GGGI Update

Frank Rijsberman, Director-General, GGGI

June 11, 2019
The Climate Crisis in 2018: heat waves, fires, floods, droughts intensify

2018: Floods in Kerala worst in a hundred years

2018: Republic of Korea sets all-time record high temperature amid deadly heat wave

2018: Massive forest fires and intense droughts affecting millions of people
GGGI President and Chair Ban Ki-moon accepts job as national fine dust czar

President Moon Jae-in, right, shakes hands with Ban Ki-moon, former United Nations secretary general, at the Blue House on Thursday as Ban accepted Moon’s offer to head a national agency to tackle the fine dust issue. [YONHAP] March 22, 2019
Also in March 2019: Cyclone Idai hit Mozambique

- Over 1000 deaths
- Over 110 thousand displaced in camps
- Over 1.5 million children affected
- Over $2Bn in damages
- Mozambique’s GBP is around $12Bn
Some good news, all in May 2019:

- **IRENA**: falling renewable energy costs will drive global climate action

- **Longi Green Energy Technology**: record low solar energy price USD 1.7 cent per Kilowatt hour – cheapest form of energy

- **IEA**: Solar, EVs and energy storage are 3 of 45 energy technologies keeping pace with energy transition goals
Global progress on energy access: 89% but very different LDCs

62% of people living in LDCs have no access to electricity compared with 10% in ODCs.

54% of people without access to electricity worldwide live in LDCs.

82% of people in rural areas in LDCs have no access to electricity.

The World is making progress towards achieving universal access to electricity, but LDCs lagging.

Achieving universal access to electricity by 2030 will require 3.5 times as many people in LDCs gaining access each year as in the last decade.

Source: UNCTAD, The LDC countries report May 2019
News from GGGI
News from GGGI Members

• New Members in 2018: Tonga (and Paraguay completed ratification)

• New Members in 2019: Sri Lanka, Burkina Faso, Uzbekistan

• Close to membership: Colombia, Ecuador, EU, Kuwait, Morocco, Nepal, Uganda

• Recent intent to join: Angola, Cote d’Ivoire, Madagascar, Sudan, Togo, Turkmenistan, Zambia

• Total countries in accession: 22 countries (expressed interest but not yet ratified):
Headquartered in Seoul, Republic of Korea, GGGI has **32 members** with operations in **33 countries**

**Member Countries**
Australia, Burkina Faso, Cambodia, Colombia, Costa Rica, Denmark, Ethiopia, Fiji, Guyana, Hungary, Indonesia, Jordan, Kiribati, Republic of Korea, Lao PDR, Mexico, Mongolia, Norway, Papua New Guinea, Paraguay, Peru, Philippines, Qatar, Rwanda, Senegal, Thailand, Tonga, United Arab Emirates, United Kingdom, Vanuatu, Viet Nam

**Operations**
Burkina Faso, Cambodia, China, Colombia, Costa Rica, Ethiopia, Fiji, Guyana, Hungary, India, Indonesia, Jordan, Kiribati, Lao PDR, Mexico, Mongolia, Morocco, Mozambique, Myanmar, Nepal, Papua New Guinea, Peru, Philippines, Rwanda, Senegal, Thailand, Uganda, United Arab Emirates, Vanuatu, Viet Nam

*Operations in 12 LDCs indicated in red*
GGGI Resource Mobilization

Earmarked project funding: *sharp increase:*
  * New commitments signed in 2018: US$31 million
  * New commitments signed to date in 2019: US$15 million
  * Pipeline value (adjusted): US$ 48 million

Core funding: *under pressure / new opportunities:*
  * In 2017-18: $5M/annum reduction Denmark & Norway
  * From 2020: Australia election makes new core uncertain
  * New opportunities core / programmatic earmarked: Indonesia, Qatar, Kuwait, Canada, France, New Zealand

10 New donors (2017-18): *strong diversification:*
  * BMGF, EU, GCF, Italy, KOICA, Luxembourg, Netherlands, 3 UN orgs
GGGI
2018 RESULTS

USD 482 MILLION GREEN INVESTMENTS RAISED IN 2018

32 green growth policies adopted by 17 governments with GGGI’s support

2018
70 PROJECTS FUNDED AND IMPLEMENTED

2017
49

+43%

2 NEW MEMBERS

30 PROJECTS BROKED 71 PARTNERSHIPS

21 PROJECTS BENEFITTING 17 COUNTRIES

29 policy outputs that informed the development of green growth policies

88 COMPLETED ADVISORY OUTPUTS that informed decisions on green growth investments

319 CAPACITY BUILDING ACTIVITIES

10,466 participants
GG / NDC / LEDS Planning

• **Colombia:** National Green Growth Plan – approved June 2018

• **Indonesia:** Low Carbon Development Initiative – December 2018

• **Fiji:** Low Emission Development Strategy – COP24, Dec 2018

• **Laos:** National Green Growth Plan – February 2019

• **Mongolia:** National Energy Efficiency Plan & Appliance EE standards

• **Rwanda:** Minimum Compliance Green Building Code & Greening new Bugesera airport.
Green and Climate Finance

- GGGI mobilized green and climate finance commitments of over US$1 billion in 2017-18
- Still a very short track record – to mature and scale up!
- Strong GCF strategic partnership: focus on direct access for members
  - 24 countries elected GGGI as delivery partner,
  - 12 readiness projects awarded
  - 12 more in pipeline plus 5 NAPs
  - 6 full proposals submitted to GCF for about $250M in climate finance
- Growing private sector engagement (15 project examples in 2018)
Strategy 2030 Process Overview
For “A low-carbon, resilient world of strong, inclusive, and sustainable growth”

1. Scoping & stakeholder analysis
   - Outcomes: Forum and GGGI teams have aligned sense of purpose
                 A clear and detailed project plan
                 Understanding of project risks, and mitigation strategies
                 Fully developed stakeholder map

2. Internal review and analysis
   - Outcomes: Shared understanding of what’s working well, and where the risks and weaknesses of current value creation model are

3. External trends analysis
   - Outcomes: GGGI team skilled up on Horizon Scanning research
                 Strong understanding future drivers of change for GGGI, and what risks and opportunities that presents for the organization

4. 2030 strategy and goal setting
   - Outcomes: Draft 2030 vision and outline strategic goals developed through staff workshop
                 GGGI team skilled up on futures methodology and facilitation
                 GGGI staff engaged and energized by emerging strategy

5. Stakeholder engagement (strategy testing)
   - Outcomes: Strategy tested and refined through stakeholder engagement
                 Systemic, bold 2030 vision and strategy articulated in final report
Fiji has adopted a detailed development plan that could see the Pacific Island country soak up more carbon than it emits by 2050. Fiji’s Low Emissions Development Strategy was launched at the UN climate conference held in December 2018 in Katowice, Poland.

The Sonora State Green Growth Strategy was adopted in 2018. Developed by GGGI at the Mexican government’s request and with regular civil society participation, the Green Growth Strategy (GGS) is the first of its kind in Mexico.

The strategy aims to build an innovative, resilient, low-carbon economy by working across a range of strategic areas, including renewable energy, energy efficiency, sustainable mobility, water management, and sustainable rural and urban development.
Colombia: Scaling up Multilateral Partnership for Deforestation in Colombia

In 2018, Norway extended its partnership with Colombia to halt deforestation, by renewing the Joint Declaration of Intent to ensure continued funding and technical expertise to protect some of the most valuable, life-supporting, and biodiverse forests in the world.

Nepal: Advancing Green Growth in Nepal through Electric Mobility

Nepal’s new electric buses will help the government fulfill its commitment under the country’s Nationally Determined Contribution, which sets targets for air quality and electric vehicle adoption.

A collaborative effort by the Ministry of Forests and Environment, Ministry of Physical Infrastructure and Transport, and GGGI led to the launching of Nepal’s first National Action Plan for Electric Mobility—a road map for achieving the NDC targets.

In 2018, Norway extended its partnership with Colombia to halt deforestation, by renewing the Joint Declaration of Intent to ensure continued funding and technical expertise to protect some of the most valuable, life-supporting, and biodiverse forests in the world.
Rwanda: Rwanda Green Fund – Mobilizing Climate Finance and Scaling up Green Growth

In March 2018, the Government of Rwanda received a grant of USD 32.8 million from the Green Climate Fund to strengthen climate resilience in rural communities in northern Rwanda. This was just the latest example of the Rwanda Green Fund demonstrating its capacity and leadership in mobilizing finance for green growth and climate action.

GGGI has supported FONERWA through capacity development and the elaboration of a multi-year business and sustainability plan. GGGI has also assisted the fund to prepare a number of successful funding proposals.

Mongolia: Raising Green Growth Awareness among Youth in Mongolia

In 2018, a collection of short animated videos brought Mongolia’s green growth plans directly to new audiences and advocated for environmentally-friendly policies and practices.

GGGI played a leading role in preparing and producing the videos for the government, as part of its support to Mongolia in promoting the mainstreaming of green growth among government institutions and the general public.
UAE: Assessing Climate Risks as a Key Step toward Resilience in the UAE

UAE has been achieving economic success, overcoming the challenges of a harsh desert environment with scarce water resources and less arable land. However, the increasing impacts of climate change may impede progress and thus require proactive approaches to enhance resilience while tapping potential opportunities. In response to this challenge, the UAE developed the National Climate Change Plan through the support of GGGI. One of the plan’s main pillars is an adaptation program that aims to conduct climate risks assessments in key sectors as the basis for implementing adaptation measures.

Vanuatu: Financing 100% Renewable Energy in Vanuatu

As Vanuatu’s government looks to improve their electricity supply while following a path of sustainable, environmentally-friendly growth, GGGI is playing a key role in securing investment for the Pacific Island country to achieve its development goals.

GGGI, which developed parts of the National Energy Road Map, covering energy efficiency and green growth — has helped create the National Green Energy Fund to mobilize finance for investment.
Green Cities: 2019 Investment Pipeline

Overview

17 Opportunities

- Sustainable Transport: 5
- Rooftop Solar / EE: 5
- Waste to Resource: 3
- Waste Water: 1
- Cross-sector: 3

14 Countries

- S/SE Asia: 6
- MENA: 2
- Africa: 4
- LATAM: 2

424 Investment Size (US$ million)

- Investment Ready: US$ 194 million
- Design / Structuring Phase: US$ 25 million
- Origination Phase: US$ 205 million
## Sustainable Transport
### Investment Pipeline

<table>
<thead>
<tr>
<th>No.</th>
<th>Project</th>
<th>Country</th>
<th>Investment Opportunity</th>
<th>Investment Size</th>
<th>Current Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bus Rapid Transit (BRT) in Amman</td>
<td>Jordan</td>
<td>International competitive bidding tenders for the supply and O&amp;M of BRT vehicle and System control operators is expected by Q4-2019</td>
<td>US$ 60 million</td>
<td>Investment Ready</td>
</tr>
<tr>
<td>2.</td>
<td>Bus Rapid Transit (BRT) in Vientiane</td>
<td>Laos PDR</td>
<td>To be identified. Currently in a planning and policy development phase. GGGI is conducting a pre-feasibility study to evaluate the electric bus option.</td>
<td>TBD</td>
<td>Origination Phase</td>
</tr>
<tr>
<td>3.</td>
<td>Smart Payment for Public Transport</td>
<td>Rwanda</td>
<td>Growth capital for expansion of public transport payment system to secondary cities in Rwanda.</td>
<td>US$ 2 million</td>
<td>Investment Ready</td>
</tr>
<tr>
<td>4.</td>
<td>Green Bus Transport in Kampala</td>
<td>Uganda</td>
<td>To be identified. Currently in a planning and policy development phase. Mandate from Government to appoint GGGI as an advisor to the BRT project is expected soon.</td>
<td>TBD</td>
<td>Origination Phase</td>
</tr>
</tbody>
</table>
# Roof Top Solar & Energy Efficiency Investment Pipeline

<table>
<thead>
<tr>
<th>No.</th>
<th>Project</th>
<th>Country</th>
<th>Investment Opportunity</th>
<th>Investment Size</th>
<th>Current Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Energy Efficiency in SME sector</td>
<td>Thailand</td>
<td>Co-investment with a leading ESCO, Energy Efficiency Services Ltd. (EESL), towards implementation of energy efficiency measures in SME sector</td>
<td>US$ 20 million</td>
<td>Investment Ready</td>
</tr>
<tr>
<td>2.</td>
<td>Green Telecom Towers</td>
<td>Papua New Guinea</td>
<td>Build, Own &amp; Operate (BOO) solar-diesel hybrid system for 100 telecom towers.</td>
<td>US$ 20 million</td>
<td>Origination Phase</td>
</tr>
<tr>
<td>3.</td>
<td>Solar PV for New Industrial Towns</td>
<td>India</td>
<td>GGGI has been mandated to conduct the pre-feasibility study and advise on the implementation structure.</td>
<td>US$ 120 million</td>
<td>Origination Phase</td>
</tr>
<tr>
<td>4.</td>
<td>Roof-top Solar in Adama Industrial Park</td>
<td>Ethiopia</td>
<td>Project locations to be identified. Currently in a planning and policy development phase.</td>
<td>TBD</td>
<td>Origination Phase</td>
</tr>
<tr>
<td>5.</td>
<td>JV Partnership for Onsite Solar PV (60% Equity Ownership)</td>
<td>Guyana</td>
<td>JV Partnership for Onsite Solar PV</td>
<td>US$ 12 million</td>
<td>Investment Ready</td>
</tr>
</tbody>
</table>
## Waste to Energy Investment Pipeline

<table>
<thead>
<tr>
<th>No.</th>
<th>Project Description</th>
<th>Country</th>
<th>Investment Opportunity</th>
<th>Investment Size</th>
<th>Current Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Vegetable market waste to Bio-CNG</td>
<td>India</td>
<td>Project locations to be identified. Currently in a planning and policy development phase. GGGI has been mandated by the local governments to advise on project feasibility assessment.</td>
<td>US$ 11 million</td>
<td>Origination Phase</td>
</tr>
<tr>
<td>2.</td>
<td>E-Waste Treatment</td>
<td>Thailand</td>
<td>Project locations to be identified. Currently in a planning and policy development phase. GGGI has been mandated by Udon Thai municipality to advise on the implementation of the pilot project.</td>
<td>TBD</td>
<td>Origination Phase</td>
</tr>
<tr>
<td>3.</td>
<td>Municipal Solid Waste (MSW) to Energy</td>
<td>Morocco</td>
<td>Project locations to be identified. Currently in a planning and policy development phase. GGGI has been mandated by the provincial government of Kenitra to advise on project feasibility assessment.</td>
<td>US$ 54 million</td>
<td>Origination Phase</td>
</tr>
</tbody>
</table>
## Waste Water Investment Pipeline

<table>
<thead>
<tr>
<th>No.</th>
<th>Project</th>
<th>Country</th>
<th>Investment Opportunity</th>
<th>Investment Size</th>
<th>Current Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sanitation Services in Siem Reap</td>
<td>Cambodia</td>
<td>Three investment opportunities for private sector participation related to the delivery of sanitation services and associated waste water treatment.</td>
<td>TBD</td>
<td>Design and Structuring Phase</td>
</tr>
</tbody>
</table>

**South East Asia**
Jordan : Amman Bus Rapid Transit (BRT)

Project Overview

The Bus Rapid Transit (BRT) is the first public transport project that includes the development of infrastructure and transport operating system in Amman.

BRT Components

- 32 km dedicated bus lanes separated from other regular traffic with lane barriers serving, sidewalks, mixed-traffic lanes and non-motorized lanes.
- As per GGGI proposal, a critical section of the BRT system is expected to run on a fully electric bus system.
- 60 modern buses with capacity of 120 passengers per bus.
- High quality stations with park-n-ride facilities
- Integrated fare collection system

Project Timeline

- Jul 2009: Project Established
- Apr 2010: Feasibility study completed
- Oct 2010: Commitment from AFD
- Feb 2013: Project reevaluation completed
- Dec 2016: Resumption of AFD fund release
- Oct 2018: Sahafeh network station commissioned
- Dec 2019: BRT operator selection
- Dec 2020: Completion of civil works
- Mar 2021: Start of BRT Operations
Jordan: Amman BRT – Vehicle Operator
Investment Overview (Readiness: Investment Ready)

The “Vehicle Operator”, one of the key service provider for the BRT system, will be responsible for the following project components of the Amman Bus Rapid Transit System:

1. Supply and fund the procurement of 60 modern 18m long low floor buses, each with a capacity of 120 persons.

2. Operation and maintenance of BRT vehicles in accordance with a schedule set forth by Greater Amman Municipality.

3. Provision of BRT system operations training to the BRT vehicle drivers

Key Investment Highlights

• Fixed price contract with sovereign payment guarantee. Jordan is rated B+ by S&P with a stable outlook.

• Min. revenue guarantee for the duration of the contract period allows for near complete recovery of the expected capital investment.

• Monthly payment is indexed to fuel and electricity prices.

• Local firms without relevant expertise can bid by partnering with established international firms.

• Opportunity to realize upwards of 15% IRR on an unlevered basis.

Contract Details

<table>
<thead>
<tr>
<th>Contract Period</th>
<th>10 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Contract Value</td>
<td>US$ 40+ million</td>
</tr>
<tr>
<td>• Capital Investment *</td>
<td>US$ 40 million</td>
</tr>
<tr>
<td>• Annual O&amp;M revenue</td>
<td>TBD</td>
</tr>
</tbody>
</table>

Selection Process

International Competitive Bidding (ICB) based on experience, financial capability and the cost of providing the services.

Proposed payment terms

• Remunerated on the basis of the number of bus kilometers operated in line with a schedule paid out in pre-defined time intervals;

• Min. revenue guarantee expressed in terms of min. annual bus kilometers

• Partial indexation to fuel price and inflation to cover fuel and O&M cost

• No forex indexation

• Additional payment (as % of total system revenue) if KPIs are satisfied.

• Sovereign payment guarantee provided by Ministry of Finance

• Government Default: Early termination payment to operator based on the depreciated value of the fleet + Min. investment return

Issuance of RFP

Q4 - 2019

* Based on the assumption that the 30 out of 60 bus will be electric buses.

All figures in US$ is based on a FX conversion rate of US$ 1 = JOD 0.71
Jordan: Amman BRT – System Control Operator
Investment Overview (Readiness: Investment Ready)

The "System Control" operator, one of the key service provider for the BRT system, will be responsible for design, supply, installation, operation, and maintenance of the following project components of the Amman Bus Rapid Transit System:

1. BRT control center to enable a centralized control of bus operations.

2. Intelligent Transportation System (ITS), including systems for real-time passenger information, fleet scheduling, and fleet management.

3. Fare System, including electronic fare media, automatic fare collection, electronic fare validation, and settlement and clearance processing.

4. Station Management, including station and corridor passenger services, security, general cleaning and light maintenance, and landscaping.

Key Investment Highlights

- Fixed price contract with sovereign payment guarantee. Jordan is rated B+ by S&P with a stable outlook.
- O&M cost increase is partially mitigated by indexation to local CPI.
- Local firms without relevant expertise can bid by partnering with established international firms.
- Opportunity to realize upwards of 15% IRR on an unlevered basis.

<table>
<thead>
<tr>
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</tr>
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<tbody>
<tr>
<td>Contract Period</td>
</tr>
<tr>
<td>Total Contract Value *</td>
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<tr>
<td>- Capital Investment</td>
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<tr>
<td>- Annual O&amp;M revenue</td>
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<tr>
<td>Selection Process</td>
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<tr>
<td>Proposed payment terms</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Issuance of RFP</td>
</tr>
</tbody>
</table>

* Estimate based on Peshawar BRT System control contract awarded in 2018

All figures in US$ is based on a FX conversion rate of US$ 1 = JOD 0.71
Rwanda: Smart Payment for Public Transport
Investment Overview (Readiness: Investment Ready)

• GGGI is supporting the government of Rwanda to develop secondary cities as competitive economic centers pursuing climate resilient, sustainable & inclusive growth.

• An outcome of this engagement is the identification of AC Group as a potential solution provider for automatic payment systems for public transportation.

• The proposed investment in AC Group is an equity raise of US$ 2 m towards implementation of “Tap & Go” automatic payment systems in the secondary cities.

AC Group

• AC Group Ltd is a Rwandan tech company providing smart transport solutions. Since 2015, AC Group has changed payments on all public buses in Kigali to smart payments known as Tap & Go and introduced WiFi on all buses.

• In the next phase, a smart phone app, Tap & Go 2.0 is scheduled to be launched by June 2019 to provide value added services for the 2 million Tap & Go users.

• Using the data collected, AC Group plans to optimize routing and scheduling with an aim of making public transport the preferred means of transport for all citizens.

• The governments of Angola, Tanzania and Kenya have approached AC Group to replicate the solutions that have been deployed in Rwanda.
PNG: Green Telecom Towers
Investment Overview (Readiness: Origination Phase)

- The proposed investment aims at funding the Energy Service Companies (ESCO) in PNG towards providing simple, efficient, and reliable power for telecom networks by replacing diesel fuel with solar hybrid system.

- A total of 100 towers operated by the major telecom operators in PNG is being targeted in the current phase. The total investment required is approx. US$ 20 million.

**Project Highlights**

- Solar hybrid system addresses the two main challenges faced by the telecom tower companies in PNG
  
  o High operating expenditure: Energy costs account for ~30 to 40% of total operational expenditure for a telecom tower company.
  
  o Diesel pilferage losses ~20% have been observed in the industry which further increases the energy costs

- Pilot project in PNG has demonstrated the following benefits
  
  o Monitoring of the project during the first year of operation has revealed an operational cost saving of over $40,000 and a 72% reduction in diesel fuel consumption.
  
  o Reduced maintenance requirements and increased service intervals.

<table>
<thead>
<tr>
<th>Project Characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>100 Telcom towers in urban and semi-urban areas of PNG</td>
</tr>
<tr>
<td>Asset ownership</td>
<td>ESCO</td>
</tr>
<tr>
<td>Cost of Solar Hybrid system</td>
<td>US$ 150 – 200k per unit</td>
</tr>
<tr>
<td>Capital Structure</td>
<td>TBD</td>
</tr>
<tr>
<td>Contract Period</td>
<td>10 - 15 years</td>
</tr>
<tr>
<td>Funding</td>
<td>ESCO</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>ESCO</td>
</tr>
<tr>
<td>Risk</td>
<td>Risk sharing between Tower company and ESCO</td>
</tr>
<tr>
<td>Expected Payback</td>
<td>7 – 8 years</td>
</tr>
</tbody>
</table>
India : Solar PV for New Industrial Towns
Investment Overview (Readiness : Origination Phase)

• 150 MW Solar PV development to cater to the new industrial town development (NTD) along the under construction 700 KM Nagpur-Mumbai highway

• Total project cost is US$ 120 million and the equity requirement is US$ 40 million

Project Highlights

• The development of the 700 km highway in the region is a national priority and industrial belt development is key to revenue generation from the new highway. Land acquisition for the highway complete, funding secured by AIIB and nationalized banks and government budget.

• The Krushi Samruddhi Kendra (new industrial towns) will spread across 10 districts and comprise agro-based industrial, manufacturing and commercial hub along with a residential area equipped with basic amenities.

• Power (renewable) for the new industrial corridor is in the planning document of State-run power utility. The utility commits to buy the power of the new solar PV plant.

• GGGI designed project will be directly aligned and contributes to the Renewable Generation Obligation.

Project Characteristics

<table>
<thead>
<tr>
<th>Location</th>
<th>5 locations in 10 districts. 1000 acres land locations identified for the project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Investment</td>
<td>US$ 120 million</td>
</tr>
<tr>
<td>Capital Structure</td>
<td>30% Equity ; 70% Debt (expected)</td>
</tr>
<tr>
<td>Transaction Structure</td>
<td>Design, build, finance, operate, and transfer (DBFOT)</td>
</tr>
<tr>
<td>Power Purchase Agreement tenure</td>
<td>20 year firm fixed price</td>
</tr>
<tr>
<td>Unlevered IRR (Expected)</td>
<td>12%</td>
</tr>
</tbody>
</table>

New Town Development Locations

- Nagpur
- Jalna
- Wardha
- Aurangabad
- Amaravati
- Ahmednagar
- Washim
- Nashik
- Buldhana
- Thane
Guyana : JV Partnership for Onsite Solar PV
Investment Overview (Readiness : Investment Ready)

- Local Engineering, Procurement, and Construction company seeking a Joint Venture partner to expand its early stage onsite solar PV business in Guyana
- JV partner will acquire a stake of up to 60% to develop a $20 million 14 MW pipeline
- JV will set up a SPC to finance, build, own, and operate the projects under solar lease agreements

### Key Investment Highlights

**Local Partner : Soventix GmbH**

- Strong local engagement of small and medium businesses with more than 20 years of operations in Guyana.
- Experienced in permitting, building, and operating onsite solar PV in Guyana, with over 30 installations to date

**Strong market fundamentals**

- Nearly one-third of Guyana’s energy use is off grid, with reliance on diesel: cost of electricity around $0.29/kWh.
- Grid power (85% diesel and oil, 15% biomass) is high cost and unreliable, with tariff rates for commercial and industrial customers around $0.25/kWh

**Favorable regulatory framework**

- Guyana established the Urban Sector Solar Energy Program to scale up renewable energy deployment. Guyana has a national target of transitioning to 100% renewable energy by 2025
- Local utility (Guyana Power and Light) is working on ways to encourage more grid-connected onsite solar PV

### Key Figures

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Total Solar PV Capacity</td>
<td>14 MW</td>
</tr>
<tr>
<td>Total Investment</td>
<td>US$ 20 million</td>
</tr>
<tr>
<td>Capital Structure</td>
<td>30% Equity ; 70% Debt</td>
</tr>
<tr>
<td>Solar Lease Term</td>
<td>10 to 15 years</td>
</tr>
<tr>
<td>Equity IRR</td>
<td>15%</td>
</tr>
<tr>
<td>Guyana Credit Rating</td>
<td>Not Rated</td>
</tr>
<tr>
<td>Guyana – Ease of doing business</td>
<td>Medium</td>
</tr>
</tbody>
</table>
India : Organic Waste to Bio-CNG
Investment Overview (Readiness : Origination Phase)

• The proposed investment aims at establishing high technology bio-methanation facilities in 10 Tier 1 & 2 cities of India, where organic waste from vegetable & fruit market is converted to high grade natural gas.

• The total investment is estimated at US$ 11 million, of which the sponsor’s equity commitment is US$ 2.6 million. The local financial institutions will provide the remainder of the debt financing required.

Key Investment Highlights

• Project to be implemented under PPP structure (BOOT model) between the government and the project sponsor.

• Standardized plant design based on commercially proven Bio-CNG production process. Useful life is 20 years.

• Favorable long term bulk supply of segregated organic waste from the respective municipal corporation.

• Attractive Bio-CNG off-take policy by the Govt. of India guaranteeing price certainty for first 3 years

• Capital subsidy from Govt. of India – up to 20% of project cost.

Project Characteristics

<table>
<thead>
<tr>
<th>Location</th>
<th>10 Municipalities in Tier 1 &amp; 2 cities of the states of Karnataka &amp; Andhra Pradesh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Plant Capacity</td>
<td>450 Tonnes per day of Vegetable &amp; Fruit market organic Waste</td>
</tr>
<tr>
<td>Bio-CNG : Production</td>
<td>18 Tonnes per Day</td>
</tr>
<tr>
<td>Bio-Fertilizer :</td>
<td>6 Tonnes / Day</td>
</tr>
<tr>
<td>Investment Metrics (US$ Basis)</td>
<td>14.5 % 7 years</td>
</tr>
</tbody>
</table>

All figures in US$ is based on a FX conversion rate of US$ 1 = INR 70

Key Investment metrics is calculated based on the assumption that the INR depreciates annually against the US$ at the CPI differential rate of 4% p.a.
Thailand : E-Waste Recycling Plant
Investment Overview (Readiness : Origination Phase)

- GGGI, in partnership with Udon Thani City Municipality, is working to establish the systematic e-waste management system and scalable material recycling center.
- Capex estimates from the pre-feasibility study for a pilot e-waste treatment plant of 500 kg/day at Udon Thani is US$ 3 million.
- Preliminary desktop economic analysis of the project suggests that break-even is achieved by processing high grade e-waste of > 100 Tonnes per year.

Implementation Structure
- Project to be implemented under PPP structure (BOOT model) between the government and the project sponsor.
- Standardized plant design based on commercially proven E-Waste treatment process. Useful life is 20 years.
- Favorable long term bulk supply of electronic waste from the respective municipal authorities.
- Capital subsidy from Govt. of Thailand.

<table>
<thead>
<tr>
<th>Pilot Project - Key Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
</tr>
<tr>
<td><strong>Plant Capacity</strong></td>
</tr>
</tbody>
</table>
| **E-Waste Composition** (Base Case) | TV: 30\%  
Mobile: 40\%  
Laptop: 20\%  
Printer: 10\% |
| **Revenue Factor** | 75\% of potential value recovered by recycling |
| **Economic Appraisal** (Key Findings) |  
- Below a throughput of ~100 tonnes per year, break-even is not reached  
- Commodity prices have a strong impact on the business performance  
- Profitable to treat IT equipment whereas a high share of TVs would lower the financial performance. 
- Printed Circuit Boards (PCB) is a major revenue driver. |
Morocco: Organic Waste to Energy
Investment Overview (Readiness: Origination Phase)

- The proposed investment aims at establishing anaerobic digestor plants in 7 provinces of Morocco, where organic waste is converted to biogas, which is then converted to heat and power (CHP – Combined Heat & Power).

- The total investment is estimated at US$ 54 million, of which the sponsor’s equity commitment is US$ 16 million. The local and multi-lateral financial institutions are expected to provide the debt financing required.

Key Investment Highlights

- Project to be implemented under PPP structure between the government and the project sponsor.

- Standardized plant design based on commercially proven anaerobic digestion process. Useful life of the plant is 20 years.

- Favorable long term bulk supply of segregated organic waste from the fruit/vegetable markets and animal slaughter waste.

- Support from the provincial government on the off-take of electricity and heat produced from the plant.

- European Investment Bank (EIB) has conducted the feasibility study and has expressed interest in supporting this investment.

Project Characteristics

<table>
<thead>
<tr>
<th>Location</th>
<th>11 plants located in the industrial areas of 7 provinces in Morocco</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedstock capacity (aggregate)</td>
<td>440 Tonnes per day of Organic waste</td>
</tr>
<tr>
<td>Annual biogas Output (aggregate)</td>
<td>21.7 million m³</td>
</tr>
<tr>
<td>Net power capacity for sale of electricity (aggregate)</td>
<td>6.3 MW</td>
</tr>
<tr>
<td>Net thermal capacity for sale of heat output (aggregate)</td>
<td>4.2 MW</td>
</tr>
<tr>
<td>Investment Metrics (US$ Basis)</td>
<td>9.0% 11 years</td>
</tr>
</tbody>
</table>

* 4 plants in Casablanca province including one in Zenata Eco City
# 2 plants in Rabat-Sale province

All figures in US$ is based on a FX conversion rate of US$ 1 = MAD 9.5
Cambodia: Sanitation Services in Siem Reap
Investment Overview (Readiness: Design and Structuring Phase)

- GGGI has been supporting the Cambodia government and selected municipalities in the development of a "Sustainable City Strategic Plan" for secondary cities in Cambodia.
- Siem Reap, a major secondary city in Cambodia with an estimated population of 248,777 people and 56,571 households as of 2017, was selected by GGGI to improve its sanitation delivery system.

Investment Opportunities

A business and operational model was developed by GGGI and three investment opportunities for private sector participation have been identified.

1. Sanitation Control Operator: Establish and operate a centralized call center for the city of Siem Reap for handling desludging requests, and implement smart systems for real-time management of desludging scheduling and operations.

2. Desludging Fleet Operator: Procure and maintain the desludging fleet and conduct operations as per the service requests.

3. Waste Water Treatment Plant: PPP project to be awarded to a private concessionaire on Build, Own and Operate (BOO) model.

Business & Operational Model

The diagram below depicts the proposed business model in terms of flow of desludging operations, finances and institutional set-up to implement the sanitation system in Siem Reap.
In Conclusion:

- GGGI is now in its 7th year as an international organization
- No longer in start-up, but in maturation phase: focus on in-country results
- Strong increase in demand: 32 members + 22 countries in accession!
- Financially healthy – but looking for additional core to fund expansion
- Continued strong green growth planning results & over $1Bn green and climate finance mobilized
- Ready to present its Strategy 2030 to the members!
Thank You

Twitter: @FrankRijsberman