

BRIGHAM YOUNG UNIVERSITY MODEL UNITED NATIONS CONFERENCE

Sponsored by the David M. Kennedy Center for International Studies
Friday, October 26, 2018 – Provo, Utah

SECRETARIAT

Jacob Stebbing
Security Council

Olivia Demordaunt
General Assembly Plenary

Nell Stevens
*General Assembly Fourth
Committee*

Emma Gleave
*United Nations Environment
Programme*

Aidan Houston
Model European Union

Marco Pesci
*Commission on Science and
Technology for Development*

Elizabeth Griffith
Human Rights Council

Cheyenne Rivera
*Organization of American
States*

Olivia Whiteley
Secretary General

Emily Jackson Thorn
Executive Director

DAVID M. KENNEDY
CENTER FOR
INTERNATIONAL STUDIES

Cory Leonard
Assistant Director

Bill Perry
MUN Instructor

Dear Delegates,

Welcome to the 29th annual Brigham Young University Model United Nations Conference (BYUMUN). I look forward to your participation in our committee, the United Nations Environment Programme (UNEP), where we will address several salient topics regarding current environmental problems.

My name is Emma Gleave and I will be serving as your committee director. I represented France in the UNEP at the New York MUN Conference in 2016. As part of the BYU MUN Team, I acquired many skills which have greatly enhanced my college experience and broadened my interests in international issues. Currently a junior, I am a Neuroscience major minoring in Psychology and Political Science here at BYU.

The topics slated for discussion in committee this year are:

- I. Solar Solutions: Bridging the Energy Gap for Off-Grid Settlements
- II. Addressing E-Waste with Technological Innovation

UNEP is the official environmental advisory arm of the United Nations, influencing agenda and policy-making worldwide to protect our planet. The committee works largely to promote sustainable development practices and the UN Sustainable Development Goals (SDGs).

The topics for this year represent just two small areas of focus for UNEP, and this background guide will act as an introduction providing a foundation for discussion. However, we anticipate a rich and full session as you prepare individually, researching your own innovative solutions to bring to conference.

Should you have questions or concerns, please feel at liberty to contact me via e-mail at the address below. I wish you the best of luck in your preparations and look forward to your innovative input and future contributions this Fall.

Best,

Emma Gleave

Director, United Nations Environment Programme

ejgleave@gmail.com

Committee History

*“A healthy planet depends on all of us.”
-UNEP Website Homepage, 2018*

Mission

The United Nations Environmental Programme (UNEP) functions as the leading authority worldwide on all environmental topics ranging from plastic pollution to sustainable development, and whose “mission is to provide leadership and encourage partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations.”¹ UNEP is the central component of the UN for coordination and advocacy of environmental issues among other UN entities, as well as external organizations including governments, Non-Government Organizations (NGOs), and other private groups.

History and Organization

The Stockholm UN Conference on the Human Environment in 1972 laid the groundwork for an official environmental appendage of the UN, with numerous environmental concerns being raised around international governance². UNEP was officially created as a recognized UN body following the adoption of Resolution 2997 (XXVII) during the December GA session in 1992 to take charge of environmental issues within the UN.³ Its main governing body is the UN Environmental Agency (UNEA)– formerly known as the UNEP Governing Council– made up of Member States, the Secretariat and Committee of Permanent Representatives, and Environmental Fund. UNEA reports to ECOSOC and the GA, and UNEP’s budget is received via the Environmental Fund, which relies on Member State/external donors.⁴

UNEP is primarily headquartered in Nairobi, Kenya, but also employs six regional offices globally in North America, Latin America and the Caribbean, Europe, Africa, West Asia, and Asia and the Pacific.⁵ These offices serve as important hubs for regional and local participation in environmental discussion, policy-making, and problem-solving, and provide a network for sub-regional concerns to surface at higher level UNEA and UNEP discussion.

Since establishment, UNEP has been involved in a number of conferences and collaborations on environmental issues, such as the UN Conference on Environment and Development (UNCED) or “the Rio de Janeiro Earth Summit” in 1992, where the *Rio Declaration on Environment and Development*⁶ was conceived, as well as *Agenda 21*⁷ adopted, which led to conception of Inter-Agency Committee on Sustainable Development (IACSD) to address environmental concerns. UNEP has significant management and authority within IACSD as

¹ Ibid.

² United Nations. "Report of the United Nations Conference on the Human Environment." Stockholm, 5-16 June 1972. Accessed June 04, 2018. http://www.un.org/ga/search/view_doc.asp?symbol=A/CONF.48/14/REV.1.

³ General Assembly, The United Nations. “Resolution 2997 (XXVII).” Accessed June 7, 2018. <http://www.un-documents.net/a27r2997.htm>.

⁴ "Funding for UN Environment." UN Environment. Accessed June 04, 2018. <https://www.unenvironment.org/about-un-environment/funding-un-environment>.

⁵ "Regional Presence– UN Environment." UN Environment. Accessed June 04, 2018. <http://web.unep.org/about/how-we-operate/regional-presence-office>

⁶ General Assembly, The United Nations. “Report of the United Nations Conference on Environment and Development– Rio de Janeiro, 3-14 June 1992.” Accessed June 7, 2018. <http://www.un-documents.net/a27r2997.htm>.

⁷ General Assembly, The United Nations. “Agenda 21 on Sustainable Development”. The United Nations Conference on Environment and Development– Rio de Janeiro, 3-14 June 1992.” Accessed June 7, 2018. <https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf>

a major task manager, since encouraging the theme of sustainability among “seven broad thematic areas: climate change, disasters and conflicts, ecosystem management, environmental governance, chemicals and waste, resource efficiency, and environment under review”.⁸

Recent History

More recently, UNEP has been highly focused on sustainable development and in 2012 organized a follow-up conference to the original Rio conference in 1992, “Rio +20”. At this summit, the body “shifted the focus of the ‘green economy’ agenda to the national and domestic level”, garnering hundreds of commitments from Member States to move toward “green economy” where poverty eradication and eco-friendly development coincide in *The Future We Want*.⁹ ¹⁰ As the deadline for the Millennium Development Goals (MDGs)¹¹ approached, Rio +20 served as a starting point for the Post-2015 Development Agenda and perhaps more importantly for the creation of UNEA to increase UNEP’s role as a leader and global authority on environmental issues.

While environmental topics made up 1 of the 7 MDGs (Goal 7, “Ensure Environmental Sustainability”), the 2030 Agenda for Sustainable Development includes 9 out of the 17 Sustainable Development Goals (SDGs)¹² focused on the environment. Goals 6, 7, 8, 9, 11, 12, 13, 14, and 15 each address various aspects of UNEP areas of work, including water sanitation and preservation, affordable/clean energy, green economic growth, sustainable transport and infrastructure to tackle climate change, sustainable consumption and management of natural resources, climate change and natural disasters, marine pollution, and ecosystem protection and deforestation.

Additionally, UNEP more recently launched a fresh campaign to combat climate change at the 2015 Paris Climate Conference, or Conference of Parties 21 (COP21), producing a landmark line of commitment from numerous Member States to keep global warming capped “with the aim of keeping global warming below 2°C”¹³. This commitment was revisited again at COP23 in Bonn, Germany as part of the yearly conferences reviewing progress in accordance with the original UN Framework on Climate Change (UNFCCC) from the original Rio Summit in 1992.¹⁴

⁸ United Nations Environment. “Why Does UN Environment Matter?” Accessed June 04, 2018. <https://www.unenvironment.org/about-un-environment/why-does-un-environment-matter>.

⁹ United Nations. “Future We Want - Outcome Document .. Sustainable Development Knowledge Platform.” Accessed June 05, 2018. <https://sustainabledevelopment.un.org/futurewewant.html>.

¹⁰ Council on Foreign Relations. “Examining Rio 20’s Outcome.” Accessed June 05, 2018. <https://www.cfr.org/expert-roundup/examining-rio20s-outcome>.

¹¹ United Nations. “United Nations Millennium Development Goals.” Accessed June 04, 2018. <http://www.un.org/millenniumgoals/>.

¹² United Nations. “United Nations Sustainable Development Goals.” Accessed June 04, 2018. <https://sustainabledevelopment.un.org/sdgs>.

¹³ COP 21 Paris.” Center for Climate and Energy Solutions. October 29, 2017. Accessed June 06, 2018. <https://www.c2es.org/content/cop-21-paris/>.

¹⁴ BMU - Mobil Wandel. “COP 23 - UN Climate Change Conference in Bonn.” Accessed June 06, 2018. <https://www.cop23.de/en/>.

Annotated Bibliography

BMU - Mobil Wandel. "COP 23 - UN Climate Change Conference in Bonn." Accessed June 06, 2018.
<https://www.cop23.de/en/>.

COP 23 or the 23rd Session of the Conference of the Parties to the U.N. Framework Convention on Climate Change (UNFCCC) was held in Bonn, Germany in 2017, and was notably praised for being a certifiably environmentally-friendly conference. Topics covered were a review of progress on items like the Sustainably Development Goals and more recent Paris Agreement.

COP 21 Paris." Center for Climate and Energy Solutions. October 29, 2017. Accessed June 06, 2018.
<https://www.c2es.org/content/cop-21-paris/>.

COP 21 or the 21st Session of the Conference of the Parties to the U.N. Framework Convention on Climate Change (UNFCCC) was the highly successful and politically well-attended convention held in Paris in December 2015, which resulted in landmark agreements on global greenhouse gas emissions limits and reduction goals for both developed and developing nations, known as the Paris Agreement.

Council on Foreign Relations. "Examining Rio 20's Outcome." Accessed June 05, 2018.
<https://www.cfr.org/expert-roundup/examining-rio20s-outcome>.

A publication from the Council on Foreign Relations, this document provides analysis on the success of the Rio+20 summit on environmental sustainability, held in Rio de Janeiro as a sort of anniversary and review of the original Rio summit, revealing that green economics and sustainability remain at the crux of UNEP's mission in 2012, and that individual nations have a large role to play in solving these issues.

General Assembly, The United Nations. "Agenda 21 on Sustainable Development". The United Nations Conference on Environment and Development– Rio de Janeiro, 3-14 June 1992." Accessed June 7, 2018.
<https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf>

This document outlines the action-plan of regarding the official creation at Rio in 1992 of a full sustainable development initiative.

General Assembly, The United Nations. "Report of the United Nations Conference on Environment and Development– Rio de Janeiro, 3-14 June 1992." Accessed June 7, 2018. <http://www.un-documents.net/a27r2997.htm>.

This report and the above listed resolution are essentially the founding document of UNEP, in which its creation was commissioned after passage in December, as part of the Rio Declaration on Environment and Development. It outlines the organizations purpose, governing council, specifies responsibilities, and funding.

General Assembly, The United Nations. "Resolution 2997 (XXVII)." Accessed June 7, 2018.
<http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm>.

This resolution and subsequent report are essentially the founding document of UNEP, in which its creation was commissioned after passage in December, as part of the Rio Declaration on Environment and Development. It outlines the organizations purpose, governing council, specifies responsibilities, and funding.

United Nations Environment. "About– UN Environment." Accessed June 04, 2018.
<https://www.unenvironment.org/about-un-environment>.

This is the main page from UNEP website, describing its purpose as an advocate for global environmental issues.

United Nations Environment. "Funding for UN Environment." Accessed June 04, 2018.
<https://www.unenvironment.org/about-un-environment/funding-un-environment>

This portion of the UNEP website explains how the current funding system is set up within the bounds of the UN, including donor statistics.

United Nations Environment. "[Regional Presence](http://web.unep.org/about/how-we-operate/regional-presence-office)– UN Environment." Accessed June 04, 2018.
<http://web.unep.org/about/how-we-operate/regional-presence-office>

This portion of the UNEP website lays out the current organization of the body, including its 6 regional offices from which it governs, aside from the main one located in Nairobi, Kenya.

United Nations Environment. "Why Does UN Environment Matter?" Accessed June 04, 2018.
<https://www.unenvironment.org/about-un-environment/why-does-un-environment-matter>

This page from the UNEP website discusses a few of the relevant topics the body deals with and their international impact, outlining 7 main thematic areas: disasters and conflicts, environmental governance, climate change, resource efficiency, environment under review, ecosystem management, and chemicals and waste.

United Nations. "Future We Want - Outcome Document: Sustainable Development Knowledge Platform." Accessed June 05, 2018. <https://sustainabledevelopment.un.org/futurewewant.html>.

This document from the UN General Assembly builds off GA Res. 64/236 of 24 December 2009 in reinforcing the UN Conference on Sustainable Development, and discusses progress of eradicating poverty, strengthening international law, and upholding previously-passed documents like those from the Rio Conventions in pursuing sustainable development, among many things as it was adopted as part of Rio+20.

United Nations. "Report of the United Nations Conference on the Human Environment." Stockholm, 5-16 June 1972. Accessed June 04, 2018.
http://www.un.org/ga/search/view_doc.asp?symbol=A/CONF.48/14/REV.1.

This 1972 UN report represents the earliest formal documentation involving a variety of economic issues that was the precursor to the creation of UNEP, outlining topics such as green economy and environmental action, and served as a building block for later resolutions and summits to build off of in pursuing sustainable development.

United Nations. "United Nations Millennium Development Goals." Accessed June 04, 2018.
<http://www.un.org/millenniumgoals/>.

The precursors to the newer Sustainable Development Goals, the Millennium Development Goals were 8 broader categories that overlap with the SDGs somewhat, targeting development in areas of poverty reduction, public health improvements with HIV/AIDS, etc., all leading up to the deadline of 2015.

United Nations. "United Nations Sustainable Development Goals." Accessed June 04, 2018.
<https://sustainabledevelopment.un.org/sdgs>.

This webpage is the main page providing an overview of the 2030 Agenda for Sustainable Development's Sustainable Development Goals (SDGs). These 17 goals build off the former Millennium Development goals, and represent the major sectors of desired progress for global betterment, from poverty eradication to environmental issues discussed here.

I. Solar Solutions: Bridging the Energy Gap for Off-Grid Settlements

“The productive use of energy is what turns access into economic development, and what ensures that investments in electricity infrastructure are economically viable. But that means looking beyond satisfying households basic needs to achieving transformational energy access – satisfying producers’ needs for adequate, reliable and affordable energy.”

- Mukhisa Kituyi, UNCTAD Secretary-General

Introduction

As a primary advocate for global environmental issues, the United Nations Environmental Programme (UNEP) seeks to manage and prevent pollution and climate change. Noting that poverty often correlates to greater waste and less environmentally-friendly practices¹⁵ UNEP promotes sustainable development in tandem with its neighboring UN branches. One of the greatest roadblocks to socioeconomic mobility is a lack of access to power. As highlighted by university academics and researchers for *Science Advances*, “[e]conomic studies show that electricity access holds considerable potential to improve household incomes, increase educational attainment, enhance access to media, and boost convenience in everyday life”.¹⁶

In developing nations, entire segments of the population often live in what are termed “off-grid settlements,” meaning populated areas in which people are “[n]ot using or depending on public utilities, especially the supply of electricity.”¹⁷ Indeed, one major issue of concern for UNEP is the fact that “1 billion people worldwide live without electricity,” a resource essential for achieving economic well-being. Unfortunately, progress is slow. The UN *Frontiers 2017* report on emerging environmental issues stated, “it is projected that nearly 780 million people could still remain off-grid in 2030.”¹⁸ However, recent advances in technology have led to the invention of solar energy systems, such as solar panels and smaller-scale lamps, which provide promising potential to helping achieve the Sustainable Development Goal (SDG) of universal energy access by 2030.¹⁹ UNEP, which is committed to achieving the 2030 Agenda for Sustainable Development, notes that, “[w]ith the right policies and regulations on renewable energy and a clear vision of future possibilities, off-grid solar could be key to achieving...universal access to affordable, reliable and modern energy services, and for eliminating poverty.”²⁰

It is important to distinguish between those who deliberately seek an “off-grid lifestyle” with those living in an entirely off-grid settlement due to lack of resources or public infrastructure. Frequently those who choose to live off-grid may be “looking for a way to live in harmony with and lessen their impact on the environment,”²¹ and typically already possess adequate economic resources to ensure their lifestyle choice yields overall ecological benefit. However, individuals in underdeveloped off-grid settlements do not have the same choice nor resources to start with. A study in India published in *Science Advances* in 2017 revealed that “many households in remote rural communities are not electrified because of the high cost of extending the electricity grid.”²² These

¹⁵ Boyce, James K. "Inequality as a Cause of Environmental Degradation." *Ecological Economics* 11, no. 3 (1994): 169-78. doi:10.4337/9781843766971.00010.

¹⁶ Aklin, Michaël, Patrick Bayer, S. P. Harish, and Johannes Urpelainen. "Does Basic Energy Access Generate Socioeconomic Benefits? A Field Experiment with Off-grid Solar Power in India." *Science Advances*. May 01, 2017. Accessed June 10, 2018. <http://advances.sciencemag.org/content/3/5/e1602153>

¹⁷ Oxford Dictionary. "Definition of Off-grid | English Oxford Dictionary." Oxford Dictionaries | English. Accessed June 9, 2018. <https://en.oxforddictionaries.com/definition/off-grid>.

¹⁸ United Nations Environment. "Frontiers 2017: Emerging Issues of Environmental Concern." Accessed June 14, 2018. <https://www.unenvironment.org/resources/frontiers-2017-emerging-issues-environmental-concern>.

¹⁹ United Nations. "Goal 7 :: Sustainable Development Knowledge Platform." Accessed June 6, 2018. <https://sustainabledevelopment.un.org/sdg7>.

²⁰ Supra note 4.

²¹ Outram, Eric. "Living off the Grid." *Earth Common Journal* 1, no. 1 (September 2011): 22-38. Accessed June 15, 2018. <https://journals.macewan.ca/earthcommon/article/download/10/19/>.

²² Supra note 3.

communities do not choose to forgo the use of technological advancements, they are financially constrained to live without electricity. Sustainable development is needed to protect the environment and reduce poverty.

Innovations and Challenges in Rural versus Urban Contexts

A 2014 UN report revealed that “1.06 billion people, predominantly rural dwellers, still function without electricity. Half of those people live in sub-Saharan Africa.”²³ While expanding solar technologies certainly remains a global issue, it disproportionately affects developing nations, most noticeably in sub-Saharan Africa, as well as India and other areas of Asia.²⁴ The benefits of extending solar capacities to populations living in these highly off-grid nations are substantial; “Economic studies show that electricity access holds considerable potential to improve household incomes, increase educational attainment, enhance access to media, and boost convenience in everyday life,” according to the 2017 *Science Advances* journal publication.²⁵

In primarily rural areas, “[s]olar energy was among the first renewable energy technologies adopted globally to meet the basic electricity needs of off-grid populations”.²⁶ Solar power provides a powerful alternative and greater sustainability as a renewable energy source

“[i]n remote rural communities, [where] the cost of solar power can fall below the cost of grid extension.”²⁷ However, despite the potential of solar energy, economic access to such technologies still remains an issue for many Member States. Studies recently conducted in 15 Rwandan villages “show that adoption [of solar solutions] will be impeded by affordability, suggesting that policy would have to consider more direct promotion strategies such as subsidies or financing schemes to reach the UN goal.”²⁸

Additional concerns for consideration include the scope and quality of the energy source, since high communal usage times may also impede effectivity. In India, during times “[w]hen only small loads of power are available, households may not have enough energy for productive uses with transformative potential. Electrification programs that rely on off-grid technologies must consider the trade-offs between the complexity, the costs, and the benefits of these systems”²⁹, to ensure that the quantity and quality of power made available to individuals and businesses will be sufficient to actually improve their current energy capabilities and support growing economic opportunities.

While off-grid areas are typically rural, urban populations can also lack access to adequate technological infrastructure and power. The UN reports that “[c]urrently, about one-quarter of the urban population in developing regions, or some 881 million people, live in informal settlements and many live without access to electricity”³⁰, categorizing them as off-grid, despite the acknowledgement that “cities have become the main driver of economic development.”³¹ Though these off-grid settlements may lack infrastructure for on-grid electricity, solar energies have reached populations through an increase of personal power mechanisms sold “in Africa and Asia, where at least 95 per cent of the world’s off-grid population reside.”³² Among ways to render

²³ Supra note 6.

²⁴ UNCTAD. “Technology and Innovation Report 2011”. Report. 2011. 5. Accessed June 14, 2018. http://unctad.org/en/Docs/tir2011_en.pdf.

²⁵ Supra note 3.

²⁶ Supra note 5.

²⁷ Supra note 3.

²⁸ Grimm, Michael, Munyehirwe, Anicet, Peters, Sievert, and Maximiliane. "First Step up the Energy Ladder? Low Cost Solar Kits and Household's Welfare in Rural Rwanda | The World Bank Economic Review | Oxford Academic." OUP Academic. October 20, 2016. Accessed June 16, 2018. <https://academic.oup.com/wber/article/31/3/631/2433616>.

²⁹ Supra note 3.

³⁰ Supra note 5.

³¹ United Nations Environment. "Seizing the Opportunity :: Our Planet - UN Environment." Accessed June 7, 2018. <http://web.unep.org/ourplanet/october-2016/articles/seizing-opportunity>.

³² Supra note 5.

possible such access to personal power mechanisms “have been successful roll-outs of solar products with improved batteries, lower capital costs, affordable financing and easy access to pay-as-you-go schemes.”³³

However, concerns have risen about the amount of power available to urban off-grid populations, especially as solar energy may even serve as a replacement to more traditional energy sources. Current urban practices are unsustainable; Habitat III Secretary-General and UN-Habitat Executive Director Joan Clos reported that “our cities consume 78 per cent of the world’s energy, produce more than half of all greenhouse gas emissions and consume much more land than is needed, with consequent environmental impacts.”³⁴

Providing access to energy for individuals and households constitutes one major focus of the push for harnessing solar technologies in off-grid settlements. However, sufficient energies also should be extended to supporting large-scale, even corporate, economic development among more developed Member States. Discussing Goal 7 of the SDGs, Mukhisa Kituyi, the Secretary General at the UN Conference on Trade and Development (UNCTAD) in 2017, emphasized the importance of considering not only the basic energy needs of households, but those of expanding businesses and corporations as well: “For electrification to transform LDC economies, modern energy provision needs to spur productivity increases and unlock the production of more goods and services.”³⁵

It is important to note, however, that there is not a one-size-fits-all technological or policy solution to bridging the energy gap; each individual country must evaluate a number of viable energy solutions to determine which practices and technologies will be best suited to their political, environmental, and economic circumstances. However, numerous resources do exist to aid Member States in identifying areas for change, such as the Technology Bank for the Least Developed Countries and other UN reporting programs like the Kyoto Protocol and UN Framework Convention on Climate Change (UNFCCC).^{36 37}

The Role of Governments, Banks, and Other Promising Partners

Governments may play a crucial role in bridging the energy gap, as they control much of the policy and resources available to those living off the grid. Member States adherence to important obligations under UNFCCC and the Kyoto protocol serve as policy guides, though enforcement of such agreements proves difficult for a body like UNEP, which lacks an authoritative enforcement unit.

While governments represent one powerful sector pursuing solar technologies, achieving the SDGs by 2030 will require greater partnerships, including the involvement and partnership of Banks, similar non-government organizations (NGOs), and funds. Since the central challenge of expanding off-grid solar is financial, innovations have and hopefully will continue to focus on creating more affordable systems for installation. Banks and global funds such as Green Climate Fund, the African Development Bank, and Africa50 may

³³ Ibid.

³⁴ Supra note 18.

³⁵ Supra note 1.

³⁶ United Nations. "With Access to Clean, Modern Energy, Poorer Countries Look to Power Ahead through Innovation – UN Report | UN News." Accessed June 16, 2018. <https://news.un.org/en/story/2017/11/636982-access-clean-modern-energy-poorer-countries-look-power-ahead-through-innovation>.

³⁷ United Nations. "Kyoto Protocol To The United Nations Framework ... - UNFCCC." 1998. Accessed June 17, 2018. <https://unfccc.int/resource/docs/convkp/kpeng.pdf>.

contribute to more successful implementation by participating in finance schemes,³⁸ offering small low-interest loans or microcredit, or encouraging community cost-sharing to make these technologies accessible.³⁹

Questions to Consider

1. What technological innovations could render solar solutions more affordable to developing nations?
2. What kinds of solutions are needed specifically for urban populations off-grid?
3. How can governments better incentivize banks and other funds/partners to aid in distributing and developing solar technologies?

³⁸ Green Climate Fund Newsroom. "GCF, African Development Bank and Africa50 Signal Support for Desert to Power Programme." May 25, 2018. Accessed June 18, 2018. (1) <https://www.greenclimate.fund/-/gcf-african-development-bank-and-africa50-signal-support-for-desert-to-power-programme?inheritRedirect=true&redirect=/what-we-do/newsroom/news-stories>.

³⁹ Sovacool, Benjamin K. "Deploying Off-Grid Technology to Eradicate Energy Poverty." *Science Mag*. October 05, 2012. Accessed June 18, 2018. <http://science.sciencemag.org/content/338/6103/47.full>.

Annotated Bibliography

Aklin, Michaël, Patrick Bayer, S. P. Harish, and Johannes Urpelainen. "Does Basic Energy Access Generate Socioeconomic Benefits? A Field Experiment with Off-grid Solar Power in India." *Science Advances*. May 01, 2017. Accessed June 10, 2018. <http://advances.sciencemag.org/content/3/5/e1602153.full>.

As described in its Abstract, this publication is focused on the assessment of success and experience with solar microgrids, particularly in India. It importantly addresses many of the benefits, but also the challenges associated with electrification, such as quality and quantity of the power source.

Boyce, James K. "Inequality as a Cause of Environmental Degradation." *Ecological Economics* 11, no. 3 (1994): 169-78. doi:10.4337/9781843766971.00010.

This journal publication discusses various theories about the connectedness of environmental damages and degradation in respect to factors of poverty and resource-control as well as wealth.

"Frontiers 2017: Emerging Issues of Environmental Concern." UN Environment. Accessed June 14, 2018. <https://www.unenvironment.org/resources/frontiers-2017-emerging-issues-environmental-concern>.

This publication from UN Environment expounds on the current issues and areas of environmental concern worldwide as of 2017. Solar energy and off-grid settlements constitute one of these areas.

"GCF, African Development Bank and Africa50 Signal Support for Desert to Power Programme." Green Climate Fund Newsroom. May 25, 2018. Accessed June 18, 2018. (1) <https://www.greenclimate.fund/-/gcf-african-development-bank-and-africa50-signal-support-for-desert-to-power-programme?inheritRedirect=true&redirect=/what-we-do/newsroom/news-stories>.

This news article from the Green Climate Fund Newsroom discusses a collaboration between three international organizations in order to make solar power more accessible in Africa, particularly to the Sahel region. The three parties involved in this development project are the Green Climate Fund, the Africa50 investment fund and the African Development Bank.

Grimm, Michael, Munyehirwe, Anicet, Peters, Sievert, and Maximiliane. "First Step up the Energy Ladder? Low Cost Solar Kits and Household's Welfare in Rural Rwanda | The World Bank Economic Review | Oxford Academic." *OUP Academic*. October 20, 2016. Accessed June 16, 2018. <https://academic.oup.com/wber/article/31/3/631/2433616>.

This article evaluates the 2030 Sustainable Development Agenda at work in rural Rwanda, particularly in regard to electrification methods to promote sustainable development via low-cost kits and technologies for off-grid.

Oxford Dictionary. "Definition of Off-grid | English Oxford Dictionary." Oxford Dictionaries | English. Accessed June 9, 2018. <https://en.oxforddictionaries.com/definition/off-grid>.

The basic definition of off-grid as provided by the Oxford Dictionary, which can be applied in context to the discussion of off-grid settlements.

Outram, Eric. "Living off the Grid." Earth Common Journal 1, no. 1 (September 2011): 22-38. Accessed June 15, 2018. <https://journals.macewan.ca/earthcommon/article/download/10/19/>.

This journal publication discusses in further depth what it means to live off-grid, and various contexts in which this may be achieved. Though tailored more for a conversation on voluntary off-grid living, elements of the article still apply to an off-grid settlement that merely lacks infrastructure to be on the grid.

Sovacool, Benjamin K. "Deploying Off-Grid Technology to Eradicate Energy Poverty." Science Mag. October 05, 2012. Accessed June 18, 2018. <http://science.sciencemag.org/content/338/6103/47.full>.

This journal publication highlights the connection between poverty reduction and implementation of sustainable off-grid technologies such as solar power to encourage development. It includes discussion of various methods for implementation including microcredit, community cost-share, and other models for economic advancement.

UNCTAD. "Press Release, November 22, 2017". Accessed June 18, 2018. <http://unctad.org/en/pages/PressRelease.aspx?OriginalVersionID=436>.

This press release from the United Nations Conference on Trade and Development in 2017 discusses the progress and challenges of the world's developing nations, which largely depends on factors of accessible energy options for development. It provides updates on countries' progress, and what additional supports could be beneficial to pursuing SDG 7.

UNCTAD. "Technology and Innovation Report 2011". Report. 2011. Accessed June 14, 2018. http://unctad.org/en/Docs/tir2011_en.pdf.

This report from the United Nations Conference on Trade and Development in 2011 is a compilation of progress, shortcomings, and new technologies within the context of renewable energy and sustainable development in the face of climate change.

United Nations. "Goal 7 :: Sustainable Development Knowledge Platform." Accessed June 6, 2018. <https://sustainabledevelopment.un.org/sdg7>.

Goal 7 of the Sustainable Development Goals focuses on encouraging modernized, sustainable access to energy that will be widely affordable, which effort may be helped greatly by the continuing distribution and innovation of solar power technologies.

United Nations. "Kyoto Protocol To The United Nations Framework - UNFCCC." 1998. Accessed June 17, 2018. <https://unfccc.int/resource/docs/convkp/kpeng.pdf>.

A landmark protocol, this document from 1998 outlines guidelines and agreements on reducing emissions in acknowledging threats related to climate change. The protocol focuses most heavily on industrialized nations, as moderation for greenhouse gases and their damages to the atmosphere.

United Nations. "With Access to Clean, Modern Energy, Poorer Countries Look to Power Ahead through Innovation – UN Report | UN News." Accessed June 16, 2018. <https://news.un.org/en/story/2017/11/636982-access-clean-modern-energy-poorer-countries-look-power-ahead-through-innovation>.

This UN News report discusses the progress of the world's lesser-developed countries in regard to sustainable development, including Sustainable Development Goal 7 for clean, accessible energy options for all.

United Nations Environment. "Seizing the Opportunity :: Our Planet - UN Environment." Accessed June 7, 2018. <http://web.unep.org/ourplanet/october-2016/articles/seizing-opportunity>.

This page, from the infrastructure-occupied UN Habitat III branch of the UN, provides applicable commentary on cities and their significance in development. Additionally, it emphasizes the role of urban planning on environment to ensure sustainability of settlements.

II. Addressing E-Waste with Technological Innovation

"We are witnessing an unprecedented amount of electronic waste rolling out over the world. Not only does it account for a large portion of the world's non-recycled waste mountain, but it also poses a growing threat to human health and the environment, due to the hazardous elements it contains."
-Achim Steiner, UN Under-Secretary-General and Executive Director of UNEP

Introduction

The technological innovations of the last few decades have provided incredible opportunities for growth and economic development, offering a seemingly infinite number of creative solutions to the world's most pressing issues—many of which have yet to be fully discovered. Equally as unpredictable as these developmental opportunities, however, are the vast number of unforeseen challenges that accompany growth. From the leaking of toxic chemicals into the environment to the ethical issues of what populations are systematically exposed to them, proper management of technological waste (e-waste) has become a top priority within the United Nations (UN). Economic development constitutes one of the main focuses for the UN 2030 Agenda for Sustainable Development, which emphasizes the role of technology within several of the Sustainable Development Goals (SDGs), notably SDGs 12, 13, and 9.⁴⁰ Each of these goals also contain sub-goals that specifically address issues of responsible consumption and production⁴¹, climate action⁴², and the need for new technological innovation in industry and infrastructure⁴³—including the need for a plan to manage e-waste resulting from technological upgrades, and further protocol such as that of the 1989 Basel Convention, which introduced for the first time restrictions on transporting hazardous wastes across borders.⁴⁴ As populations grow and modernize, and, as waste increases, innovation in technology will be “key to addressing environmental degradation, climate change, food scarcity, waste management, and other pressing global challenges.”⁴⁵

Electronic waste (e-waste), also referred to as “e-scrap” and “end-of-life electronics” are terms often used to describe used electronics that are nearing the end of their useful life, and are discarded, donated or given to a recycler.⁴⁶ One major issue surrounding e-waste is that high turnover from technological material goods like phones, computers, and televisions, leads to a vast sum of hard waste in landfills. The United State's Environmental Protection Agency (EPA) reported in 2017 that only an estimated 25% of the nation's e-waste was captured for recycling.⁴⁷

UNEP acknowledges that technological advancements can be both highly beneficial and seriously detrimental to society and the environment, noting on their webpage that “technologies used for treating waste help solve

⁴⁰ United Nations. "SDGs ∴ Sustainable Development Knowledge Platform." Accessed June 6, 2018. <https://sustainabledevelopment.un.org/sdgs>.

⁴¹ United Nations. "Goal 12 ∴ Sustainable Development Knowledge Platform." Accessed June 6, 2018. <https://sustainabledevelopment.un.org/sdg12>.

⁴² United Nations. "Goal 13 ∴ Sustainable Development Knowledge Platform." Accessed June 6, 2018. <https://sustainabledevelopment.un.org/sdg13>.

⁴³ United Nations. "Goal 9 ∴ Sustainable Development Knowledge Platform." Accessed June 6, 2018. <https://sustainabledevelopment.un.org/sdg9>.

⁴⁴ United Nations Environment Programme. "Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal." Basel Convention—1989. Accessed June 21, 2018. <http://www.basel.int/Portals/4/BaselConvention/docs/text/BaselConventionText-e.pdf>.

⁴⁵ United Nations Environment. "Why Does Technology Matter?" Accessed June 21, 2018. <https://www.unenvironment.org/explore-topics/technology/why-does-technology-matter>.

⁴⁶ EPA. "Cleaning Up Electronic Waste (E-Waste)." December 11, 2017. Accessed June 14, 2018. <https://www.epa.gov/international-cooperation/cleaning-electronic-waste-e-waste>.

⁴⁷ Ibid.

environmental problems whereas refrigeration and air-conditioning systems that use ozone-depleting refrigerants have huge environmental impacts associated with their use.”⁴⁸

With this in mind, the UNEP encourages the sustainable development of more environmentally-friendly technologies and recognizes the need for adequate waste-management practices to protect the environment from the potentially hazardous byproducts of tech and hardware already in circulation.

Economic and Ethical Factors of E-Waste

One of the major challenges surrounding the issue of e-waste management is environmental discrimination. Existing e-waste managerial practices disproportionately impact minority populations. While more-developed countries are more likely to contribute toward waste generation, less-developed countries often host disposal sites and become responsible for managing pollution. Some developing countries, such as Ghana, have no limits on e-waste’s importation.⁴⁹ Worldwide, e-waste production is skewed non-distributionally toward developing countries. The Population Reference Bureau reports that, “Roughly 40 million metric tons of electronic waste (e-waste) are produced globally each year, and about 13 percent of that weight is recycled mostly in developing countries.”⁵⁰ Thus, as more industrialized nations continue to produce and develop newer technologies and leave behind older tech, the market for e-waste disposal becomes more lucrative. Developing nations buy e-waste with the hope of salvaging precious metals like platinum or gold that may be embedded in the scrap metal, despite the landmark 1989 Basel Convention, which prohibited the transportation of hazardous waste for disposal across borders.⁵¹

While economically this may not appear to pose any grave ethical dilemmas, often times the working conditions for those recycling these metals in less-developed parts of the world are hazardous. This is, in part, why it is more cost effective for big corporations or even governments to ship their e-waste overseas. Facilities and specialized equipment for safe recycling are expensive to run.⁵² The profit-margin is more favorable to selling and shipping the waste abroad rather than processing it at home, increasing the likelihood of smuggling or illegal shipment in a “global waste market... worth around \$410 billion a year”.⁵³ As a result, the ethical and environmentally-conscious e-waste disposal and recycling processes are frequently disregarded, as states protect profit margin over people.

However, despite increased production of e-waste among more industrialized countries, production is also growing among developing nations. Researchers publishing in the *Journal of Health and Pollution* wrote, “Although technologically developed countries are the main source of e-product production and e-waste generation, the generated volume has also been increasing in developing countries and those in transition due to transport and transfer from e-waste source countries.”⁵⁴ As “the fastest growing waste stream in the world at

⁴⁸ Supra note 7.

⁴⁹ Heacock, Michelle, Carol Bain Kelly, Kwadwo Ansong Asante, Linda S. Birnbaum, Åke Lennart Bergman, Marie-Noel Bruné, Irena Buka, David O. Carpenter, Aimin Chen, Xia Huo, Mostafa Kamel, Philip J. Landrigan, Federico Magalini, Fernando Diaz-Barriga, Maria Neira, Magdy Omar, Antonio Pascale, Mathuros Ruchirawat, Leith Sly, Peter D. Sly, Martin Van Den Berg, and William A. Suk. "E-Waste and Harm to Vulnerable Populations: A Growing Global Problem." *Environmental Health Perspectives* 124, no. 5 (2015). Accessed June 15, 2018. doi:10.1289/ehp.1509699.

⁵⁰ Population Reference Bureau. "The Human and Environmental Effects of E-Waste." April 4, 2013. Accessed June 21, 2018. <https://www.prb.org/e-waste/>.

⁵¹ Supra note 6.

⁵² Grant, Kristen, Fiona C. Goldizen, Peter D. Sly, Marie-Noel Brune, Maria Neira, Martin Van Den Berg, and Rosana E. Norman. "Health Consequences of Exposure to E-waste: A Systematic Review." *The Lancet Global Health* 1, no. 6 (October 20, 2013). Accessed June 24, 2018. doi:10.1016/s2214-109x(13)70101-3.

⁵³ Supra note 1.

⁵⁴ Md. Sahadat Hossain, Sulala M.Z.F. Al-Hamadani, and Md. Toufiquir Rahman. "E-waste: A Challenge for Sustainable Development". *Journal of Health and Pollution* Vol. 5, No. 9 (December 2015), pp. 3-11.

present”, and a direct result of rapid industrialization of the developing world, the need for sustainable development plans also must coincide with efforts to both reduce and treat e-waste.⁵⁵

Chemical and Health Hazards to E-Waste

Given that the distribution of e-waste is stacked toward developing nations, the health hazards that can accompany managing it disproportionately affect developing nations. Further increasing health hazards, the working conditions of most e-waste processing sites in developing countries are less regulated and ill-suited for human health. Ghana’s Agbogbloshie region, population of 40,000, receives 215,000 tons of secondhand electronics due to lack of restriction on imports of e-waste, making it “one of the largest informal e-waste dumping and processing sites in Africa.”⁵⁶

At best, management of e-waste occurs in a controlled and formal recycling plant where potential hazards can be minimized.⁵⁷ Sustainable e-waste management will require recycling plants equipped with new innovative solutions that minimize the impact of hazardous chemicals on both recyclers and the environment. Unfortunately, due somewhat to some of the economic factors discussed previously, recycling of e-waste does not always take place in a formally-regulated plant and “varying national safety standards can mean that workers at formal or semiformal recycling centres still risk exposure [to toxins] at low doses.”⁵⁸ Outside of these so-called recycling plants, methods for breaking down precious metals are increasingly rudimentary and damaging— employing the use of cable-burning, toxic soldering, acid baths— and lacking guidelines entirely so that workers are at immense risk, developing various diseases due to unregulated exposure to harmful chemicals and fumes.⁵⁹ The toxicity of these breakdown processes depends on the type of e-waste and method of disassembly but frequently may be attributed to mercury, cadmium, and lead— “non-recyclable components of a single computer may contain almost 2 kilograms of lead”, yielding a meager \$6 return in value of product scrapped.⁶⁰

In landfills, e-waste’s high concentration of toxic chemicals presents a risk to water and soil supply. The pollution of water and soil supplies results in the contamination of crops⁶¹, posing significant health concerns to the public. One of the oldest and most infamous waste-processing-sites in the world, Guiyu, situated in the Guandong Province of China. Guiyu stands as an example of how even repeated environmental damages to one small area cannot necessarily be contained but may negatively affect populations in the greater region itself. Guiyu’s residents have been shown to have “substantial digestive, neurological, respiratory, and bone problems”, yet even those in the nearby Pearl River Delta Region may be at risk for the same due to “wind patterns in Southeast China [which] disperse toxic particles released by open-air burning”.⁶² Similarly, e-pollution dumped in cities or the open wild, poses a risk to wildlife, as “[i]ndirect effects of electronic waste (e-waste) have been proposed as a causal factor in the decline of bird populations” by researchers of China’s agroecosystems.⁶³

⁵⁵ Ibid.

⁵⁶ Supra note 11.

⁵⁷ Supra note 14.

⁵⁸ Ibid.

⁵⁹ Supra note 11.

⁶⁰ Baker, Elaine, Emmanuelle Bournay, Akiko Harayama, Phillipe Rekeawicz, Milton Catelin, Nicole Dawe, and Otto Simonette. *Vital Waste Graphics*. Report. October 12, 2004. Accessed June 19, 2018. https://gridarendal-website-live.s3.amazonaws.com/production/documents/s_document/253/original/wastereport-full.pdf?1488197426.

⁶¹ Supra note 16.

⁶² Supra note 12.

⁶³ Zhang, Qiang, Jiangping Wu, Yuxin Sun, Min Zhang, Bixian Mai, Ling Mo, Tien Ming Lee, and Fasheng Zou. "Do Bird Assemblages Predict Susceptibility by E-Waste Pollution? A Comparative Study Based on Species- and Guild-Dependent Responses in China Agroecosystems." *Plos One* 10, no. 3 (2015). Accessed June 24, 2018. doi:10.1371/journal.pone.0122264.

Conclusions and Solutions

UNEP has sponsored and featured a number of creative solutions, from the development of “an inter-agency Issue Management Group on tackling e-waste” and the idea of a special E-waste summit and Coalition⁶⁴, to public outreach media and advertising⁶⁵; ultimately, UNEP concludes that in regard to technology, its “development, deployment, transfer and diffusion is a complex process. However, environmentally sound technologies need to be compatible with development goals and any national environmental, socio-economic, and cultural priorities.”⁶⁶ Thus, as Member States remain focused on incorporating suggested action items from the SDGs, both technological innovation with economic advances and responsible management of e-waste may be achievable.

Questions to Consider

1. How can big tech companies be encouraged to collaborate in prioritizing sustainable development over economic/potential net gains?
2. How can governments (and big businesses) be held accountable for exploitative international transfers of waste?
3. In what ways can developing nations encourage safer recycling practices? How can recycling e-waste be made more affordable for any country or business?

⁶⁴ United Nations Environment Programme. “An end to electronic waste: Building the E-waste Coalition”. International Telecommunication Union, Geneva, Switzerland World Summit on the Information Society Forum, 2018. Accessed 29 July 2018. <http://wedocs.unep.org/handle/20.500.11822/25189>; http://wedocs.unep.org/bitstream/handle/20.500.11822/25189/Agenda%20-%20E-waste_WSIS_March%2021st%202018.pdf?sequence=1&isAllowed=y

⁶⁵ United Nations Environment Programme. “E-Waste 2.0: Recycling For Sustainability”. 2016. Accessed July 29, 2018. http://wedocs.unep.org/bitstream/handle/20.500.11822/7587/e_waste_infog_en.pdf?sequence=5&isAllowed=y

⁶⁶ Supra note 7.

Annotated Bibliography

Baker, Elaine, Emmanuelle Bournay, Akiko Harayama, Phillipe Rekacewicz, Milton Catelin, Nicole Dawe, and Otto Simonette. *Vital Waste Graphics*. Report. October 12, 2004. Accessed June 19, 2018. https://gridarendal-website-live.s3.amazonaws.com/production/documents/s_document/253/original/wastereport-full.pdf?1488197426.

This academic report contains a series of statistics and graphics compiled through UNEP with data submitted to the Basel Convention Secretariat. The intent of its publication is to serve as a resource for both policy and public informing alike, in addressing global waste and its management.

EPA. "Cleaning Up Electronic Waste (E-Waste)." December 11, 2017. Accessed June 14, 2018. <https://www.epa.gov/international-cooperation/cleaning-electronic-waste-e-waste>.

This publication from the Environmental Protection Agency of the United States introduces the basic definitions of e-waste and the agency's various collaborative partners in both understanding and addressing it.

Heacock, Michelle, Carol Bain Kelly, Kwadwo Ansong Asante, Linda S. Birnbaum, Åke Lennart Bergman, Marie-Noel Bruné, Irena Buka, David O. Carpenter, Aimin Chen, Xia Huo, Mostafa Kamel, Philip J. Landrigan, Federico Magalini, Fernando Diaz-Barriga, Maria Neira, Magdy Omar, Antonio Pascale, Mathuros Ruchirawat, Leith Sly, Peter D. Sly, Martin Van Den Berg, and William A. Suk. "E-Waste and Harm to Vulnerable Populations: A Growing Global Problem." *Environmental Health Perspectives* 124, no. 5 (2015). Accessed June 15, 2018. doi:10.1289/ehp.1509699.

This publication addresses the growing quantities of, and health risks associated with e-waste both to humans and the environment. Additionally, it outlines some of the contributing factors to toxicity and hazard, including method of processing.

Grant, Kristen, Fiona C. Goldizen, Peter D. Sly, Marie-Noel Brune, Maria Neira, Martin Van Den Berg, and Rosana E. Norman. "Health Consequences of Exposure to E-waste: A Systematic Review." *The Lancet Global Health* 1, no. 6 (October 20, 2013). Accessed June 24, 2018. doi:10.1016/s2214-109x(13)70101-3.

This journal publication reviews many of the ways in which e-waste accumulation can present negative and hazardous consequences for health, targeting specific concerns in e-waste management practices. Also, it addresses outcome probabilities for complications in various body functions across a spectrum of age brackets.

Md. Sahadat Hossain, Sulala M.Z.F. Al-Hamadani, and Md. Toufiqur Rahman. "E-waste: A Challenge for Sustainable Development". *Journal of Health and Pollution* Vol. 5, No. 9 (December 2015), pp. 3-11.

This journal publication covers the adverse effects of e-waste to developing countries, and the threat that e-waste poses to the fulfillment of the UN Sustainable Development Goals due to holes in policy, regulation, and management of hazardous materials.

Population Reference Bureau. "The Human and Environmental Effects of E-Waste." April 4, 2013. Accessed June 21, 2018. <https://www.prb.org/e-waste/>.

This compilation of statistics from the Population Reference Bureau, a research center that partners with various non-profits and other organizations to provide data on health and environmental topics. Here is outlined many of the impacts of e-waste, as well as regions most impacted by it.

United Nations. "SDGs :: Sustainable Development Knowledge Platform." Accessed June 6, 2018. <https://sustainabledevelopment.un.org/sdgs>.

This webpage is the main page providing an overview of the 2030 Agenda for Sustainable Development's Sustainable Development Goals (SDGs). These 17 goals build off the former Millennium Development goals, and represent the major sectors of desired progress for global betterment, from poverty eradication to environmental issues discussed here.

United Nations. "Goal 9 :: Sustainable Development Knowledge Platform." Accessed June 6, 2018. <https://sustainabledevelopment.un.org/sdg9>.

Goal 9 of the Sustainable Development Goals focuses on a strong infrastructure in development, industrialization centered in sustainability, and encouraging innovation, with sub-goal points 9.4-9.C correlating most strongly with UNEP topics.

United Nations. "Goal 12 :: Sustainable Development Knowledge Platform." Accessed June 6, 2018. <https://sustainabledevelopment.un.org/sdg12>.

Goal 12 of the Sustainable Development Goals outlines the need for global practices of sustainable consumption and also production. Point 12.1 particularly highlights environmental concerns in policy and 12.2 in emissions footprints of cities.

United Nations. "Goal 13 :: Sustainable Development Knowledge Platform." Accessed June 6, 2018. <https://sustainabledevelopment.un.org/sdg13>.

Goal 13 of the Sustainable Development Goals covers the topic of climate change and its accompanying sub-points. 13.B particularly calls for infrastructural planning and development in lesser-developed areas.

United Nations Environment. "Illegally Traded and Dumped E-Waste Worth up to \$19 Billion Annually Poses Risks to Health, Deprives Countries of Resources, Says UNEP Report." May 12, 2015. Accessed June 10, 2018. <https://www.unenvironment.org/news-and-stories/press-release/illegally-traded-and-dumped-e-waste-worth-19-billion-annually-poses>.

This press release from May 2015 features commentary from UN Under-Secretary-General and Executive Director of UNEP, Achim Steiner, speaking about the prevalence and challenges of e-waste increasing in recent times. The remainder of the publication presents various statistics about e-waste hazards and its net worth in the global market.

United Nations Environment. "Why Does Technology Matter?" Accessed June 21, 2018. <https://www.unenvironment.org/explore-topics/technology/why-does-technology-matter>.

This page from the UNEP website briefly addresses some of the pros and cons of technology use in global society today, most importantly noting the duality of usefulness and potential to harm our environment.

United Nations Environment Programme. "Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal." 1989. Accessed June 21, 2018. http://www.basel.int/Portals/4/Basel_Convention/docs/text/BaselConventionText-e.pdf.

The Basel Convention is a landmark piece/protocol moderating the rules and regulations surrounding waste transfer, particularly trans-border. Founded in 1989, this protocol remains highly influential in the discussion today surrounding e-waste and near end-of-life electronics, which almost always contains chemicals and substances classifiable as hazardous.

United Nations Environment Programme. "An end to electronic waste: Building the E-waste Coalition". International Telecommunication Union, Geneva, Switzerland World Summit on the Information Society Forum, 2018. Accessed 29 July 2018. <http://wedocs.unep.org/handle/20.500.11822/25189>; http://wedocs.unep.org/bitstream/handle/20.500.11822/25189/Agenda%20-%20E-waste_WSIS_March%2021st%202018.pdf?sequence=1&isAllowed=y

This published page from UNEP represents efforts to organize a special coalition for addressing e-waste specifically, harnessing resources through a greater international dialogue between top UN leaders and the already-established Issue Management Group set forth by the UN Environment Management Group (EMG) to oversee ongoing efforts to combat e-waste.

United Nations Environment Programme. "E-Waste 2.0: Recycling For Sustainability". 2016. Accessed July 29, 2018. http://wedocs.unep.org/bitstream/handle/20.500.11822/7587/e_waste_infog_en.pdf?sequence=5&isAllowed=y

This set of flyers demonstrate one effort by UNEP to raise public awareness of e-waste and recycling options. The infographics highlight the hazards and disposal options for such materials.

Zhang, Qiang, Jiangping Wu, Yuxin Sun, Min Zhang, Bixian Mai, Ling Mo, Tien Ming Lee, and Fasheng Zou. "Do Bird Assemblages Predict Susceptibility by E-Waste Pollution? A Comparative Study Based on Species- and Guild-Dependent Responses in China Agroecosystems." *Plos One* 10, no. 3 (2015). Accessed June 24, 2018. doi:10.1371/journal.pone.0122264.

This study focuses on bird populations studies in South China, and their biological responses and susceptibility to e-waste, as well as occurring population decline due to increases in pollution and e-waste.