO) in a long-term effort to reduce the risk of transfer of invasive species through ship ballast water through governance reform and technology development and transfer."³⁰⁶

Marine Sustainability

In efforts to attain sustainability on all fronts, work toward securing marine ecosystems has been multipronged and include identifying the areas of concern. Marine Ecosystems are of utmost importance

²⁹⁴ Code of Conduct for Responsible Fisheries. FAO. <http://www.fao.org/docrep/005/v9878e/v9878e00.HTM>

²⁹⁵ Ibid.

²⁹⁶ *Marine Litter: an Analytical Overview*. UNEP. http://www.unep.org/regionalseas/marinelitter/publications/docs/anl_oview.pdf

²⁹⁷ Fisheries, International Trade and Sustainable Development. ICTSD. http://ictsd.org/downloads/2008/06/fish_policypaper.pdf

²⁹⁸ Regional Seas Programme. UNEP. <http://www.unep.org/regionalseas/about/default.asp>

²⁹⁹ *The Future we want*. Rio+20. <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N12/381/64/PDF/N1238164.pdf?OpenElement>

³⁰⁰ United Nations Development Programme. Water and Ocean Governance. http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/focus_areas/water_and_ocean_governance.html

³⁰¹ Ibid.

³⁰² United Nations Development Programme. Ocean and Coastal Area Governance. http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/focus_areas/water_and_ocean_governance/ocean-coastal-governance.html

³⁰³ Ibid.

³⁰⁴ Ibid.

³⁰⁵ United Nations Development Programme. Ocean and Coastal Area Governance. http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/focus_areas/water_and_ocean_governance/ocean-coastal-governance.html

³⁰⁶ Ibid.

because they “cover seventy percent of the Earth’s surface and make up the largest aquatic system on the planet.”³⁰⁷ Marine Ecosystems are comprised of oceans, estuaries and salt marshes, coral reefs and coastal areas like lagoons.³⁰⁸ “More than 60% of the human population now lives on or near a coastline and 80% of tourism is concentrated in coastal areas; and these areas are some of the most fragile ecosystems and species and most continuously abused.”³⁰⁹ Areas like “mangroves, reefs, and seagrass beds protect coastlands by reducing wave action and helping to prevent erosion, while salt marshes and estuaries act as sediment sinks, filtering runoff from the land.”³¹⁰ In regards to available renewable freshwater resources, “about fifty-four percent is already appropriated by humanity for various uses – irrigated agriculture (70%), industry (22%) and domestic use (8%)”.³¹¹ Furthermore, Marine Ecosystems serve as the habitat to many species such as planktonic organisms, various fish species, birds, and large marine mammals.³¹² These Ecosystems are both food and shelter for marine animals, some of which face extinction.³¹³ With its many purposes, “protecting marine and coastal biodiversity is a priority and has been addressed through the establishment and management of Marine Protected Areas (MPAs)”.³¹⁴ MPAs are “any areas of intertidal or sub tidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment”.³¹⁵ In addition, “MPAs cover many different types of protection – some are ‘no-take zones’ that are essential to enable fish stocks to recover, while others allow multiple uses of their resources”.³¹⁶

Although Marine Ecosystems have strong connections to economic stability, “increases in human activities such as overfishing, coastal development, pollution, and the introduction of exotic species have caused significant damage and pose a serious threat to marine biodiversity”.³¹⁷ About 40 percent of the world oceans are “heavily affected” by human activity.³¹⁸ Marine and coastal resources and industries are valued at “an estimated \$3 trillion per year or about five percent of global GDP, with an estimated sixty three percent of global ‘ecosystems services’ provided by marine and coastal systems”.³¹⁹ Marine Ecosystems services include climate, water, nutrients, and carbon regulation, and have a non-market value estimated at twenty two trillion USD per year.³²⁰ There are also adverse effects on socioeconomic development in many member states because of the lack of access to water and sanitation.³²¹ Additionally, about “900 million people lack access to safe water and over 2.7 billion lack access to basic sanitation”.³²² In particular, Sub-Saharan Africa and Asia are experiencing significant losses due to access to water and sanitation. GDP in “India, Ghana and Cambodia are estimated at annual losses of 6.4%, 5.2% and 7.2%, respectively.”³²³

In response to concerns of marine sustainability, Eco-system-Based management plans address issues of governance. “Ecosystem-based management (EBM) is a place-based approach to natural resource use that aims to restore and protect the health, function and resilience of entire ecosystems for the benefit of all

³⁰⁷ United States Environmental Protection Agency. Marine Ecosystems. <http://www.epa.gov/bioiweb1/aquatic/marine.html>

³⁰⁸ Ibid.

³⁰⁹ International Union for Conservation of Nature. Marine Protected Areas – Why have them?.

http://www.iucn.org/about/work/programmes/pa/pa_what/?4646/Marine-Protected-Areas--Why-have-them/

³¹⁰ Ibid.

³¹¹ Ibid.

³¹² Ibid.

³¹³ United States Environmental Protection Agency. Marine Ecosystems. <http://www.epa.gov/bioiweb1/aquatic/marine.html>

³¹⁴ International Union for Conservation of Nature. Marine Protected Areas – Why have them?.

http://www.iucn.org/about/work/programmes/pa/pa_what/?4646/Marine-Protected-Areas--Why-have-them/

³¹⁵ Ibid.

³¹⁶ Ibid.

³¹⁷ United States Environmental Protection Agency. Marine Ecosystems. <http://www.epa.gov/bioiweb1/aquatic/marine.html>

³¹⁸ United Nations Development Programme. Water and Ocean Governance.

http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/focus_areas/water_and_ocean_governance.html

³¹⁹ Ibid.

³²⁰ Ibid.

³²¹ Ibid.

³²² Ibid.

³²³ Ibid.

organisms.”³²⁴ EBM provide a “framework for developing effective management plans based on an accepted set of guiding principles which include emphasize the health of the whole ecosystem and account for how actions affect each other”.³²⁵ EBM is “a long-term, integrated approach that recognizes humans are part of and have significant influences on their environments; and is a shift away from conventional, jurisdictional, short term management.”³²⁶ A successful plan “includes adaptive management strategies and trade-offs, whether between ecosystem services, management strategies or other components of the plan, which are made as explicitly as possible.”³²⁷

For instance, Integrated Water Resources Management (IWRM) is “a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.”³²⁸ This management system includes assessing national goals and water resource issues, policies and strategy; and developing an implementation plan and monitoring progress.³²⁹ IWRM “incorporates issues of equity, efficiency and environment, however work still needs to be done achieve its goals”.³³⁰ On the other hand, the United Nations Environment Programme (UNEP) has a “Marine and Coastal Ecosystems Branch (MCEB), yielded from its Medium Term Strategy, which focuses on the top issues of maintaining marine ecosystems and their services for human well-being.”³³¹ The UNEP MCEB uses its “Marine Ecosystems Unit (MEU), the Global Programme of Action for the Protection of the Marine Environment from Land based Activities (GPA), and the Regional Seas Programme (RSP) as a framework for regional and global cooperation for the protection of the marine environment”.³³² The Marine Ecosystems Unit (MEU) handles “resource management through the development and provision of tools, guidelines and implementation of demonstration projects, such as ecosystem-based adaptation and climate change vulnerability assessments.”³³³ The Global Programme of Action for the Protection of the Marine Environment from Land based Activities (GPA) goal is “to mitigate and prevent the degradation of the marine environment from land-based activities by facilitating the realization of the duty of States to preserve and protect the marine environment.”³³⁴ The GPA is the “only global programme addressing the interface between fresh water and the coastal environment and encourages countries to develop National Programmes of Action (NPA) to address priority issues based on the particular needs and capacities of their economies and institutions”.³³⁵ The Regional Seas Programme (RSP) “addresses the accelerating degradation of the world’s oceans and coastal areas through the sustainable management and use of the marine and coastal environment.”³³⁶ The RSP “also focuses on biodiversity, land-based sources of pollution, capacity building and education/awareness, as well as engaging neighboring countries in comprehensive and specific actions to protect their shared marine environment.”³³⁷

International Governing Documents and Organizations

At the close of the eighteenth century, nations understood that oceans adjacent to territorial coastlines were the exclusive property of the holding state, but the early measure of this territorial sea was three miles, then

³²⁴ SeaWeb. What is Ecosystem-based Management?. <http://www.seaweb.org/resources/ebm/whatisebm.php>

³²⁵ Ibid.

³²⁶ Ibid.

³²⁷ Ibid.

³²⁸ United Nations. Integrated Water Resources Management (IWRM). <http://www.un.org/waterforlifedecade/iwrm.shtml>

³²⁹ Ibid.

³³⁰ United Nations Development Programme. Water and Ocean Governance. http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/focus_areas/water_and_ocean_governance.html

³³¹ United Nations Environment Programme. Marine and Coastal Ecosystems. <http://www.unep.org/ecosystemmanagement/UNEPsWork/MarineandCoastalEcosystems/tabid/513/Default.aspx>

³³² Ibid.

³³³ Ibid.

³³⁴ United Nations Environment Programme. Marine and Coastal Ecosystems. <http://www.unep.org/ecosystemmanagement/UNEPsWork/MarineandCoastalEcosystems/tabid/513/Default.aspx>

³³⁵ Ibid.

³³⁶ Ibid.

³³⁷ United Nations Environment Programme. Marine and Coastal Ecosystems. <http://www.unep.org/ecosystemmanagement/UNEPsWork/MarineandCoastalEcosystems/tabid/513/Default.aspx>

the maximum range of coastal cannons.³³⁸ As no nation could own territory beyond this range, the ocean at large was under the seventeenth century freedom of the seas doctrine, or anarchy beyond another nation's vessels.³³⁹ This situation persisted until 1945 when the United States, wishing to cement its control of offshore resources, claimed all maritime territory to the North American continental shelf. A crisis developed as Member States began establishing arbitrary territorial limits with vastly differing rules for navigation and exploitation.³⁴⁰

The earliest attempt to provide comprehensive rules for marine governance was the 1958 UNCLOS I.³⁴¹ This led to the four 1958 Geneva conventions, which are the basis for all current international maritime agreements. These formed the official definitions of international debate and wrote the broad guidelines of naval law.³⁴² However, despite establishing the rules and obligations of Member States within territorial waters, the treaties failed to establish the geographical limits of this new zone.³⁴³ In an attempt to rectify this, as well as lingering issues on the sovereignty of fishing rights, delegates met for UNCLOS II in 1960. Unable to reach consensus, the conference closed with no additions to international law and would leave the issue until 1973.³⁴⁴

The oil embargo on the Middle East led to greatly increased interest in securing rights to the potential fossil fuel stockpiles held offshore.³⁴⁵ The result was the nine yearlong UNCLOS III and the drafting of the current Law of the Sea. This incorporated two major additions that would set the hard rules for maritime exploitation as well as sustainability. Member States received territorial waters extending to twelve nautical miles with Exclusive Economic Zones extending some 200 nautical miles from their shore and complete ownership of all resources therein.³⁴⁶ This figure gives control of eighty-five percent of hydrocarbon reserves and over ninety percent of prime fisheries to various coastal governments as exclusive assets. Further, nations with longer continental shelves have jurisdiction extending to 350 miles, while contributing profits from exploitation to the International Seabed Authority (ISA) for equal distribution to all other parties of the convention.³⁴⁷ The second major advance is in the establishment of clear rules and powers for marine conservation. Member States have environmental power over their EEZ's and the authority to enforce international agreements on vessels destined for their ports while making a vessel's flag state accountable for its actions against international agreements.³⁴⁸ Authority over the high seas and relevant seabed lies with the ISA, which possesses broad power to set rules governing its use and maintenance.

UNCLOS III further enshrined a basic responsibility for sustainable marine management to Member States and an encouragement to develop agreements that supported even greater conservation and sustainability.³⁴⁹ FAO's CCRF is a document that now guides the international community in more sustainable fisheries exploitation. Endorsed by the Earth Summit and Rio+20, the code provides wide-ranging guidelines to Member States on national marine policy designed to counter the clear decline in the overexploited fish market. Augmenting the actions of these bodies, the International Maritime Organization (IMO), a UN agency serving shipping corporations and operators, provides guidelines to ship captains on how to comply with international agreements and national policies.³⁵⁰ Through organizations

³³⁸ Background to UNCLOS. UNEP. <http://www.continentalshelf.org/about/1143.aspx>

³³⁹ UNCLOS Overview. United Nations. http://www.un.org/Depts/los/convention_agreements/convention_historical_perspective.htm#Historical%20Perspective

³⁴⁰ Ibid

³⁴¹ Background to UNCLOS. UNEP. <http://www.continentalshelf.org/about/1143.aspx>

³⁴² Ibid

³⁴³ Ibid

³⁴⁴ Ibid.

³⁴⁵ UNCLOS Overview. United Nations.

http://www.un.org/Depts/los/convention_agreements/convention_historical_perspective.htm#Historical%20Perspective

³⁴⁶ Ibid.

³⁴⁷ Ibid

³⁴⁸ Ibid

³⁴⁹ CCRF. FAO. <http://www.fao.org/docrep/005/v9878e/v9878e00.HTM#BAC>

³⁵⁰ Introduction to IMO. IMO. <http://www.imo.org/About/Pages/Default.aspx>

such as the IMO, the private sector has a voice in the designing and modifying of international instruments, in order to, efficiently answer maritime needs and realities.

Marine Abuses

Fish is quickly becoming one of the world's highest traded commercial goods.³⁵¹ The UNDP estimates the market value of marine and coastal resources to be about three trillion USD annually, close to five percent of the global GDP.³⁵² In addition to the growing trade in fish, shipping now accounts for ninety percent of global trade.³⁵³ In an effort to better control annual catch, many Member States have developed complex systems of aquaculture, or aqua farming. Aquaculture, providing for fifty percent (or 51.7 million tonnes) of the world's food consumption, is the most rapidly expanding form of food production to date.³⁵⁴ Compared to agriculture, aquaculture's use of resources is more productive, and its growth rates exceed thirty percent on an annual basis.³⁵⁵ For the expansion and success of aquaculture to continue, governance of aquaculture must ensure long-term stability of the resources involved in this food production sector.³⁵⁶ Over twenty-five percent of developing nations' protein consumption comes from domestic fishing; these numbers climb even higher in regions of the Asia-Pacific.³⁵⁷ Currently, the international fishery industry accrues 63 billion US dollars annually and employs at least 200 million people in fisheries-related jobs.³⁵⁸ Developing nations alone contribute over seventy percent to the production of capture fisheries.³⁵⁹ However, regions of the Asia-Pacific dominate the field of aquaculture, mostly due to China's extensive production, accounting for eighty-nine percent of world production.³⁶⁰

Although aquaculture is the fastest growing food producer in the industry, conversion of ocean waters for aqua cultural use is a major cause of degradation to the marine environment.³⁶¹ The FAO's Code gives Member States the right to fish and use aquatic resources, given that they accept the obligation to the responsible conservation and management of the resources they put to use.³⁶² In addition, the measures that nations take to ensure the conservation of marine ecosystems must not be restricted to target species or specific resources; rather, measures taken must ensure the conservation of all aspects of the marine environment.³⁶³ At the current rate of per capita fish consumption, FAO projections show that global aquaculture production must reach 80 million tonnes before 2050.³⁶⁴ FAO estimates that seventy-five percent of the world's fisheries have been severely or in some cases completely depleted due to poor fisheries management and inappropriately designed subsidies.³⁶⁵ However, the demand for fisheries' products is still increasing, and expects to increase further, fueled extensively by developing countries, which account for three times the consumption and production of developed nations.³⁶⁶ Worldwide, the percentage of threatened fish species rose approximately twelve percent from 2010 to 2011.³⁶⁷ In 2002

³⁵¹ Fisheries, International Trade and Sustainable Development. ICTSD.

http://ictsd.org/downloads/2008/06/fish_policypaper.pdf

³⁵² Water and Ocean Governance. UNDP.

http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/focus_areas/water_and_ocean_governance.html

³⁵³ Marine Environment. IMO. <http://www.imo.org/OurWork/Environment/Pages/Default.aspx>

³⁵⁴ Aquaculture. FAO. <http://www.fao.org/fishery/aquaculture/en>

³⁵⁵ Aquaculture Resources. FAO. <http://www.fao.org/fishery/topic/13530/en>

³⁵⁶ Governance of Aquaculture. FAO. <http://www.fao.org/fishery/topic/13542/en>

³⁵⁷ Fish Protein. UNEP. <http://www.unep.org/dewa/vitalwater/article176.html>

³⁵⁸ Fisheries, International Trade and Sustainable Development. ICTSD.

http://ictsd.org/downloads/2008/06/fish_policypaper.pdf

³⁵⁹ Ibid

³⁶⁰ State of World Aquaculture. FAO. <http://www.fao.org/fishery/topic/13540/en>

³⁶¹ Human Actions leading to Coastal Degradation. UNEP. <http://www.unep.org/dewa/vitalwater/article179.html>

³⁶² CCRF. FAO. <http://www.fao.org/docrep/005/v9878e/v9878e00.HTM#BAC>

³⁶³ Ibid

³⁶⁴ State of World Aquaculture. FAO. <http://www.fao.org/fishery/topic/13540/en>

³⁶⁵ Fisheries, International Trade and Sustainable Development. ICTSD. http://ictsd.org/downloads/2008/06/fish_policypaper.pdf

³⁶⁶ Ibid

³⁶⁷ 2011 Development Index. The World Bank. <http://data.worldbank.org/indicator/EN.FSH.THRD.NO?display=graph>

alone, over seventy-five percent of the world's fish production went solely towards human consumption purposes.³⁶⁸ However, the fishing industry is not the only hazard to the marine environments of the world.

The United Nations defines marine litter as any material made or used by people discarded, disposed of, or abandoned within coastal and marine ecosystems.³⁶⁹ Current estimates indicate that the world's oceans accrue 6.4 million tons of litter annually, with over 13,000 pieces of floating plastic found every square kilometer.³⁷⁰ It makes sense that coastal areas with higher population densities are the areas with the highest levels of coastal alteration and degradation.³⁷¹ In fact, studies prove this to hold true across the globe.³⁷² Yet, there is no limit to where the litter can travel; the currents of the oceans as well as the movements of the wind make it possible for pollution to reach any vast number of shores, waterways, and seabeds.³⁷³ The Rio+20's outcome document commits Member States to the cleanup of marine pollution by implementing frameworks and blueprints proposed by multiple conventions and organizations, including but not limited to the International Maritime Organization (IMO), as well as adopting may combative anti-pollution strategies.³⁷⁴ Though many programs currently exist to combat the ever-growing issue of marine litter, various studies from around the globe indicate the situation worsens with each passing year.³⁷⁵ Estimates today classify approximately forty percent of the world's oceans as "heavily affected" by human activities such as pollution, overfishing, and ecosystem losses.³⁷⁶ The amount of plastic pollutants in marine ecosystems has become so widespread that research shows microscopic plastics are a common occurrence within coastal and marine habitats.³⁷⁷ Furthermore, despite all the damages done to the world's marine ecosystems, only ten percent of marine territory is under protection by law.³⁷⁸ Although shipping now accounts for ninety percent of the world's transportation of trade goods, merchant shipping, and fishing vessels are the main source of marine litter, closely followed by offshore oil and gas platforms.³⁷⁹ Offshore drilling accounts for approximately twenty percent of the world's oil and natural gas.³⁸⁰ However, oil pollutants, excluding massive oil spills caused by mismanagement of tankers and drills, are constantly flowing into the oceans through coastal recreation and natural underwater sources.³⁸¹ Oil drillers use these natural seeps to identify possible reserves for human use; however, these seeps account for nearly fifty percent of the oceans' annual oil pollution.³⁸²

³⁶⁸ Fisheries, International Trade and Sustainable Development. ICTSD.

http://ictsd.org/downloads/2008/06/fish_policypaper.pdf

³⁶⁹ *Marine Litter: an Analytical Overview*. UNEP.

http://www.unep.org/regionalseas/marinelitter/publications/docs/anl_oview.pdf

³⁷⁰ Ibid

³⁷¹ Coastal Populations and Shoreline Degradation. UNEP. <http://www.unep.org/dewa/vitalwater/article180.html>

³⁷² 2011 Development Index. The World Bank.

<http://data.worldbank.org/indicator/EE.BOD.MTAL.ZS/countries/1W?display=map>

³⁷³ *Marine Litter: an Analytical Overview*. UNEP.

http://www.unep.org/regionalseas/marinelitter/publications/docs/anl_oview.pdf

³⁷⁴ The Future We Want. Rio+20.

<http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N12/381/64/PDF/N1238164.pdf?OpenElement>

³⁷⁵ *Marine Litter: an Analytical Overview*. UNEP.

http://www.unep.org/regionalseas/marinelitter/publications/docs/anl_oview.pdf

³⁷⁶ Water and Ocean Governance. UNDP.

http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/focus_areas/water_and_ocean_governance.html

³⁷⁷ *Marine Litter: an Analytical Overview*. UNEP.

http://www.unep.org/regionalseas/marinelitter/publications/docs/anl_oview.pdf

³⁷⁸ 2011 Development Index. The World Bank.

<http://data.worldbank.org/indicator/ER.MRN.PTMR.ZS/countries/1W?display=graph>

³⁷⁹ *Marine Litter: an Analytical Overview*. UNEP.

http://www.unep.org/regionalseas/marinelitter/publications/docs/anl_oview.pdf

³⁸⁰ Benefits of Marine and Coastal Ecosystems. UNEP. <http://www.unep.org/dewa/vitalwater/article168.html>

³⁸¹ Marine Oil Pollution. UNEP. <http://oils.gpa.unep.org/>

³⁸² Natural Sources. UNEP. <http://oils.gpa.unep.org/facts/natural-sources.htm>

Case Study: Fishery in the United Republic of Tanzania

Located on the coast of East Africa, the United Republic of Tanzania understands firsthand the importance of Marine Sustainability. Tanzania has both “marine and inland fisheries resources and its present annual fish catch is about 350,000 metric tons.”³⁸³ In addition, “the marine water covers 64,000 square kilometers which includes the Indian Ocean and the Exclusive Economic Zone which covers 223,000 square kilometers.”³⁸⁴ Tanzania borders “shared East African great lakes – Lakes Victoria, Tanganyika and Nyasa.”³⁸⁵ Tanzania also has “other small natural lakes, manmade lakes, river systems and many wetlands with fish potential, all of which 58,000 square kilometers.”³⁸⁶ In particular, “fishery has major socioeconomic and cultural importance in Tanzania, and also contributes significantly to food security.”³⁸⁷ Fishing is “a multispecies, involving variety of fishing gears and vessels and most coastal communities depend on marine resources for their livelihood.”³⁸⁸ Fishing has significantly contributed to employment as well with “80,000 fishermen who are permanently employed is and few others obtain their livelihood from the sector by being employed in the fishing and fishery related activities.”³⁸⁹ In addition, “artisanal fishermen produce about 90% of the total fish catch; only 10% is derived from industrial fishing.”³⁹⁰ Financially, “the contribution of the sector to GDP for the past five years has been staggering between 1.6 and 3.1%.”³⁹¹ Since it is on the shore, “local consumption and export is growing and multi-species fishery increasingly faces problems of local overexploitation.”³⁹² As a result, “locating fish has become extremely challenging, both in terms of suitable fishing grounds and costs of reaching there as near-shore fish stocks dwindle and move further offshore.”³⁹³ Although fisheries are “renewable resources, they are limited and have to be conserved, managed and developed on sustainable basis.”³⁹⁴

In response, Tanzania has worked on numerous efforts to bring sustainability to the forefront of the agenda. In 1992, Mafia Island habitants along with Shell Development Tanzania, Ltd., Tanzanian government agencies, World Wide Fund for Nature (WWF), and scientific entities “worked together to address the destruction of coral reefs there by fishers from outside the area who used dynamite as a fishing tool”.³⁹⁵ This was through “a series of workshops aimed at developing specific goals and objectives for management.”³⁹⁶ Recent fisheries policy identify and address issues had by fisheries and “sets focus is on the promotion of sustainable exploitation, utilization, and marketing of fish resources to achieve the intended national social economic objectives and protection of the aquatic environment to sustain development”.³⁹⁷ Further, with the assistance of public partners to identify areas with favorable biological and physical environmental variables for fish.³⁹⁸ “The Ministry of Livestock and Fisheries Development will use near-real time maps displaying this information and locations of Potential Fishing Zones (PFZs),

³⁸³ United Republic of Tanzania. Natural Resources. <http://www.tanzania.go.tz/naturalresourcesf.html>

³⁸⁴ Ibid.

³⁸⁵ Ibid.

³⁸⁶ United Republic of Tanzania. Natural Resources. <http://www.tanzania.go.tz/naturalresourcesf.html>

³⁸⁷ African Monitoring of the Environment for Sustainable Development (AMESD). AMESD Services are tested in Real Life Situations <http://www.amesd.org/component/content/article/64-context/148-amesd-services-are-tested-in-real-life-situations.html>

³⁸⁸ Ibid.

³⁸⁹ United Republic of Tanzania. Natural Resources. <http://www.tanzania.go.tz/naturalresourcesf.html>

³⁹⁰ Ibid.

³⁹¹ Ibid.

³⁹² United Republic of Tanzania. Natural Resources. <http://www.tanzania.go.tz/naturalresourcesf.html>

³⁹³ African Monitoring of the Environment for Sustainable Development (AMESD). AMESD Services are tested in Real Life Situations <http://www.amesd.org/component/content/article/64-context/148-amesd-services-are-tested-in-real-life-situations.html>

³⁹⁴ United Republic of Tanzania. Natural Resources. <http://www.tanzania.go.tz/naturalresourcesf.html>

³⁹⁵ United Nations Environment Programme. Taking Steps Toward Marine and Coastal Ecosystem-Based Management. http://www.unep.org/pdf/EBM_Manual_r15_Final.pdf

³⁹⁶ Ibid.

³⁹⁷ Ibid.

³⁹⁸ African Monitoring of the Environment for Sustainable Development (AMESD). AMESD Services are tested in Real Life Situations <http://www.amesd.org/component/content/article/64-context/148-amesd-services-are-tested-in-real-life-situations.html>

and in turn reduce the time and effort spent in searching for fishing ground.”³⁹⁹ On the other hand, in the spirit of interdependence, Tanzania participates in the “United Nations Educational, Scientific and Cultural Organization (UNESCO) University Twinning and Networking (UNITWIN) Cooperation Programme in Marine Biology and Sustainable Development for East Africa.”⁴⁰⁰ One of the objectives of this program was to “facilitate capacity building in marine research, training and policy advice in Tanzania, with a long term development objective of establishing a Regional Pole of Excellence in Marine Sciences and Technology”.⁴⁰¹ Paired its University of Dar es Salaam with the Bangor University, Wales for a project on Marine Sustainable Development in Tanzania, the relationship was to develop two postgraduate training courses in marine science to be implemented.⁴⁰²

Conclusion

The health of the world’s marine ecosystems is clearly in decline and without action the over exploitation and unchecked pollution threaten to destroy a key resource in the world’s long-term development strategy. The current body of International law provides Member States with the legal tools required to safeguard marine resources but without a redefinition of economically profitable sustainability the world’s oceans remain an unacceptably threatened region.

Committee Directive

This Background Guide (BGG) attempts to provide delegates with an overview of the economic challenges of marine sustainability and the need for decision on this issue. Delegates are encouraged to utilize the Technical Appendix Guide (TAG), which includes additional resources to aid comprehension and conference preparation.

In considering the subject it is important to keep in mind that the topic’s emphasis is on defining a relationship. It is the duty of the delegates to first debate and determine what exactly this new balance is to be. Will it provide a framework for future involvement on the issue? Actions taken without a contemporary definition of sustainable marine exploitation will be unable to effectively and efficiently produce change on the problem. The UNDP seeks to develop a comprehensive doctrine of marine management that falls within and further develops both UNCLOS and the actions of the FAO and IMO while holding true to the spirit of the Rio+20 conference.

Questions to consider:

- What are the UNDP’s long-term goals for marine sustainability and Member State economic development?
- Do limitations in exploitation hold true during economic hardship?
- Does the UN have the authority to safeguard resources in the face of human suffering?
- Does the maintenance of human populations supersede environmental concerns?
- Do national environmental agreements apply to impoverished local populations?
- Is sustainability a luxury of developed nations?
- Is sustainability realistic weighed against economic demand for marine products?

³⁹⁹ Ibid.

⁴⁰⁰ United Nations Educational, Scientific and Cultural Organization (UNESCO). UNITWIN Cooperation Programme in Marine Biology and Sustainable Development For East Africa (854). <http://www.unesco.org/en/unitwin/access-by-region/africa/United-Republic-of-Tanzania/unitwin-cooperation-programme-in-marine-biology-and-sustainable-development-for-east-africa-854/>

⁴⁰¹ Scientific Committee on Oceanic Research. Wales – Tanzania marine sciences partnership. www.scor-int.org/Capacity_Building/states/states_docs/Wales-Tanzania/Marine/Sciences/Partnership.doc

⁴⁰² Ibid.

Technical Appendix Guide

Topic I: Measuring the Economic Impact of Alternative Energy Projects in the Developing World

Energy Generation Quick Reference Table

Energy Type	Average Annual Fuel Cost per MW (thousand USDs)	Average Construction Cost per MW (million USDs)	Average Efficiency	Average CF	Average Price per kW/h (USD)
Wind	0	2.10	50%	25%	0.06-0.10
Biomass	23	1.5	71%	95%	0.08-0.10
Solar	0	5.78	75%	21%	0.14-0.18
Geothermal	0	2.83	17%	90%	0.04-0.07
Hydroelectric	0	1.3	90%	36%	0.03-0.12
Coal (Emission Controlled)	12	4.42	42%	85%	0.02
Natural Gas (Emission Controlled)	42	2.34	44%	87%	0.08

(Data combined from the following sources.) CRS Report for Congress Power Plants: Characteristics and Costs. Congressional Research Service. November 13, 2008, Biomass Combined Heat and Power Catalog of Technologies. US EPA. September 2007, Promotion of New and Renewable Sources of Energy. The United Nations General Assembly. 7 August 2007 Promotion of Wind Energy. UNDP-GEF. May 2008

Renewables 2011: Global Status Report. Renewable Energy Policy Network for the 21st Century.

http://www.ren21.net/Portals/97/documents/GSR/REN21_GSR2011.pdf

The document was used briefly in the topic but it is an in-depth report on renewable energy for 2011. It can provide a deeper understanding into how renewable systems work and to what extent they have achieved acceptance in various countries and regions. It is highly recommended that delegates familiarize themselves with power generation systems before discussion of topic one.

GEF: Global Environment Facility: Investing in Our Planet.

http://www.thegef.org/gef/gef_projects_funding

This is the global environment facilities search database of projects. It provides several different search criteria, but can provide delegates with an easy way to find out what UNDP and the GEF are doing in their country and the progress on those project's objectives. Delegates should at a minimum be aware of where their countries are on energy projects for topic one.

Topic II: Examining the Efficacy of International Agreements on Local Environmental Viability

Bulkeley, Harriet (2005). Reconfiguring Environmental Governance: Towards a Politics of Scales and Networks. *Political Geography Volume 24, Issue 8, November 2005, Pages 875–902*

<http://www.sciencedirect.com/science/article/pii/S0962629805000880>

This article looks at environmental governance from the political and regulatory aspects. In addressing the issue of space, scale, and connectedness in governance, the development of transnational networks is reviewed to highlight the importance of geography in addressing environmental issues. Further, this article will assist in understanding the larger picture of space and land configuration so it can be used strategically resolve issues of governance.

Earth Summit 2012 <http://www.earthsummit2012.org/>

This website is the portal for the Earth Summit 2012 initiative. This resource offers the opportunity to view various projects being executed for initiative, as well as the history, stakeholders, and timeline. This will be beneficial when researching on the current status of Rio+20.

Paavola, Jouni (2007). Institutions and Environmental Governance: A Reconceptualization *Ecological Economics Volume 63, Issue 1, 15 June 2007, Pages 93–103*

<http://www.sciencedirect.com/science/article/pii/S092180090600526X>

This article discusses the development of an institutional approach to environmental governance. Further, the article highlights the relations between environmental governance, global interdependence, environmental conflict, and social justice. It also lists basic environmental functions, such as regulation, monitoring, and enforcement. This article will be beneficial to identifying practical ways to tackle environmental governance as a global community.

Permanent Court of Arbitration. Environmental Dispute Resolution

http://www.pca-cpa.org/showpage.asp?pag_id=1058

This article from the Permanent Court of Arbitration discusses the development and use of environmental rules. Further, this article outlines the relationship between PCA environmental rules and MEAs, as well as briefly discusses the UNEP/PCA advisory group. This resource will offer legal examples of how environmental issues have been handled as a framework.

World Health Organization. Environmental Performance Reviews

<http://www.who.int/heli/impacts/environmperformreview/en/index.html>

This article gives another insight into the Environmental Performance Reviews (EPRs) developed and used by the United Nations Economic Commission for Europe (UNECE). More importantly, it highlights the use of EPRs to address health issues with the WHO. This article provides examples of what health indicators are used, and also displays an example of environment effecting policy that can be built on.

United Nations Development Programme. The Environment and Energy Thematic Trust Fund
<http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/EETTF/>

This article discusses the UNDP administered Environment and Energy Thematic Trust Fund (EETTF). This article reviews the EETTF's history in regards to donors and allocations, as well as current management and recent reports. Additionally, this article is beneficial as it provides information on a UNDP supported program.

United Nations Economic Commission for Europe (UNECE). Environmental Performance Reviews Home
<http://www.unece.org/env/epr/welcome.html>

This website is the hub for the UNECE Environmental Performance Reviews (EPRs). The EPRs are used by the UNECE's Committee on Environmental Policy with the objective of opening up discussion on environmental issues and bringing Member States to basic environmental standards and conditions. This website gives a framework as well as a measurement tool that can be used for assessment.

United Nations Environment Programme. World Congress on Justice, Governance and Law for Environmental Sustainability
<http://www.unep.org/delc/worldcongress/About/tabid/55695/Default.aspx>

This website goes into detail on the World Congress convened by the United Nations Environment Programme in Rio de Janeiro. Embarking on the United Nations Conference on Sustainable Development/Rio+20, the World Congress goal is to follow up on the success at the Global Judges Symposium in 2002 and reassess goals, vision, law, and approaches for the implementation environmental governance and spreading outcomes of Rio+20. This website also goes into the development of the World Congress in regards to preparation, objectives and outcomes, and its governance structure. This article will be instrumental with giving a current report of international efforts in governance, as well as what to look forward to.

Topic III: Redefining the Relationship between Marine Sustainability and Economic Development

UN Department of Economic and Social Affairs: Division for Sustainable Development. Core Publications Agenda 21. http://www.un.org/esa/dsd/agnenda21/res_agenda21_00.shtml

This is the Agenda 21 document of the United Nations Conference on Environment and Development (Earth Summit). In 1992, the Earth Summit was groundbreaking for both the way it brought Member States together and for the broad objectives they were able to agree on. This spirit is reflected in the Agenda 21 outcome document which formed the basis of what the UN has been working to achieve in environmental and development issues in the twenty years since. It is a valuable read that will aid delegates in understanding the contexts of Topic 3.

Environment. The World Bank: Working for a World Free of Poverty.
<http://data.worldbank.org/topic/environment>

This is a link to the World Bank's 2011 Development Indicators for the environment. While not all Member States report, it still provides a valuable resource for changes in marine ecosystems. Additionally, the website's graph portion can be used to compare and selectively manage data from different Member

States and regions. Delegates will find this a useful tool for assessing their home government's position and its place among other Member States.

A Blueprint for Ocean and Coastal Sustainability. An inter-agency paper towards the preparation of the UN Conference on Sustainable Development (Rio+20).

http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/pdf/interagency_blue_paper_ocean_rioPlus20.pdf

This PDF file is a cooperative document prepared in the run up to the Rio+20 conference and contains valuable data and analysis of trends within world oceans and an assessment of possible changes and their effects on current trends. Delegates will find this a relevant asset in their preparations and provide a background for solutions brought forward in committee.