

# Global Green Growth Institute – Future Earth Australia Fellowship Program Research Projects with GGGI

*This document provides summaries of possible research projects to be conducted through the GGGI-Future Earth Australia Fellowship Program, although applicants may submit other, original ideas for research projects as well. Note, all start and end dates indicated in the project summaries below are tentative, and will be confirmed later following the selection process.*

## Global Programs

### 1. GGGI Headquarters – Scenario Model and Analysis for Green Cities

**Location:** Seoul, Republic of Korea

**Duration:** August 15, 2018 – February 15, 2019

**GGGI Thematic Focus Area:** Green Cities

**Description:** GGGI has developed an Excel-based Simulation Tool through its Green Growth Performance Measurement (GGPM) project to measure a country's green growth performance in six sectors, including cities. The tool aims to analyze the impacts of different policy options on green growth performance and provide input in planning and formulating green growth policies. The current tool for cities includes models to assess green growth impacts of market-based incentives for energy efficiency investments, building and appliance standards, investment in water connections and sanitation facilities, and formal registration of land tenure in slums. These models will be used to create scenarios for resource efficiency and conservation for cities in GGGI member and partner countries.

The research project on Scenario Model and Analysis for Green Cities under the Fellowship Program would aim to validate the underlying assumptions of the models and create interactive links to the indicators of resource efficiency and conservation (e.g., energy consumption, water consumption, greenhouse gas emissions, solid waste generation, etc.).

The kinds of qualifications and skills expected for a researcher supporting this project include: master's degree in engineering, geography, environment or related fields with focus on buildings and cities; knowledge of resource efficiency and conservation including energy, water, and land; experience in quantitative modelling and building scenarios; and expertise in using programming tools like Microsoft Excel.

**Proposed Deliverables:** (1) a refined simulation tool for green cities using Microsoft Excel as the primary programming software; and (2) a publishable paper on Scenario Model and Analysis of Resource Efficiency and Conservation for Green Cities in selected GGGI member and partner countries.

## 2. GGGI Headquarters – Green Growth Performance in the Tourism Sector

**Location:** Seoul, Republic of Korea

**Duration:** August 15, 2018 – February 15, 2019

**GGGI Thematic Focus Area:** Cross-cutting

**Description:** Tourism is a booming industry in biodiversity-rich countries and becoming an important economic growth sector worldwide. Because there are many ecological and economic trade-offs in the eco-tourism industry, it is important to identify and implement appropriate policies to enhance economic benefits and reduce environmental costs to society. Some GGGI member and partner countries are interested to measure the contribution of the tourism sector to green growth performance. Through its Green Growth Performance Measurement (GGPM) project, GGGI has developed an Excel-based Simulation Tool to measure a country's green growth performance in six sectors including energy, industry, transport, cities, water, and agriculture, forestry, and other land use (AFOLU). The tool aims to analyze the impacts of different policy options on green growth performance and to provide input in planning and formulation of green growth policies. The inclusion of tourism in the tool will benefit countries that increasingly depend on this sector to enhance economic growth.

The proposed research project on Green Growth Performance in the Tourism Sector under the Fellowship Program aims to develop simulation models for the tourism sector and create interactive links to indicators on resource efficiency and conservation (e.g., energy consumption, water consumption, greenhouse gas emissions, solid waste generation, etc.).

The kinds of qualifications and skills expected for a researcher supporting this project include: master degree in tourism, geography, environment, or related fields; knowledge of resource efficiency and conservation including energy, water, and land in the tourism sector; experience in quantitative modelling and building scenarios; and knowledge in using programming tools like Microsoft Excel.

**Proposed Deliverables:** (1) Excel-based modules of the simulation tool for eco-tourism; and (2) a publishable paper on Scenario Model and Analysis of Resource Efficiency and Conservation for Eco-tourism in selected GGGI member and partner countries.

**Description:** Global Green Growth Institute (GGGI) was established in 2012 as an agenda-based international organisation to solely promote green growth and support its member and partner countries in their transition to an inclusive and green growth model. As such, GGGI's mandate includes demonstrating that green growth is possible, and that inclusive economic growth and environmental protection are mutually reinforcing for achieving quality and sustenance of growth. Understanding the state, trends, and readiness of green growth in GGGI's member and partner countries is important for GGGI to align and deliver effective advisory that realises countries' Sustainable Development Goals (SDGs) and Nationally Determined Contribution (NDC) aspirations under the Paris Agreement.

## 3. GGGI Headquarters – Climate Adaptation Needs and Readiness in GGGI Countries

**Location:** Seoul, Republic of Korea

**Duration:** August 15, 2018 – February 15, 2019

**GGGI Thematic Focus Area:** Cross-cutting

**Description:** Global Green Growth Institute (GGGI) was established in 2012 as an agenda-based international organisation to promote green growth and support its member and partner countries in their transition to an inclusive and green growth model. As such, GGGI's mandate includes demonstrating that green growth is possible, and that inclusive economic growth and environmental protection are mutually reinforcing for achieving quality and sustenance of economic growth.

Climate change adaptation is key to sustaining growth and minimizing disproportionate impacts of climate change on the poorer communities and countries. Adaptation is integral to climate action outlined in countries' Nationally Determined Contributions (NDCs) submitted under the Paris Agreement, and key to realizing the UN Sustainable Development Goals (SDGs). Climate change adaptation and mitigation measures are often inter-linked, and given the limited financial resources in the developing countries, it also warrants maximizing the synergy between adaptation and mitigation actions. Enhanced adaptation to climate change is one of GGGI's six Strategic Outcomes (SOs), the long-term development goals that GGGI strives to contribute to in its member and partner countries.

This research project aims to provide a comprehensive assessment of climate change adaptation needs and readiness in GGGI countries in terms of financing, policy, and institutional arrangements in context of realizing the SDG goals and aspirations outlined in national NDCs. The assessment is expected to be based on existing data and information on countries' climate change vulnerability, adaptation needs (e.g., outlined in the NDCs), and adaptation policies and programs. The project should result in a practical framework and recommendations to align adaptation and mitigation measures and policies in green growth programs.

The research could draw from on-going projects in GGGI involving analytical assessments on adaptation, such as GGGI's Strategic Outcomes, green growth readiness assessment project with the African Development Bank Group, and Green Growth Index.

The kinds of qualifications and skills expected for a researcher supporting this project include: master degree in engineering, geography, social science, or a related field experience in analytical research and/or consultancy (qualitative and quantitative) on relevant topics; a good grasp of key sustainable development concepts including experience with NDC and/or SDG analysis and policy review; prior publication in scientific journals; ability to synthesize varied information and data from multiple sources; and data analysis experience in Microsoft Excel.

**Proposed Deliverables:** (1) development and application of an analytical framework for the assessment; (2) comprehensive assessment of climate change adaptation needs and readiness in GGGI countries in terms of financing, policy, and institutional arrangements in context of realizing the SDG goals and aspirations outlined in national NDCs; and (3) a publishable article on the project outcomes.

#### **4. GGGI Headquarters – State and Trends of Green Growth in Selected GGGI Countries**

**Location:** Seoul, Republic of Korea

**Duration:** August 15, 2018 – February 15, 2019

**GGGI Thematic Focus Area:** Cross-cutting

**Description:** Global Green Growth Institute (GGGI) was established in 2012 as an agenda-based international organisation to promote green growth and support its member and partner countries

in their transition to an inclusive and green growth model. As such, GGGI's mandate includes demonstrating that green growth is possible, and that inclusive economic growth and environmental protection are mutually reinforcing for achieving quality and sustenance of growth. Understanding green growth state, trend and readiness in its member and partner countries is important for GGGI to align and deliver effective advisory that realises countries' Sustainable Development Goals (SDGs) and Nationally Determined Contribution (NDC) aspirations under the Paris Agreement.

**This research** project aims to produce a comparative assessment of the state and trends of green growth in selected GGGI member and partner countries by using selected green growth indicators and review of related policies, institutions, financing particulars and human capacity.

The research project could draw from relevant on-going projects in GGGI, such as GGGI's Strategic Outcomes (GGGI's long-term development outcomes), green growth readiness assessment project with African Development Bank Group, and Green Growth Index.

The kinds of qualifications and skills expected for a researcher supporting this project include: master degree in engineering, geography, environmental science, or a related field; experience in analytical research and/or consultancy (qualitative and quantitative) on relevant topics; a good grasp of key sustainable development concepts including experience with NDC and/or SDG analysis and policy review; prior experience publishing in scientific journals; and data analysis experience in Microsoft Excel.

**Proposed Deliverables:** (1) the development and application of an analytical framework for the assessment; (2) comparative assessment of the state and trends of green growth in selected GGGI member and partner countries by using as set of green growth indicators and review of related policies, institutions, financing particulars and human capacity; and (2) a publishable paper that summarizes the results and recommendations.

## 5. GGGI Headquarters – Web-based Dashboard for GGGI Strategic Outcomes and SDGs

**Location:** Seoul, Republic of Korea

**Duration:** August 15, 2018 – February 15, 2019

**GGGI Thematic Focus Area:** Cross-cutting

**Description:** Global Green Growth Institute (GGGI) was established in 2012 as an agenda-based international organisation to solely promote green growth and support its member and partner countries in their transition to an inclusive and green growth model. As such, GGGI's mandate includes demonstrating that green growth is possible, and that inclusive economic growth and environmental protection are mutually reinforcing for achieving quality and sustenance of growth.

GGGI's Strategic Plan 2015-20 outlines six Strategic Outcomes (SOs). SOs are long-term development outcomes that GGGI strives to contribute to in its member and partner countries through country program activities. GGGI recognises that green growth programs would need to be take into account country-specific approach, and would need to be aligned to realise countries' Sustainable Development Goals (SDGs) and Nationally Determined Contribution (NDC) aspirations under the Paris Agreement.

GGGI's strategic research and knowledge sharing unit, the Office of Thought Leadership, is developing country-specific targets for the SOs, and developing frameworks and indicators to align its programs to maximise SDG and NDC implementation efforts.

The project under this Fellowship Program aims to develop an online interactive dashboard using open-source tools that would be able to visualize and compare the following for GGGI member and partner countries: current state and targets of GGGI SOs, current state and time-series of SDGs closely related to the GGGI SOs, and information on GGGI projects and programs linked to the SOs and SDGs.

Data on SOs, information on which SDGs are related to SOs (and how), and data/information on GGGI projects, as well as the underpinning framework for developing the relational database will be provided. The Fellow will be required to collate and prepare time-series data on related SDGs from openly source databases such as ones available from World Bank and Sustainable Development Solutions Network.

The project is linked to and would require consultation with the following ongoing initiatives: GGGI Strategic Outcomes target-setting project, green growth readiness assessment project with the African Development Bank Group, and GGGI Green Growth Index development project.

**Proposed Deliverables:** (1) development of a simple and easily updatable relational database consisting of the information and data on SOs, related SDGs and GGGI projects; and (2) design and development of an online interactive tool to visualize the data/information; and (3) a concise report describing the tool and its application.

## 6. GGGI Headquarters – Renewable Energy Policy Analysis

**Location:** Seoul, Republic of Korea

**Duration:** August 15, 2018 – November 15, 2018

**GGGI Thematic Focus Area:** Energy

**Description:** GGGI's Office of Thought Leadership works to link GGGI's sustainable energy programs and projects to cutting-edge leadership in green growth. Its activities include producing new rigorous green energy policy research, analysis, and analytical tools and facilitating global and regional knowledge sharing that better link concept to evidence, all of which ultimately contribute to the strategic objectives of GGGI by feeding into in-country service offerings and green growth impact, sustainable energy policy implementation, and investment .

GGGI developed a Wiki-based (Semantic MediaWiki) energy and climate policy database and maintains a web-based tool and collects information on currently implemented policies related to energy and climate change mitigation (including Nationally Determined Contributions) from GGGI member and partner countries. The database aims to serve as a knowledge platform that offers best practices and policy implemented in GGGI member and partner countries, and to provide energy knowledge services for researchers and decision-makers around the globe. GGGI's long-term goal for this database is to provide an open, collaborative platform to gather all energy and climate-related policies with full geographical and sectoral coverage.

This proposed research project aims to provide key analytical support to the Thought Leadership energy team in the process of setting up energy and climate policy database and researching, compiling, and analyzing renewable energy and climate policy data, tools, guidelines, arranging documentations and perform the data collection, analysis, and reporting.

The kinds of qualifications and skills expected for a researcher supporting this project include: master degree in climate, environmental, or resource economics, business administration, energy policy, sustainable development, or related fields; experience in analysis, design, delivery, or evaluation of renewable energy policies in developing countries; good knowledge in standard office software applications; ability to support development of quantitative models; web and database programming skills.

**Proposed Deliverables:** (1) configuration of a customized GGGI’s Energy and Climate policy database that streamlines and automates operations; (2) updated inventories of energy policies implemented in countries; (3) draft summary report about the energy policy database and guidelines; (4) datasets and analysis of renewable energy and climate change mitigation policies, renewable energy incentives, and other policy-related data; (5) research and analysis related to the emissions, life-cycle, and other environmental impacts of renewable energy policies and “best policy practices”; (6) development knowledge-based tools, such as policy positions, concept papers, and other research papers; and (7) website content and updates.

## 7. GGGI Headquarters – Research on Resilience of Transport Networks

**Location:** Seoul, Republic of Korea

**Duration:** August 15, 2018 – February 15, 2019

**GGGI Thematic Focus Area:** Green Cities

**Description:** As natural disasters become more frequent and severer due to climate change, transport networks in cities are disrupted more often than ever. It is therefore important to build transport networks that can withstand such disasters, but what is equally critical is to restore the functionality of transport networks if they are disrupted.

This research aims to address how to measure/assess the level of resilience of a transport network and how to restore the connectivity of the network quickly and economically when a disaster strikes, so that basic supplies can be provided to the affected people or people can be evacuated. Assisted by literature survey, the project defines the resilience of a transport network to fit the purpose of this research. Based on the definition, a mathematical or quantitative model to optimally restore the network’s connectivity is developed. The model is then tested on a toy network (such as the Sioux Falls network) or a real transport network to the extent possible.

**Proposed Deliverables:** (1) Technical report on resilience of transport networks; (2) research paper for journal publication.

## 8. GGGI Headquarters – Research on Mobility as a Service

**Location:** Seoul, Republic of Korea

**Duration:** August 15, 2018 – February 15, 2019 (flexible start date; six months or longer)

**GGGI Thematic Focus Area:** Green Cities

**Description:** To part from traditional growth patterns in transport, various policies based on new technologies and behavioral change of travelers have been explored or implemented, including electrification of vehicles, car sharing, non-motorized transport, and intelligent transportation systems. One forward-looking idea in this regard is Mobility as a Service (MaaS), the concept of shifting away from personally-owned modes of transport and towards mobility solutions that are consumed as a service. MaaS assisted by electric vehicles and car sharing (and eventually autonomous driving) and powered by information and communication technology (ICT) is anticipated to offer vastly lower-cost mobility alternatives with environmental co-benefits. As urban density continues to grow, MaaS could provide an alternative way for people to move in a way that is faster, cleaner, and less expensive than current options. By “disrupting” the supply side of transport services, MaaS may transform a relatively rigid transport system into one that is significantly more flexible without new large investments.

In this context, this research project would aim to analyze and address questions such as: How will mobility demands be served in coming years? Can mobility demands be commoditized and provided

by various service providers? Will Mobility as a Service make vehicle ownership obsolete? How can this concept be applied in developing cities where technology and infrastructure might be insufficient or immature?

**Proposed Deliverables:** (1) monograph on Mobility as a Service; (2) research paper for journal publication.

## 9. GGGI Headquarters – Research on Application of Machine Learning in Transport

**Location:** Seoul, Republic of Korea

**Duration:** August 15, 2018 – February 15, 2019

**GGGI Thematic Focus Area:** Green Cities

**Description:** Big data, artificial intelligence, and machine learning have been repositioning themselves from theoretical concepts of computer science to practical tools to make our life better. Navigation apps and car sharing platforms are examples of practical applications in the transport sector that use these concepts.

This research particularly looks into the use of neural networks and deep learning techniques to improve the effectiveness of transport systems. These concepts have been used in transport planning including traffic assignment and traffic signal optimization. Other areas of application will be explored in this research.

**Proposed Deliverables:** (1) technical report on application of machine learning in transport; (2) research paper for journal publication.

## 10. GGGI Headquarters – Research on Health Benefits of Cleaner Mobility Options

**Location:** Seoul, Republic of Korea

**Duration:** August 15, 2018 – February 15, 2019

**GGGI Thematic Focus Area:** Green Cities

**Description:** Transport is fundamental to economic and social development. It generates jobs and drives growth, both within the transport sector itself and across the economy via other sectors that depend on transport services to move people, goods, and services in an efficient manner. The development of transport systems, however, has also brought negative externalities to society, such as traffic congestion, accidents, and noise. In particular, transport is one of the main sources of greenhouse gas emissions and ambient air pollution in urban areas. Transport is responsible for around half of energy-related nitrogen oxide (NO<sub>x</sub>) emissions and is an important source of primary particulate matter, PM<sub>2.5</sub>, which affects human health more than any other pollutant. As such, cleaner mobility options including non-motorized transport such as walking and cycling would generate health benefits.

GGGI has conducted research on estimating health benefits from avoided air pollutants. This research project would aim to refine the current methodology, potentially focusing, on non-motorized transport modes.

**Proposed Deliverables:** (1) technical report on health benefits of cleaner mobility options; (2) research paper for journal publication.

## 11. GGGI Headquarters – Gender and Green Growth Research Fellowship

**Location:** Seoul, Republic of Korea

**Duration:** August 15, 2018 – February 15, 2019

**GGGI Thematic Focus Area:** Cross-cutting

**Description:** GGGI and UN Environment jointly host and manage the Green Growth Knowledge Platform (GGKP), a global network of nearly 60 international organizations, research institutes, and think tanks focused on promoting green growth. The GGKP addresses major knowledge gaps in green growth theory and practice by promoting collaboration and coordinated research. It also uses world-class knowledge management and communication tools to provide practitioners, policymakers, and other experts with opportunities to access, share, and utilize green growth policy analysis, guidance, information, and data.

The GGKP aims to achieve these objectives, in part, through collaborative working groups, which bring one senior-level representative each from key institutions working on green growth together with external experts. GGKP's expert working groups are mandated to identify gaps in green growth knowledge and data and to collaborate in filling those gaps by stimulating a broader research agenda.

This research project would support activities of the GGKP Gender and Green Growth expert working group (research panel), as well as assist the GGKP Secretariat and the GGGI Gender and Safeguards team on creating a proposal for a larger, multi-year initiative around gender and green growth.

Women constitute the majority (approximately 70%) of the poor and marginalized parts of those populations adversely affected by climate change and environmental degradation. As a result, a transition to an inclusive green economy is expected to deliver many critical benefits to women. GGKP activities provide improved access to the information necessary to mainstream gender into green economy planning and implementation. It allows GGKP's partners to share their experience and integrate gender considerations into all aspects of their own development, implementation and capacity building programs. The GGKP aims to continue to directly facilitate practical action around gender and green growth through several research-oriented activities.

Some experience related to environmental economics or a related field would be valuable for this work, particularly if acquired in an international organization, as well as understanding of research on gender and sustainability, green growth or green economy and related tools and initiatives is also desirable.

This fellowship will be based in Seoul at GGGI Headquarters. The fellow will work closely with the GGKP team in Seoul, South Korea as well as the counterpart team in Geneva Switzerland.

**Proposed Deliverables:** (1) literature review of existing research on gender-relevant aspects green growth, which may be used as the basis for creating an expert working group dedicated to addressing knowledge gaps around green growth and gender or social inclusion; (2) development of gender-focused research proposals, knowledge management activities, and knowledge sharing activities through regional workshops, capacity building initiatives, and the GGKP Annual Conference; (3) new research on a key topic addressing gender and green growth, resulting in a technical report or peer-reviewed article; (4) support for two or more webinars focused on gender or social inclusion with leading international organizations working on these issues; and (5) identification of relevant gender-focused research materials, studies, and analysis to be posted on the GGKP website's thematic pages on gender.

## 12. GGGI Headquarters – Natural Capital Mainstreaming in Green Growth Research Fellowship

**Location:** Seoul, Republic of Korea

**Duration:** August 15, 2018 – February 15, 2019

**GGGI Thematic Focus Area:** Cross-cutting

**Description:** GGGI and UN Environment jointly host and manage the Green Growth Knowledge Platform (GGKP), a global network of nearly 60 international organizations, research institutes, and think tanks focused on promoting green growth. The GGKP addresses major knowledge gaps in green growth theory and practice by promoting collaboration and coordinated research. It also uses world-class knowledge management and communication tools to provide practitioners, policymakers, and other experts with opportunities to access, share, and utilize green growth policy analysis, guidance, information, and data.

The GGKP aims to achieve these objectives, in part, through collaborative working groups, which bring one senior-level representative each from key institutions working on green growth together with external experts. GGKP's expert working groups are mandated to identify gaps in green growth knowledge and data and to collaborate in filling those gaps by stimulating a broader research agenda.

A fellow is sought to provide program management support to the GGKP Natural Capital Expert Working Group to support the research of the Mainstreaming Natural Capital in Green Growth Project.

Some experience related to environmental economics or a related field would be valuable for this work, particularly if acquired in an international organization. Understanding of research on natural capital, sustainable infrastructure, green growth, or green economy and related tools and initiatives is also desirable.

This fellowship will be based in Seoul at GGGI Headquarters. The fellow will work closely with the GGKP team in Seoul as well as the counterpart team in Geneva Switzerland.

**Proposed deliverables:** (1) provide overall operational support to the GGKP Natural Capital Expert Working Group and other working groups, including engaging external consultants, managing web pages, monitoring and evaluation of project indicators and working with the research program lead; (2) provide substantive support to the GGKP Natural Capital Expert Working Group by conducting research on natural capital issues, drafting background notes, and preparing and circulating summaries from relevant meetings; (3) support the growth of the GGKP's green growth community of practice through the identification of experts, partners, and outreach opportunities; (4) support the GGKP's outreach to and communication with donors; and (5) substantive support to the GGKP Secretariat through facilitation of the GGKP Natural Capital Expert Working Group and other GGKP working groups.

## Country Programs

### 13. GGGI China – The Beijing-Korea-Mexico Air Quality Research Report

**Location:** Beijing, China

**Duration:** August 15, 2018 – February 15, 2019

### **GGGI Thematic Focus Area: Energy, Green Cities**

**Description:** Since Chinese leaders declared a “war on pollution” in 2014, changes toward pollution reduction have been made and improvements are noticeable through several data analysis. However, compared to the national standard and the WHO standard, an elaborate plan to fight air pollution in 2018-2020 is still a priority under public demand. Examining the experience of Seoul, Republic of Korea and Mexico City, Mexico on advanced anti-pollution campaign may of great help to Beijing as well as the Xiong’An New City.

This proposed research project involves analyzing comprehensive policy measures that the other key cities have taken to address pollution, the feasibility of implementing these measures in Chinese cities or city groups, the need to adapt the measures to Chinese situation, and assessment of relevant lessons learned from experience. In addition, the research would consider unique measures that China has taken on its own and its impact on air quality. With the analysis on the three countries’ effort to combat air pollution, the proposed research would identify several air quality measures which can be applied to additional developing countries.

The research will be supervised by GGGI China technical staff and conducted in collaboration with China’s Ministry of Environmental Protection (MEP).

**Proposed Deliverables:** (1) a report detailing the measures and analysis including methods used, key findings, and policy recommendation; and (2) a standardized GGGI PowerPoint presentation for use with government stakeholders.

## **14. GGGI China – Greening Investments along the Belt and Road**

**Location:** Beijing, China

**Duration:** August 15, 2018 – February 15, 2019

**GGGI Thematic Focus Area:** Cross-cutting

**Description:** China proposed the Belt and Road Initiative in 2013 as a broad vision to connect countries via infrastructure development, and it is expected to further unleash the flow of trade, finance, and people. China is expected to invest an estimated USD 150 billion in Belt and Road partner countries in the next five years, and a green Belt and Road would definitely contribute to the sustainable development of these countries. By promoting green finance, GGGI seeks to identify environmentally sustainable projects and initiatives, as well as a set of policies that would encourage the development of greener economic activities. The decisions of financial institutions such as the Asian Infrastructure Investment Bank, the Silk Road Fund, the China Development Bank, the China Export-Import Bank, and other Chinese state-owned banks are critical to shaping the long-term sustainability of Belt Road projects.

However, the Chinese government and large state-owned enterprises are most interested in investment in large-scale projects in Belt and Road countries, which generally means medium and small green, sustainable development projects are not prioritized for investment. There are thus opportunities to introduce more innovative mechanisms to strengthen the Belt and Road Initiative as a driver of green investment.

The proposed research project would aim to identify the current challenges to green investment in Belt and Road countries, possible solutions, potential resource providers, and the necessary policy and financial mechanisms to align them all. The research would be supervised by GGGI technical staff in China and GGGI HQ, and conducted in collaboration with Chinese stakeholders, such as the China Ministry of Environmental Protection (MEP), financial institutions, and business green technology providers.

**Proposed Deliverables:** (1) a report detailing the challenges and mechanism solution analysis; and (2) a standardized GGGI PowerPoint presentation for use with government stakeholders.

## 15. GGGI Fiji – Modeling Long-Term Greenhouse Gas Emissions for Fiji Low Emission Development Strategy (LEDS)

**Location:** Suva, Fiji or GGGI Headquarters in Seoul, Republic of Korea

**Duration:** August 15, 2018 – February 15, 2019

**GGGI Thematic Focus Area:** Cross-cutting

GGGI is assisting the Government of Fiji in developing its national LEDS by November 2018 under the leadership of the Ministry of Economy's Climate Change Division (CCD). Countries are invited to produce LEDS in the Paris Agreement in order to provide a roadmap for decarbonization in the long-term, through 2050. The Paris Agreement indicates that countries should develop and submit their LEDS before 2020 or soon after.

The overall aim of the LEDS development is to enhance the Fijian Government's ability to plan for decarbonization of its economy in the long-term by providing a framework and a pathway for a progressive revision and enhancement of targets under its NDC to reduce CO<sub>2</sub> emissions to 2030 and beyond. The overall impact of the project is that Fiji will continue to take the lead in setting a pathway to a low carbon future and will be able to effectively plan to reduce its GHG emissions and contribute to the implementation of the Paris Agreement.

The specific objective of this country project will be to develop a concise and strategic LEDS document describing the pathways to low-carbon development/decarbonization for Fiji starting from the 2013 NDC baseline and reaching to 2050. The LEDS analysis, stakeholder consultation process, and document preparation will be conducted during February to October 2018 and the Government of Fiji will announce the final LEDS internationally at the 24th Conference of the Parties (COP24) to the UNFCCC in December 2018. Fiji will be concluding its one year serving as the COP Presidency at COP24.

This research project would support GGGI and its project partners to conduct the baseline analysis and to develop business-as-usual and long-range emissions scenarios (including emission modelling) in one or more of the following areas:

- Energy: energy use in land, maritime, and air transport; energy generation for on-grid and off-grid electricity from fossil and renewable energy sources; electricity consumption; other fuel use for household, commercial, or industrial purposes (primarily using the LEAP model)
- Agriculture, forestry, and other land use (AFOLU)
- Industrial processes
- Waste

**Proposed Deliverables:** (1) emission scenarios, pathways, and recommended policy and financing priorities for the LEDS for one or more sectors/emission sources; (2) organized datasets of key activity data for developing emission scenarios; (3) PowerPoint presentation materials to share during stakeholder consultations with government and other stakeholders in Fiji.

## 16. GGGI Mozambique – Energy for Resilience

**Location:** Maputo, Mozambique

**Duration:** October 1, 2018 – February 28, 2019

## **GGGI Thematic Focus Area: Energy**

**Description:** This research is aimed to help ignite the off-grid energy market in Mozambique. As part of a wider funded program it will contribute towards identifying the challenges and creating the solutions for getting the most vulnerable sectors of Mozambique's society to benefit from the program. This research and report will occur at the initial stages of a 5-year program, providing an important opportunity to define the path towards effective implementation.

The Government of Mozambique, the Department for International Development (DFID) in the UK, and other stakeholders signed the Energy Africa Compact on December 1, 2017. The aim of the compact is to support the expansion of solar markets in Mozambique. With only 28% of the country able to access grid electricity, off-grid solutions are crucial for Mozambique to reach its goal of universal energy access by 2030.

A number of initiatives, including the DFID-funded BRIHLO program, are working to address barriers and activate demand for off grid solar solutions like solar home systems and mini-grids as well as efficient cook stoves. It is important to bring in the private sector to help address this problem but barriers such as access to finance, high import duties, and lack of household financing solutions all hamper growth in the sector.

Mozambicans are threatened by three potential crises, namely debt, drought, and conflict. To ensure the highest impact possible for the BRIHLO program, the Energy for Resilience research project will identify Mozambicans who may be caught in one or more of these crises, then look at activities and interventions that can be used in the program to enhance access for this section of society. This research should look to identify different business models and how they would be able to create the transformational change needed highlighting models and approaches that most impact the poor, women, and girls with practical solutions detailing how they can also be included within the BRIHLO program rollout. The Mozambican energy fund (FUNAE) will also be integral to any solution as it has already spent several years identifying needs in rural schools and health centers and is seen as the primary local entity to continue work initiated under the BRIHLO program.

GGGI's Support for the research will be given by the GGGI Safeguards, Poverty Reduction & Social Inclusion (SPRSI) and Energy teams, as well as by the Mozambique country team which will be able to link the researcher with government ministries and BRIHLO fund managers.

GGGI's Country Representative for Mozambique will oversee this fellowship research project in coordination with GGGI's BRIHLO focal point and Green Investment Services (GIS) Project Lead, as appropriate.

**Proposed Deliverables:** (1) a technical report with key findings and recommendations; (2) a publication for issue in a relevant journal; (3) a standardized GGGI PowerPoint presentation for use with government stakeholders.

## **17. GGGI Myanmar – Safeguards and Sustainability of Green Growth Interventions in Myanmar**

**Location:** Naypyidaw, Myanmar

**Duration:** October 1, 2018 – February 28, 2019

**GGGI Thematic Focus Area:** Cross-cutting

**Description:** Myanmar is often described as undergoing a triple transition – to democracy, a market economy, and peace. In that process the country is attempting to balance rapid economic growth (an average GDP growth of 7% per year over the past five and next five years) with a commitment to sustainable development. Much of the growth in the recent past has been led by investment and development of the country's natural resources in the energy, mining, agriculture, and forestry

sectors. As investment and development intensify, so do the challenges in ensuring that Myanmar's growth is environmentally and socially sustainable. The government has committed to meeting these challenges, with mainstreaming green growth in its development policy. After re-joining the international community in 2012, Myanmar has commanded high levels of interest from donor agencies and development partners, which has led to a frenetic level and activity among government departments and between sectors.

GGGI supports the Government in prioritizing and articulating strategies to inform key interventions related to inclusive green growth. GGGI and the Government are moving towards a Country Planning Framework which will provide strategic direction for GGGI's work in priority sectors, including sustainable landscapes. GGGI's main government counterpart is the Ministry of Natural Resources and Environmental Conservation (MONREC).

As such, GGGI is committed to ensure that standards for environmental and social safeguards and sustainability are met and that the governance mechanisms are strengthened through increased capacity.

This work includes up to three research projects that would focus on Safeguards and Sustainability aspects of GGGI's engagement in Myanmar. GGGI in Myanmar proposes the following possible topics:

- ***Social safeguards and empowerment impacts of soil/forest rehabilitation interventions:*** This research activity would focus on the rehabilitation and restoration of coastal ecosystems including mangrove forests (preferably), upland forests, or dry zone forests. The study would build knowledge about social stressors on landscapes, and challenges related to different types of rehabilitation and reforestation interventions. It would analyze risks to communities and alternatives to mitigation, identify measures for avoidance and management of these risks, and look at opportunities for creation of social co-benefits for men, women, boys, and girls. The research would take into account how gender roles influence land use, livelihood options, and participation of men and women in intra-household, communal, and formal government consultation and decision-making processes. It would include analysis of national policies and practices for social safeguards and sustainability, gaps in relation to international standards, and best practices and lessons learned from relevant national and international experiences, particularly within the context of REDD+.
- ***Models for benefits-sharing and social co-benefits in Payment for Ecosystem Services (PES):*** Approaches to creating sustainable landscapes incorporate ways to ensure benefits to local communities from mitigation and adaptation initiatives. In the context of soil rehabilitation initiatives in coastal areas, alternatively upland or dry zone forests, this research activity would analyze risks and opportunities of different models for benefit-sharing and social co-benefits based on national and international policy and experience. The work would draw on lessons learned from diverse PES and benefit-sharing practices, and focus on opportunities and challenges created through different business models, e.g., individual versus community approaches, service delivery versus cash payments, etc. It could also incorporate gender aspects and opportunities in reaching poor and marginalized communities.
- ***Environmental safeguards and sustainability in introduction of invasive species for soil rehabilitation:*** The research activity would analyze risks associated with the introduction of specific species (e.g., grass or trees) in soil rehabilitation initiatives and approaches to risk management and sustainability. The work would be based on national and international policy and practice in mangrove forests (preferably), upland forests, or dry zone forests. It would consider short-term versus longer-term objectives of alternative interventions.

The research project would be expected to enhance knowledge of the GGGI team and government counterparts and to support project development in Myanmar.

**Proposed Deliverables:** (1) a research report; (2) relevant recommendations and/or guidelines for mitigation and/or adaptation initiative(s); and (3) a presentation of findings to GGGI and government counterparts.

## 18. GGGI Rwanda – Biogas Production from Food Waste

**Location:** Kigali, Rwanda

**Duration:** August 15, 2018 – February 15, 2019

**GGGI Thematic Focus Area:** Energy

**Description:** The Government of Rwanda (GoR), in partnership with international organizations SNV and GIZ, began its National Domestic Biogas Program (NDBP) in 2007 with an initial budget of USD 14.1 million. Challenges encountered by the program include: (1) lack of feedstock (cow dung) to supply biogas digesters; (2) lack of familiarity with biogas technology; (3) inadequate suppliers and maintenance personnel; (4) limited financing; (5) costs incurred by households; and (6) inadequate marketing and awareness. The City of Kigali currently produces 350 tons of solid waste, of which only an estimated 2% is currently recycled. Biogas technology has been underutilized particularly in the City of Kigali and other opportunities for waste-to-energy conversion from sources such as food waste are underexploited.

Portable biodigester technology has made household biogas conversion of food waste a practical solution to integrating circular economy approaches to waste management and energy production, and biogas converters fueled by household food waste are now starting to be used in countries such as India.

The scope of this research project would be to quantify the amount of biogas that could potentially be produced from food waste in the City of Kigali. Biogas for cooking is typically imported from outside of Rwanda, resulting in additional costs and greenhouse gas emissions because of transport. The research project will include a cost-benefit analysis of the introduction of a household waste biogas program drawing from estimates of the quantity and types of food waste produced in Kigali and the potential reduction in costs and GHG emissions from the current model of importing biogas.

The fellowship will include supervision by GGGI Rwanda technical staff as well as collaboration with the GoR including the Ministry of Environment, the Ministry of Infrastructure (MININFRA), the Rwanda Housing Authority (RHA), the Rwanda Environment Management Agency (REMA), the Rwanda Utilities Regulatory Authority (RUR), and the Rwanda Energy Group (REG).

Any applicants interested in this research project may contact GGGI for a list of relevant references.

**Proposed Deliverables:** (1) a report detailing the cost benefit analysis including methods used, key findings, and policy recommendations; (2) a publication in a peer-reviewed scientific journal; and (3) a standardized GGGI PowerPoint presentation for use with government stakeholders.

## 19. GGGI Rwanda – Land Use Master Plans in Secondary City Development

**Location:** Kigali, Rwanda

**Duration:** August 15, 2018 – February 15, 2019

**GGGI Thematic Focus Area:** Green Cities

**Description:** Rwanda has been consistently steadfast in support of global action on climate change. Among other high-level global engagements, Rwanda presented the Strategic Programme for Climate Resilience (SPCR) to the Climate Investment Fund (CIF) Sub-Committee for the Pilot Programme for Climate Resilience (PPCR) in December 2017. Rwanda's SPCR is widely regarded as

an integrated, multi-sectoral and therefore economy-wide climate resilience investment plan that demonstrates the country's commitment to building broad-based climate resilience targeting high-impact investment opportunities that seek to achieve the national sustainable development objectives. The SPCR proposed four strategic investment programs for the SPCR that include one on climate resilient human settlement with a significant focus on building resilience for the six secondary cities that is a significant part of the GGGI's green cities work program

Land use planning has gained global recognition as one of the fundamental opportunities to build climate change resilience, especially over a longer time horizon. In Rwanda, a revision of the National Land Use Master Plan as well as Urban Master Plans and Local Land Development Plans present opportunities to mainstream climate change resilience into the six secondary cities. This proposed research project would seek to inform the strategy on current and future climate change considerations and ensure that integrated land use planning and spatial planning adequately integrate climate change resilience into the country's secondary city planning and implementation. The study would review current Land Use Master plans and their applications to guide secondary city development and identify constraints in the implementation. The study would support Information and data acquisition: support sourcing the existing national land use master plan and all supporting information to inform a consolidated national climate-responsive planning strategy; involve strategic discussions and interviews with officials and key private stakeholders in land use planning, spatial planning, and urban planning; and support collection and collation of research studies of national level climate change risks and vulnerability across Rwanda.

The fellow would be supervised by GGGI Rwanda technical staff as well as collaboration with the GoR.

Any applicants interested in this research project may contact GGGI for a list of relevant references.

**Proposed Deliverables:** (1) a standardized GGGI PowerPoint presentation for use with government stakeholders; (2) a report detailing key findings including the constraints and opportunities in secondary cities presented by Master planning efforts, and policy recommendations on improving planning and implementation of inclusive, green and climate responsive secondary city master plans; and (3) a publication in a peer-reviewed scientific journal.

## 20. GGGI Rwanda – Rooftop Solar Production: City of Kigali

**Location:** Kigali, Rwanda

**Duration:** August 15, 2018 – February 15, 2019

**GGGI Thematic Focus Area:** Energy; Green Cities

**Description:** GGGI Rwanda in partnership with the Rwanda Housing Authority (RHA) and the Rwanda Green Building Organization (RwGBO) have recently developed Rwanda's Green Building Minimum Compliance guidelines. The guidelines aim to maximize energy efficiency and ensure that green building and sustainable construction practices are adopted in new building construction throughout Rwanda.

The proposed research project would contribute towards ongoing work with the construction industry to promote the use of energy saving and sustainability measures throughout the sector. The purpose of the research would be to prepare estimates of the potential for solar energy production of rooftop space of all category 3 and 4 buildings in the City of Kigali. The research would entail estimating rooftop photovoltaic (PV) potential, annual system output, associated energy savings, and greenhouse gas emissions mitigated to continue to inform industry leaders and stakeholders of the benefits of sustainable practices incorporated into new and existing construction. Similar studies undertaken have produced estimates of meeting 16% of energy consumption requirements to up to

88% in cities in the United States. The research would also inform policy-makers of the potential for solar rooftop installation and the time to recuperate costs from initial installation.

The fellowship would include collaboration with GGGI Rwanda's Green Building Specialist as well as GGGI Rwanda's technical Assistants, interaction with private sector solar companies such as Mobisol, and collaboration with the Ministry of Infrastructure. The fellowship will include site visits to the Rwamagana Solar Power Station and Kigali Solaire.

Any applicants interested in this research project may contact GGGI for a list of relevant references.

**Proposed Deliverables:** (1) new research on the topic of rooftop solar production in Rwanda; (2) detailed technical report with key findings and recommendations; and (3) a standardized GGGI PowerPoint presentation for use with government stakeholders.

## 21. GGGI Rwanda – Rwanda's Model Green Villages: Greenhouse Gas Mitigation

**Location:** Kigali, Rwanda

**Duration:** August 15, 2018 – January 15, 2019

**GGGI Thematic Focus Area:** Sustainable Landscapes

**Description:** Several model green village sites have been constructed and have been in operation in two provinces of Rwanda. The villages were initiated to resettle communities in disaster-prone areas. The resettlements combine circular economy approaches to waste management, waste-to-energy conversion, sustainable agriculture, and capacity building in nutrition and livestock management to improve livelihoods and increase income-generating activities. The model green village sites aim to maximize energy use efficiency through circular economy approaches to waste-to-energy conversion to minimize the carbon footprint of each site. Few studies have been done to examine the impact of the settlements in terms of their carbon footprint. With new village sites currently in the planning stage, the outputs of the fellowship would be used to inform the policymaking and planning process for the construction of new sites and settlements.

The proposed research project would focus on calculating the net greenhouse gas emissions and carbon footprint analysis of the three model green village sites. In addition, the fellow would compare the sustainability measures in place at each site to determine their respective contribution to greenhouse gas emissions reduction and provide estimates for the multiplier effect achieved through the model green village concept. The project would require close collaboration with the Rwanda Housing Authority (RHA), the Rwanda Energy Group (REG), the Rwanda Utilities Regulatory Authority (RURA), and District-level government to determine the energy usage for each village and the offset of carbon emissions because of the waste-to-energy practices in operation. Baseline data on the Model Green Village sites would be provided by RHA.

The research project would inform donors, policy-makers, city planners, and local government stakeholders of the reduced carbon footprint of households achieved because of the model green village settlements and would also incorporate participatory rural appraisal (PRA) methods. Site visits would include travel to three green village sites.

Any applicants interested in this research project may contact GGGI for a list of relevant references.

**Proposed Deliverables:** (1) a detailed technical report; (2) a poster presentation at a conference; (3) a blog post for the GGGI main website (co-developed by the GGGI Rwanda Program Manager and the Senior Communications Specialist); and (4) a presentation at the 2018 Rwanda Green Growth Week.

## 22. GGGI Rwanda – Modelling Optimal Multi-Modal Transport: City of Kigali Sustainable Transport Solutions

**Location:** Kigali, Rwanda

**Duration:** August 15, 2018 – February 15, 2019

**GGGI Thematic Focus Area:** Green Cities

**Description:** The City of Kigali has rapidly increased in size and urbanization over the past ten years. During this time, car ownership has increased dramatically, and motorcycle taxis have also become a prominent form of transport. The population of the City of Kigali is expected to continue to rapidly increase straining existing transport systems, roads, and infrastructure. Developments in the transport sector include the establishment of a BRT system planned for 2018 and the launch of a vehicle manufacturing plant by Volkswagen that will also include electric/hybrid vehicles and a ride-hailing service. A critical area of investment will be to develop a model and framework for the promotion of a multi-modal transportation system to suit the needs of Kigali’s growing population.

GGGI aims to support the Government of Rwanda in taking a people-centered approach to developing its public transportation networks and infrastructure. The proposed research project would focus on developing recommendations for an optimal multi-modal sustainable transport system for the City of Kigali. The fellow would be charged with incorporating best practices and lessons learned from regional and international models. The fellow would be responsible for selecting a transport modelling software (such as TransCad, Citilabs CUBE, TRL’s Strategic Transport Model (STM), EMME/2, etc.) appropriate for the City of Kigali building a people-centered model for easy traffic patterns and optimizing the use of multiple modes of transport including cycling, public bus, walking, and motorcycles. The fellow would take into consideration existing data sources, minimizing greenhouse gas emissions, and needs/capacity for introducing non-motorized forms of transport. Lastly, the fellow would be tasked with developing policy recommendations and a needs assessment for the optimal system of sustainable transport developed.

The fellow would also be encouraged to create an innovative, creative, and forward-thinking model aimed at maximum energy efficiency and green growth approaches to increasing access to sustainable transport. The fellow would also have the support of GGGI Rwanda interns to conduct data collection as needed.

Any applicants interested in this research project may contact GGGI for a list of relevant references.

**Proposed Deliverables:** (1) a standardized PowerPoint presentation aimed at relevant stakeholders; (2) a journal article in a peer-reviewed publication; and (3) a technical report with key findings and recommendations.