READINESS FRAMEWORK FOR GREEN BONDS

30th April 2020
Agenda

- Welcome note and Introduction to ALP (10 min) – ALP Secretariat
- Roadmap for Green Bond Readiness Framework (15 min) – Alexia Kelly, Co-Chair of the LEDS GP Finance Working Group
- Green Bonds for Infrastructure Investments (15 min) – Mehul Patwari, South Pole Group
- Projects to back Potential Green Bond Issuances, Case Study & Credit Enhancement (25 min) – Sandeep Bhattacharya, Climate Bonds Initiative (CBI) India
- Open discussions (50 min) – All
- Closing remarks and the way forward (5 min) – Asia LEDS Partnership
• The ALP launched in Sep 2012 is a voluntary regional network promoting LEDS in Asia

• LEDS GP launched in 2011 operates through four regional platforms

• LEDS GP Global Secretariat is hosted currently by the GIZ within the Support Paris Agreement project, funded by BMU

- ALP membership: 1125 (371 Organizations and 754 Individuals)
- 45 Government Agencies from 14 Asian countries
Focus area:
Blended capital and green bonds to support achieving NDC targets

CoP activities:
• Compilation of good practices, lessons learned, success stories
• Sharing of tools, resource materials and new concepts
• In-person workshops with peer learning and networking opportunities
• More than 300 participants representing around 20 Asian countries are members of ALP CoPS
Finance CoP

50+ participants

9 Countries: Bangladesh, Bhutan, India, Indonesia, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam

Green Bonds in India - Process and Progress

CASE STUDY

April 2020

Pratiksha Gate, Senior Project Officer (Sustainable), ICLEI South Asia, India
Prateek Mishra, Project Engineer (Energy & Climate), ICLEI South Asia, India

The impact of climate change poses a significant challenge all over the world, and particularly in developing countries that are vulnerable because of rapid urbanization and a host of other factors. Consequently, these developing nations need to adopt and implement city-specific climate-resilient mitigation and adaptation measures. However, one of the biggest roadblocks to the implementation of these measures is access to funding.

The lack of any concrete advances on finance pledges at the climate change negotiations at COP24 in Katowice, Poland, in 2018, amplifies the need for innovation in financing mitigation and adaptation activities, as well as to insure against loss and damage caused by climate change.

However, developing countries are fast realizing that financial support for loss and damage (which is not governed by a legally binding framework) from developed countries is likely to be very small. While developing countries need to continue to seek clarity on the pathways of financial support under the UN Framework Convention on Climate Change (UNFCCC) regime, they cannot wait for it. Climate risk is real, and it is growing. We must share the burden and act now.

India, with its rapid urbanization and economic growth, is vulnerable to climate change impacts. While the Government of India has pledged to adopt a low-carbon development pathway that incorporates the required adaptation measures, the country urgently needs to finance green projects that have been launched, such as Smart City, Swachh Bharat and Solar City initiatives. Considering the huge projected capital and investment required, the current financing options (such as commercial banks, multilateral financial institutions and non-banking finance companies) would be inadequate.

In such a scenario, green bonds are a promising additional avenue for mobilizing climate finance, offering viable and scalable financing options, and are key to India’s sustainable development. The World Bank defines a green bond as “debt security that is issued to raise capital specifically to support climate-related or environmental projects.” (World Bank, 2013)
Climate helpdesk services

• The no cost technical assistance is available for developing countries to plan and implement NDCs, LEDS or transparency systems.
• Technical institutions and NGOs that are working directly with country governments can also avail the TA.
• For further information please visit Climate helpdesk webpage
• To avail the TA please write to alpsecretariat@iclei.org

Sri Lanka: Framework development for the national e-mobility policy

Bhutan: Scoping of pre-BRTS, Thimphu city
<table>
<thead>
<tr>
<th>Other Communities of Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean Mobility CoP</td>
</tr>
<tr>
<td>• Moving towards clean mobility by strengthening the operational and energy efficiency of public transport policies and systems</td>
</tr>
<tr>
<td>• Registration link</td>
</tr>
<tr>
<td>NDC Finance CoP</td>
</tr>
<tr>
<td>• Focuses on blended capital and green bonds to support achieving NDC targets</td>
</tr>
<tr>
<td>• Registration link</td>
</tr>
<tr>
<td>Building Energy Efficiency</td>
</tr>
<tr>
<td>• Focuses on BEE policy, technologies and Financing</td>
</tr>
<tr>
<td>• Registration link</td>
</tr>
</tbody>
</table>

To join ALP membership click here
Roadmap for Green Bond Readiness Framework

Alexia Kelly

Asia LEDS Partnership NDC Finance Community of Practice
30 April 2020
The LEDS GP Finance Working Group (FWG) supports developing countries in accelerating investment into low emission development through:

- Peer learning & collaboration
- Targeted technical resources & support
- Innovative public - private partnerships
### Green Bonds Explained

- **Proceeds to climate projects**
  - Vanilla bonds – no complicated structure
  - Comparable pricing
  - Refinance as well as project
  - 90% investment grade

- **Any entity**
  - Governments & DFIs
  - Corporates
  - Asset owners: PPPs, banks, utilities, etc
  - Municipalities

- **Any structure**
  - Senior unsecured
  - Asset-backed
  - Covered bonds
  - Other: loans, Sukuk

- **Reporting**
  - Transparency to climate asset or project
  - Independent review
  - Reporting on use of proceeds

- Green bonds are debt securities issued by financial, non-financial or public entities where the proceeds are used to finance 100% green projects and assets.

- Just like regular vanilla bonds. "green" is a bonus feature to the bond.

- It’s about the projects and assets, not the issuer.

- The *green* label is a tool for investors.
Green bonds can shift financial markets to green

Global financial markets

- $90trn bond market
- Investors are seeking yield
- Record low interest rates
- Investors want green:
  - $60trn investor commitment at UN Climate Summit
  - Insurers commit to increase climate investments 10x by 2020

Climate mitigation and adaptation requirements

- Paris agreement to keep temperature rise below 2 degrees
- IEA: Energy sector requires $53trn by 2035
- $93trn required by 2030 across all sectors

Green Bonds: Tool to shift debt capital markets to climate solutions

Slide Source: Climate Bonds Initiative
## What is Green – Climate Bonds Taxonomy

<table>
<thead>
<tr>
<th>ENERGY</th>
<th>TRANSPORT</th>
<th>WATER</th>
<th>BUILDINGS</th>
<th>LAND USE &amp; MARINE RESOURCES</th>
<th>INDUSTRY</th>
<th>WASTE</th>
<th>ICT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar</td>
<td>Private transport</td>
<td>Water monitoring</td>
<td>Residential</td>
<td>Agriculture</td>
<td>Cement production</td>
<td>Preparation</td>
<td>Broadband networks</td>
</tr>
<tr>
<td>Wind</td>
<td>Public passenger transport</td>
<td>Water storage</td>
<td>Commercial</td>
<td>Commercial Forestry</td>
<td>Steel, iron &amp; aluminium production</td>
<td>Reuse</td>
<td>Telecommuting software and service</td>
</tr>
<tr>
<td>Geothermal</td>
<td>Freight rail</td>
<td>Water treatment</td>
<td>Products &amp; systems for efficiency</td>
<td>Ecosystem conservation &amp; restoration</td>
<td>Glass production</td>
<td>Recycling</td>
<td>Data hubs</td>
</tr>
<tr>
<td>Bioenergy</td>
<td>Aviation</td>
<td>Water distribution</td>
<td>Urban development</td>
<td>Fisheries &amp; aquaculture</td>
<td>Chemical production</td>
<td>Biological treatment</td>
<td>Power management</td>
</tr>
<tr>
<td>Hydropower</td>
<td>Water-borne</td>
<td>Flood defence</td>
<td>Supply chain management</td>
<td>Fuel production</td>
<td>Waste to energy</td>
<td>Landfill</td>
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</tr>
<tr>
<td>Marine Renewables</td>
<td>Nature-based solutions</td>
<td></td>
<td></td>
<td></td>
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<td>Radioactive waste management</td>
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<tr>
<td>Transmission &amp; distribution</td>
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<tr>
<td>Storage</td>
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<tr>
<td>Nuclear</td>
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</tbody>
</table>

- Certification Criteria approved
- Criteria under development
- Due to commence

Slide Source: Climate Bonds Initiative
Principles & Standards

**Green Bond Principles (ICMA)**
**Green Loan Principles (LMA)**

1. Define eligibility criteria for use of proceeds
2. Evaluate and select assets
3. Manage proceeds
4. Report asset allocation

Eligible asset categories – 10 indicative, broad categories

Use of 3rd party to verify management and use of proceeds is encouraged

**Climate Bonds Taxonomy, Standard and Sector Criteria**

- Alignment to GBP/GLP but stricter on category eligibility
- Certification under the Climate Bonds Standard & Criteria
  - Initial and at least annual 3rd party verification of use of proceeds required
  - Only categories with Sector Criteria are eligible
  - Criteria set benchmark metrics to ensure assets are on a trajectory to decarbonisation by 2050 (ref. Paris Agreement)

**ASEAN Green Bond Standards (ASEAN Capital Markets Forum)**

- Based on GBPs
- Aligned with Climate Bonds Taxonomy
- Full disclosure of eligible projects required
- Frequent reporting encouraged and public disclosure required
- Recommendations to obtain external review and to disclose reviewer credentials

Slide Source: Climate Bonds Initiative
European issuance remains strong but Asian volumes are rising

Asia-Pacific issuance grew 35% in 2018

5 new sovereign GB issuers in 2018:
- Europe: Belgium, Ireland, Lithuania
- APAC: Indonesia
- Africa: Seychelles

2 new sovereign GB issuers in 2019:
- Europe: Netherlands
- LAC: Chile

Slide Source: Climate Bonds Initiative
Corporate sector and sovereigns becoming increasingly active

Key players:

- **Development banks**
  - Initiated green bond market. Still quite active in Emerging Markets
  - EIB is largest issuer
  - IFC now mainly emerging markets GB investor

- **Corporate sector**
  - Financial corporates now engaging as issuers & underwriter roles

- **SSA sector**
  - Government backed entities particularly important issuers – ABS issuance enhanced by Fannie Mae Green MBS
  - Sovereigns raising their game: 2018 debut deals from Indonesia, Belgium, Lithuania + repeats from Poland, France

**Issuance by issuer type - Evolution**

Slide Source: Climate Bonds Initiative
Green Bonds Growth - evidence of investor demand

Source: Climate Bonds Initiative.
Data as of 31st Dec 2019.

FOR INVESTORS
- E in ESG
- Risk mitigation
- Client reporting

FOR ISSUERS
- Investor diversification
- Capital protection characteristics
- Stock price correlation
Sovereign & Sub-National Bond Issuance Drivers

1. Strategic Coordination
2. New and diverse investors
3. Pricing Advantages
4. Visibility
5. Green Market Creation
6. Capital Mobilisation
7. International Leadership

Slide Source: Climate Bonds Initiative
Sovereign & Sub-National Issuers

**Sovereign Green Bond Issuances**
- Poland
- France
- Fiji
- Nigeria
- Indonesia
- Belgium
- Lithuania
- Ireland
- Seychelles
- Netherlands
- Hong Kong
- South Korea
- Chile

**State Government issuances**
- States in Australia
  - Victoria, Queensland, New South Wales
- USA
  - California
- Germany
  - North-Rhine Westphalia
- France
  - Île-de-France

*SSeveral of the subnational issuances have been sustainability bonds*
The Green Bond Roadmap

• A resource for corporate and government representatives and others interested in better understanding green bonds

• Provides users with a basic outline of green bonds and their role in mobilizing capital for climate change action

• [The Green Bond Roadmap]
Green Bonds for Infrastructure Investments

Asia LEDS Partnership NDC Finance Community of Practice: accelerating investment into clean energy across Asia

Mehul Patwari

April 30, 2020
Why consider green bonds as a financing tool?

- Offers **access to a large pool of low-cost capital** for green infrastructure and an opportunity for companies/government to finance low-carbon and climate resilient developments.
- Allows to **diversify the sources of funding** and to expand the investor base.
- Increase the **national and international visibility** of projects.
How to access green bond market flows?

Can the city issue a green bond?

Is there an investment grade credit rating?

Yes

No

Can a city affiliated entity issue green bonds?

Is the city a debtor to entities issuing bonds?

Yes

No

No

No

No

Yes

Issue green city bond

Explore options with credit enhancement and/or for DFIs to invest in bonds

Explore PPP or project bond issuance with private sector

Explore how to align and engage with green bond portfolio of issuers*

*For example DFIs, municipal finance institutions, banks
How to issue a green city bond?

1. **Design**: project selection, type of bond, business case, regulatory fit, identify partners

2. **Rating and Certification**: Investment grade credit rating from accredited agencies, self certification/independent review for green certification

3. **Structure**: Prepare offer document, key project agreements, monitoring and verification structure

4. **Marketing**: Road shows and one to one meetings with anchor investors

5. **Issue the green bond**: Issuance and listing

6. **Monitor and report**: Use of proceeds, quantitative and qualitative environment impacts during operations
# Types of Green Bonds

## Use of proceeds bonds
- Proceeds allocated to sub-portfolio of green projects by issuer;
- Issuer sets internal process to track the usage of proceeds and reporting to investors;
- Complete recourse to the Issuer

## Revenue bonds
- Revenues of selected projects ‘ring-fenced’ for bond payments
- Bond holders have recourse to project cash flows;
- Issuer sets internal process to track the usage of proceeds and reporting to investors;

## Securitized bonds
- Bonds collateralized by one or more projects;
- First source of repayment is generally from cash flows of the asset;
- This type of bonds are for asset based securitisation of rooftop solar PV or energy efficiency assets

## Project Bonds
- Proceeds of bonds finances single/multiple ‘Green’ Projects;
- Investors have direct exposure to risk of the projects;
- With/without recourse to the Investor
Green Securities: Disclosure Requirements (1/3)

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Disclosure Requirements as per Securities and Exchange Board of India (SEBI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eligible Projects</td>
<td>• Renewable and sustainable energy including wind, solar, bioenergy, other sources of energy which use clean technology etc.</td>
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<tr>
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<td>• Clean transportation including mass/public transportation etc.</td>
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<td></td>
<td>• Sustainable water management including clean and/or drinking water, water recycling etc</td>
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<td></td>
<td>• Climate change adaptation</td>
</tr>
<tr>
<td></td>
<td>• Energy efficiency including efficient and green buildings etc.</td>
</tr>
<tr>
<td></td>
<td>• Sustainable waste management including recycling, waste to energy, efficient disposal of wastage etc.</td>
</tr>
<tr>
<td></td>
<td>• Sustainable land use including sustainable forestry and agriculture, afforestation etc.</td>
</tr>
<tr>
<td></td>
<td>• Biodiversity conservation</td>
</tr>
<tr>
<td>Particulars</td>
<td>Disclosure Requirements as per Securities and Exchange Board of India (SEBI)</td>
</tr>
<tr>
<td>-------------------------------------</td>
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</tbody>
</table>
| Disclosure in Offer Document        | • A statement of environment objectives of the issue;  
• To mention brief on decision making process to be followed for determining eligibility of projects;  
• Systems/procedures to be employed for tracking deploying of funds raised;  
• Details of all the projects wherein the issuer would invest the proceeds of the issue |
| External reviewer/certifier         | • Issuer can appoint independent third party reviewer or certifier for reviewing the project selection. However, this is **not a mandatory** requirement. |
## Green Securities: Disclosure Requirements (3/3)

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Disclosure Requirements as per Securities and Exchange Board of India (SEBI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting Requirements</td>
<td>• <strong>Half yearly requirements</strong>: a) Tracking of utilisation of proceeds as detailed in offer document. Utilisation of proceeds to be verified by external auditor b) Details of unutilised proceeds</td>
</tr>
<tr>
<td></td>
<td>• <strong>Annual Reporting</strong>: a) Investment details: list and brief description of projects (subject to confidentiality agreements) b) Performance Indicators: quantitative environment impacts and in case quantitative impacts are not feasible mention the reasons thereof c) Methods and key underlying assumptions in preparation of performance indicators and metrics</td>
</tr>
</tbody>
</table>
| Responsibility of the Issuer | • Maintain a decision-making process for determining eligibility of projects;  
• Ensure that proceeds of issue are invested in projects that meet the documented objectives of Green Debt Securities;  
• Utilise the proceeds only for the stated purpose, as disclosed in the offer document |
From strategy to capacity building and impact assessments

- **Design** sustainable or green strategies and reduce their investments’ environmental related impacts.
- **Measure bond’s investments/issuances’ impact** along sustainability and environmental metrics.
- **Report, communicate and build capacities.**

Example of capacity building flow on green bonds

<table>
<thead>
<tr>
<th>Introduction to green bonds</th>
<th>How to access financial flows from green bonds?</th>
<th>Mapping of potential green projects</th>
<th>Monitoring, reporting, and verification structures</th>
<th>Issuing a green bond*</th>
<th>Green bond impact assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis of the current city set-up and potential issuing strategies</td>
<td>Capacity building according to the individual needs of each actor</td>
<td></td>
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</tr>
</tbody>
</table>
Green Bonds: Benefits for various stakeholders

**Banks**
1. Releases capital for new financing;
2. Helps correct Asset-Liability mismatch

**Issuer**
1. Help raise fixed cost long term debt which improves equity returns;
2. Diversification of investor base

**Green Bond Investors**
1. Investment in “Green” projects;
2. Potential appreciation as “Green” projects becomes more attractive

**Government**
1. More capital for financing of “Green” projects;
2. Development of market which brings further investment for “Green” projects thereby creating virtuous growth cycle
Thank you!

Mehul Patwari
Director Sustainable Finance
m.patwari@southpole.com
Projects to back Potential Green Bond Issuances, case study & Credit Enhancement
New Delhi

Sandeep Bhattacharya
India Project Manager

Asia LEDS Partnership NDC Finance Community of Practice: accelerating investment into clean energy across Asia
Energy Efficiency of street lamps
The Case for replacing existing street lamps with LEDs

- **Incandescent Lamp (IND)**
  - 60 Watt
  - 900 Lumens
  - 1,000 Lifetime Hours
  - 22 Incandescent Lamps

- **Compact Fluorescent Lamp (CFL)**
  - 15 Watt
  - 900 Lumens
  - 8,500 Lifetime Hours
  - 3 CFL Lamps

- **LED Lamp**
  - 12.5 Watt
  - 800 Lumens
  - 25,500 Lifetime Hours
  - 1 LED Lamp
Energy savings........

\[\text{Savings} = (\text{Baseline} - \text{Actual}) \pm \text{Adjustments}\]
…..to pay for the capex
Loan/ Bond & Payback

Financial Institutions

Loan

Repayment from portion of shared savings

ESCP/ESP

Project development, financing & execution

Payment based on saving share

End User / ULBs
## Portable & Waste Water

<table>
<thead>
<tr>
<th>Green Asset Type</th>
<th>Body/ corporate which operates the same/ likely to operate the same</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>Municipal Corporations</td>
<td>Mostly managed by Municipalities themselves.</td>
</tr>
<tr>
<td></td>
<td>Private sector participations with Public sector</td>
<td>Orange City Water Supply Company, ( NAGPUR)</td>
</tr>
<tr>
<td>Water – Special applications</td>
<td>Private sector</td>
<td>Bharat Jal Ltd.</td>
</tr>
<tr>
<td></td>
<td>Industries and Industry associations</td>
<td>Numerous industries and industrial associations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hindustan Zinc in Udaipur</td>
</tr>
</tbody>
</table>
Climate Bonds Standard Water Infrastructure Criteria

Will your project meet the Water Criteria? It’s an easy two-step

**STEP 1**
Comply with Mitigation Component
GHG emissions from water projects do not increase and comply with business-as-usual baseline or aim at emission reduction will be delivered over the operational lifetime of the water asset or project.

**STEP 2**
Comply with Adaptation & Resilience Component
Water infrastructure and its surrounding ecosystem are resilient to climate change, and have sufficient adaptation to address climate change risks.
To demonstrate that, issuers should complete a scorecard made up of five sections:

**Section 1. Allocation:** Addressing how water is shared by users within a given basin or aquifer.

**Section 2. Governance:** Addressing how/whether water will be formally shared, negotiated, and governed.

**Section 3. Technical Diagnostics:** How/whether changes to the hydrologic system are addressed over time.

**Section 4. Nature-based Solutions:** (for nature-based and hybrid infrastructure only) addressing whether issuers have sufficient understanding of ecological impacts at/beyond project site with ongoing monitoring and management capacity.

**Section 5. Assessment of the Adaptation Plan:** Checking the completeness of the coping mechanisms to address identified climate vulnerabilities.
Eligibility for certification depends on the efficacy and thoroughness of the issuer’s Vulnerability Assessment and Adaptation Plan, and the underlying climate risk assessment and management plans that they capture. This is assessed via a Scorecard, or checklist, consisting of a series of binary questions.

Section 1, 2, 3, and 5 should be completed for all water infrastructure projects, whereas section 4 should only be completed for nature-based and hybrid water infrastructure.

- **Section 1. Allocation:** Addressing how water is shared by users within a given basin or aquifer.
- **Section 2. Governance:** Addressing how/whether water will be formally shared, negotiated, and governed.
- **Section 3. Technical Diagnostics:** How/whether changes to the hydrologic system are addressed over time.
- **Section 4. Nature-based Solutions:** (for nature-based and hybrid infrastructure only) addressing whether issuers have sufficient understanding of ecological impacts at/beyond project site with ongoing monitoring and management capacity.
- **Section 5. Assessment of the Adaptation Plan:** Checking the completeness of the coping mechanisms to address identified climate vulnerabilities.
Namami Gange
Projects Execution in one of India’s most polluted river
Large Projects under execution in India

- 20 MLD Tannery Treatment plant in Kanpur
- 187 MLD sewage Treatment plant in Kolkata
- 150 MLD capacity sewage treatment plant in Patna, Bihar
- 140 MLD Sewage Treatment plant in Varanasi
- Ghaziabad & Agra, one City one operator concept
- Reliance: ETP to recycle 150 MLD of industrial effluent (50% of water recycled)
- Mangalore refinery – 30 MLD desalination plant
Mass Urban Transportation- What is allowed?

- tramways
- BRT
- metro
- commuter rail
- public bike

Climate Bonds Initiative
<table>
<thead>
<tr>
<th>Body/ corporate which operates the same/ likely to operate the same</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint Ventures of State Government &amp; Government of India</td>
<td>Delhi Metro Rail Corporation</td>
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<td>Nagpur Metro Rail Corporation Limited</td>
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<td>Lucknow Metro Rail Corporation</td>
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<td>Kochi Metro Rail Limited</td>
</tr>
<tr>
<td></td>
<td>Gujarat Metro Rail Corporation Limited</td>
</tr>
<tr>
<td>Government of India enterprise</td>
<td>Kolkata Metro Rail Corporation Ltd</td>
</tr>
<tr>
<td>Public-Private-Partnership (PPP) with State Government Authority/ State Government awarding the concession.</td>
<td>Reliance Mumbai Metro</td>
</tr>
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<td></td>
<td>L&amp;T Metro Rail Hyderabad Limited</td>
</tr>
</tbody>
</table>
### Mass transportation - Bus services

<table>
<thead>
<tr>
<th>Body/ corporate which operates the same/ likely to operate the same</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>A body which is a part of the Municipal corporation</td>
<td>• The Brihanmumbai Electric Supply &amp; Transport Undertaking - Operates buses in Mumbai</td>
</tr>
<tr>
<td></td>
<td>• Delhi Road Transport Authority - Operates buses in New Delhi</td>
</tr>
<tr>
<td></td>
<td>• Nagpur Mahanagar Parivahan Limited - Operates buses in Nagpur</td>
</tr>
<tr>
<td></td>
<td>• Pune Mahanagar Parivahan Mahamandal Limited. - Operates bus services in Pune</td>
</tr>
<tr>
<td>A body incorporated by a state government, or a subsidiary of the same.</td>
<td>• Telangana State Road Transport Corporation - Operates bus transport in Hyderabad - Secundrabad twin city.</td>
</tr>
<tr>
<td></td>
<td>• Maharashtra State Road transport Corporation - Operates buses in Nashik, Nanded, Ratnagiri, Miraj, Vasai, Nalasopara, Aurangabad &amp; Chandrapur</td>
</tr>
<tr>
<td></td>
<td>• Calcutta State Transport Corporation (CSTC) - Bangalore Metropolitan Transport Corporation</td>
</tr>
</tbody>
</table>
### Battery Charging/ Swapping Stations

<table>
<thead>
<tr>
<th>Green Asset Type</th>
<th>Body/ corporate which operates the same/ likely to operate the same</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fast charging Stations, Battery swapping stations</strong></td>
<td>Vehicle manufacturers, with help from municipality</td>
<td>Amara Raja Batteries Ltd at Tirupati</td>
</tr>
<tr>
<td><strong>Fast Charging stations &amp; Battery swapping stations at retail warehouses, promoted by retail businesses like Amazon and The Future Group.</strong></td>
<td>Retail businesses like Amazon, Flipkart, IKEA, Future group etc- may be in a JV with an Original Equipment Manufacturer</td>
<td>Operational in Hyderabad, the OEM being Gayam Motor Works</td>
</tr>
</tbody>
</table>
Charging/ Battery swapping stations

<table>
<thead>
<tr>
<th>Green Asset Type</th>
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<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast charging Infrastructure at current petrol stations.</td>
<td>Oil Majors in collaboration with electrical utilities or vehicle manufacturers</td>
<td>IOC &amp; NTPC</td>
</tr>
<tr>
<td>Fast Charging stations operated by aggregators like Ola and Uber</td>
<td>Subsidiaries of Ola and Uber</td>
<td>No examples yet, but anticipated</td>
</tr>
<tr>
<td>Upgrades to grids and distribution systems for fast Charging Infrastructure</td>
<td>Electrical utility</td>
<td>No examples yet, but anticipated</td>
</tr>
</tbody>
</table>
Solid Waste Management

<table>
<thead>
<tr>
<th>Green Asset Type</th>
<th>Body/ corporate which operates the same/ likely to operate the same</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid waste management (dry- segregates various things and recycles it)</td>
<td>Private sector/ Private sector in collaboration with Public sector</td>
<td>NEPRA Lets Recycle is totally privately run in Ahmedabad, but is working on partnerships with the municipality in Pune, Indore &amp; Mumbai. Facility at Mumbai, Pune and Indore not yet operational.</td>
</tr>
<tr>
<td></td>
<td>Municipal Corporations</td>
<td>Indore Municipal Corporation</td>
</tr>
<tr>
<td>Wet solid waste management</td>
<td>Private sector in collaboration with Public sector</td>
<td>Organic Recycling System</td>
</tr>
<tr>
<td>Decentralised solid wet waste management</td>
<td>Private sector/ Private sector in collaboration with Public sector</td>
<td>Organic recycling systems</td>
</tr>
</tbody>
</table>
Watersheds

What is the function of a watershed?
The main function of a watershed is to receive the incoming precipitation and then dispose it off.

It’s **five major functions** come under the following two heads:

• Hydrological functions:
  Collect rainfall water
  Store water in various amounts and for different periods
  Release water as runoff

• Ecological Functions:
  Provide conditions and sites for various bio-chemical reactions to take place
  Provide habitat for flora and fauna of various kinds
Examples of watershed......

Contours created on hills to arrest water run off

Which feed into Check Dams, Dykes and Canals...
Financed by Government grants & Philanthropies..

• Usually are on the books of the local bodies.
• Create **resilience in agriculture**.

• Can be Financed/ refinanced through green Bonds of rural self local government bodies or state governments.
Ramthal Drip Irrigation Project

- Ramthal (Marol) Micro Irrigation Project is one of the largest of its kind Drip Irrigation Project in Asia.
- It uses water from the River Krishna to irrigate about 60,000 acres.
- Conventional (non-drip) irrigation system could have only irrigated 30,375 acres.
- Implementation of this project will result in economical use of water, increase in irrigation potential and yield etc.
- All these benefits will together contribute to improving the economic status of farmers in the region.
- Water is delivered directly using HDPE / PVC piping network to irrigate about.
Renewable energy

<table>
<thead>
<tr>
<th>Green Asset Type</th>
<th>Body/ corporate which operates the same/ likely to operate the same</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar PV on water Reservoirs</td>
<td>Municipal Corporations, though a partnership with Private sector also looks possible.</td>
<td>Initiated by Indore Municipal Corporation</td>
</tr>
<tr>
<td>Wind power assets</td>
<td>Municipal Corporations, though a partnership with Private sector also looks possible.</td>
<td>Possible on the same model as initiated by Indore Municipal Corporation for solar PV, if suitable land is available.</td>
</tr>
</tbody>
</table>
## Rooftop Solar

<table>
<thead>
<tr>
<th>Green Asset Type</th>
<th>Body/ corporate which operates the same/ likely to operate the same</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rooftop Solar Assets on Government Buildings</td>
<td>RESCO model, auction held by nodal body (MPUVNL) set up by the state government to promote renewable energy</td>
<td>The projects, tendered by the Madhya Pradesh Urja Vikas Nigam Limited (MPUVNL), nodal body set up to encourage RE in state. Assets will be on the books of the Independent Power Producers who win the bid and then erect the rooftop solar assets.</td>
</tr>
<tr>
<td>Rooftop solar assets on residential, commercial and industrial building</td>
<td>Resident. Welfare society, commercial establishment or IPP in case of RESCO model</td>
<td>Various residential, commercial and industrial establishments.</td>
</tr>
</tbody>
</table>
Case Study- Indore Municipal Corporation
Proposed Green Masala Bonds Of Indore Municipal Corporation
Present scenario & the need for the solar project

• For its drinking water needs, Indore is mainly dependent upon river Narmada, Yashwant Sagar dam and tube-wells in the city.

• Electricity expenses towards water pumping from these sources is ~20 crores/month.

• **This is a major cash outflow of IMC.** Considering the rising population, the water consumption by the inhabitants of the city is bound to increase only, further increasing the electricity expenses.
Present scenario & the need for the solar project

• Indore Municipal Corporation, as an entity pays a electricity tariff of Rs 6.30 Per unit, which cross subsidises the residential consumers, who in turn pay a lesser tariff.

• Solar panel prices have fallen significantly over time. Making electricity generated from even small solar installations cheaper than commercial electricity tariffs in India.

• The project is expected to provide IMC with a cash surplus every month.
## Pros & Cons of Floating solar

<table>
<thead>
<tr>
<th>Pros</th>
<th>Floating SPV System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land required is 4 Acres/MW (Conventionally)</td>
<td>Frees up land for competing use</td>
</tr>
<tr>
<td>Suitable for tracking system and easy maintenance</td>
<td>Water conservation due to reduced evaporation</td>
</tr>
<tr>
<td>Large capacity solar power plants can be installed</td>
<td>Limits algae growth and improves water quality</td>
</tr>
<tr>
<td>Easy to design and install on the ground</td>
<td>Improvement in energy generation due to reduced temperature</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cons</th>
<th>Floating SPV System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy loss due to dust collection</td>
<td>Corrosion - water salinity, maintaining water quality</td>
</tr>
<tr>
<td>Degradation is more due to high temperatures</td>
<td>Dynamic loads due to wind, wave, water currents, tides</td>
</tr>
<tr>
<td>Loss of land</td>
<td>Unavailability of historical data</td>
</tr>
<tr>
<td>Might be exposed to additional shading</td>
<td>Cost of installation is increases</td>
</tr>
</tbody>
</table>
Details of Floating Solar as envisaged for Indore MC

<table>
<thead>
<tr>
<th></th>
<th>Floating + Ground Mounted System</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Capacity</td>
<td>120 MW</td>
</tr>
<tr>
<td>DC Capacity</td>
<td>144MW</td>
</tr>
<tr>
<td>Project Cost</td>
<td>500 Cr</td>
</tr>
<tr>
<td>Plant Generation per Year</td>
<td>26.97 Cr. Units/annum</td>
</tr>
<tr>
<td>*Tariff considered per Unit (Rs.)</td>
<td>6.30</td>
</tr>
<tr>
<td>REC Benefits per Unit (Rs.)</td>
<td>1.00</td>
</tr>
<tr>
<td>Annual Interest</td>
<td>45 Cr</td>
</tr>
<tr>
<td>Operation Expenditure per Year</td>
<td>20.04 Cr</td>
</tr>
<tr>
<td>Debt</td>
<td>100%</td>
</tr>
<tr>
<td>Interest Rate</td>
<td>9%</td>
</tr>
</tbody>
</table>

*Rates are subject to change as per Electricity Regulation*
Based on available site data and preliminary design, a system of 120 MWac (seasonal tilt) is proposed to be installed. Key Project Financials are as follows:

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Project Cost</td>
<td>INR 500 Cr.</td>
</tr>
<tr>
<td>Proposed Capacity</td>
<td>120 MWac / 144 MWdc</td>
</tr>
<tr>
<td>Energy Generation (at end of first year)</td>
<td>26.97 Cr. Units/annum</td>
</tr>
<tr>
<td>Debt (Total project cost)</td>
<td>INR 500 Cr.</td>
</tr>
<tr>
<td>Moratorium</td>
<td>84 months</td>
</tr>
<tr>
<td>Annual Interest Rate</td>
<td>09.00% (payable half yearly)</td>
</tr>
<tr>
<td>EPC Price, approx. subject to outcome of tender process</td>
<td>INR 4.00 Cr/Mwac</td>
</tr>
</tbody>
</table>
Techno-economic feasibility study

<table>
<thead>
<tr>
<th></th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Generation</strong></td>
<td></td>
</tr>
<tr>
<td>Energy Charges @ ₹5</td>
<td>11.25 Cr/Mon</td>
</tr>
<tr>
<td>Variable Charges @ ₹1</td>
<td>2.25 Cr/Mon</td>
</tr>
<tr>
<td><strong>Total Charges @ ₹6</strong></td>
<td>13.50 Cr/Mon</td>
</tr>
<tr>
<td><strong>Interest @ 9%</strong></td>
<td>3.75 Cr/Mon</td>
</tr>
<tr>
<td>Operating Expenditure</td>
<td>1.67 Cr/Mon</td>
</tr>
<tr>
<td>Variable Charges @ ₹1</td>
<td>2.25 Cr/Mon</td>
</tr>
<tr>
<td><strong>Total Charges</strong></td>
<td>7.67 Cr/Mon</td>
</tr>
<tr>
<td><strong>Savings A-B</strong></td>
<td>5.83 Cr/Mon</td>
</tr>
<tr>
<td><strong>Add: REC and CDM Benefits</strong></td>
<td>2.38 Cr/Mon</td>
</tr>
<tr>
<td><strong>Total Benefits p.m.</strong></td>
<td>8.21 Cr/Mon</td>
</tr>
<tr>
<td><strong>Allocation of Fund for repayment of principle amount at the 7th Year</strong></td>
<td></td>
</tr>
<tr>
<td>Sinking Fund</td>
<td>5.95 Cr/Mon</td>
</tr>
<tr>
<td><strong>Net Cash Surplus</strong></td>
<td>2.26 Cr/Mon</td>
</tr>
<tr>
<td>Interest on Sinking Fund account Approx. Rs. 125 Cr. in seven years</td>
<td>1.80</td>
</tr>
<tr>
<td>Floating Solar System (120 MW)</td>
<td></td>
</tr>
<tr>
<td>AND Incentives by Ministry of Housing &amp; Urban Affairs, Government of India Rs. 26 Cr.</td>
<td></td>
</tr>
<tr>
<td>Total Saving (excluding allocation towards Sinking Fund for principal payment)</td>
<td>10.1</td>
</tr>
<tr>
<td><strong>Savings After 7 years until 25 years</strong></td>
<td>12.05</td>
</tr>
</tbody>
</table>

**Calculation : 10.1 + 3.75 - 1.8**
Bond Guarantee

• A guaranteed Bond is a Bond that has its timely interest and principal payments backed by a Third Party, which can be a Bank or An Insurance Company.

• The guarantee on the bond lessens the default risk by creating backup “payer” in the event that the issuer is unable to fulfil it’s obligation.

• There are a few Municipalities in India with a credit rating of AA and above, which are generally accepted by investors. However, credit ratings done due to the JNNURM and AMRUT schemes indicate that the bulk of the municipalities would be rated below investment grade.
Bond Guarantee

- The USA is surely the most vibrant Municipal Bonds market.
- In the US, Average Cumulative 10-Year default rates in municipal bonds from 1970–2017 have been much lesser than corresponding corporate bonds.

The credit enhancement generally reduces the borrowing costs for an issuer since investors are prepared to accept a lower interest rate in exchange for the credit enhancement provided.

The interest savings from the use of bond insurance are generally shared between the issuer (as its incentive to use the insurance) and the credit enhancement provider (as its premium for providing the credit enhancement).
The Economics of Bond Guarantee

- Bond without Guarantee
- Bond with Guarantee
- Guarantee Fee
- Savings
Institutions Involved in Bond Guarantee in Asia

• Danajamin Nasional Berhad

GuarantCo is funded by the governments of the United Kingdom, Switzerland, Australia and Sweden through Climate Bonds Initiative.
Thank you
Questions & Discussion
Closing and next steps

- Presentations and webinar recording will be shared via email/posted online at www.asialeds.org
- Please share with your colleagues/peers
- Join the NDC Finance CoP
- For availing technical assistance please write to us
- Inform us the country priorities/needs and how ALP/LEDS GP can support
- Keep in touch!
Thank you!

Contact us at: alpsecretariat@iclei.org

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