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GREEN & CLIMATE BONDS: FINANCING RESILIENCE

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AGWA: ALLIANCE FOR GLOBAL WATER ADAPTATION
Climate & Green Bonds date back to about 2007, with the European Investment Bank and World Bank.

Bonds from multilateral institutions can be formally counted by national and international institutions as “formal” climate finance.

There are also private sector climate and green bonds, which are effectively “informal” climate finance.

Informal climate finance mechanisms place less emphasis on tracking “additionality” — the extra aspects of an adaptation project that specifically address climate change impacts relative to a non-adaptation version of the project.
Green (Climate) Bonds are making headlines

- Total 2016 expectation $100bn+
- PBoC estimate $46bn for China
- Year to date ($8bn China)

Yearly breakdown:
- 2012
- 2013
- 2014
- 2015
- 2016 YTD

Key categories:
- Bank
- Corporate
- ABS
- Muni
- Development Bank
A global market

- USA $24.8bn
- Germany $12bn
- Netherlands $11bn
- France $15.6bn
- China $14.4bn
- Aust $2bn
- Supranationals = $30bn

Legend:
- > $10bn outstanding
- $1bn - 10bn outstanding
- < $1bn outstanding
- SA $1.27bn
Key sectors of issuance

- Clean Energy
- Energy Efficiency / Low Carbon Buildings
- Low Carbon Transport
- Water
- Climate Adaptation
- Agriculture & Forestry
- Waste & Pollution Control
### Discovering the eligible investment landscape

<table>
<thead>
<tr>
<th>ENERGY</th>
<th>LOW CARBON BUILDINGS</th>
<th>INDUSTRY &amp; ENERGY-INTENSIVE COMMERCIAL</th>
<th>WASTE &amp; POLLUTION CONTROL</th>
<th>TRANSPORT</th>
<th>INFORMATION TECHNOLOGY &amp; COMMUNICATIONS</th>
<th>NATURE BASED ASSETS</th>
<th>WATER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar</td>
<td>Residential</td>
<td>Manufacturing</td>
<td>Recycling facilities</td>
<td>Rail</td>
<td>Power management</td>
<td>Agricultural assets</td>
<td>Flood Defences</td>
</tr>
<tr>
<td>Wind</td>
<td>Commercial</td>
<td>Energy efficiency processes</td>
<td>Recycled products &amp; circular economy</td>
<td>Vehicles</td>
<td>Broadband</td>
<td>Forests (managed and unmanaged)</td>
<td>Water distribution infrastructure</td>
</tr>
<tr>
<td>Geothermal</td>
<td>Retrofit</td>
<td>Energy efficiency products</td>
<td>Waste to energy</td>
<td>Mass transit</td>
<td>Resource efficiency</td>
<td>Wetlands</td>
<td>Water capture &amp; storage infrastructure</td>
</tr>
<tr>
<td>Hydropower</td>
<td>Products for building carbon efficiency</td>
<td>Retail and wholesale</td>
<td>Methane management</td>
<td>Bus rapid transport</td>
<td>Teleconferencing</td>
<td>Degraded Lands</td>
<td>Water treatment plants</td>
</tr>
<tr>
<td>Bioenergy</td>
<td>Data centres</td>
<td>Energy efficient appliances</td>
<td>Geosequestration</td>
<td>Alternative fuel infrastructure</td>
<td>Other land use (managed and unmanaged)</td>
<td>Fisheries and aquaculture</td>
<td>Assets in energy &amp; production industries</td>
</tr>
<tr>
<td>Wave and Tidal</td>
<td>Process &amp; fugitive emissions</td>
<td>Process &amp; fugitive emissions</td>
<td>Combined heat &amp; power</td>
<td>Alternative fuel infrastructure</td>
<td>Coastal infrastructure</td>
<td>Coastal infrastructure</td>
<td>Coastal infrastructure</td>
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<tr>
<td>Energy distribution &amp; management</td>
<td>Dedicated transmission</td>
<td>Dedicated transmission</td>
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</table>
CBS Water Criteria capture eligible assets and projects relating to freshwater and waste water capture, treatment and distribution (including sewage systems, water treatment plants, flood defenses, distribution systems etc)

This includes nature-based-solutions
CORE ASPECTS: WCBS

- Requires completion of a vulnerability assessment, adaptation plan
- Criteria are scored against these prepared documents by the bond issuer, verified by an independent organization, then certified by the Climate Bonds board

https://www.climatebonds.net/standards
What are Nature Based Solutions in the Water Space?

- Broadly defined as ‘green’ or hybrid green-grey solutions to water infrastructure

- Water NBS working group defined water infrastructure assets or projects that

  - Make use of existing ecosystems;
  - Restore existing ecosystems; and/or
  - Use engineering to emulate ecosystem processes in some way, particularly when existing systems are degraded
Challenges

- What makes a climate compatible solution?
  - Maximises mitigation opportunities
  - Maximises resilience of the asset or project
  - Maximises adaptation and resilience in the broader watershed/environmental, social and economic environment

- But how to assess these adaptation and resilience impacts?
  - Difficult to determine what metrics and measures
  - Focus is on design and management plans
    - Have key factors been assessed in asset design
    - Have adequate management plans been drawn up and implemented

- How to identify and balance trade-offs between mitigation and adaptation?

- How to best manage natural resources, especially over large watersheds and resources, not all of which are under issuers ownership and or control. And when talking about very long timeframes – both re life of asset (multiple decades) and impact on ecosystem
<table>
<thead>
<tr>
<th>Sub-sector</th>
<th>Assets</th>
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</thead>
<tbody>
<tr>
<td>Water storage</td>
<td>Rainwater harvesting systems</td>
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<tr>
<td></td>
<td>Aquatic ecosystems (lakes, wetlands)</td>
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<td></td>
<td>Aquifer storage</td>
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<td></td>
<td>Snowpack Runoff</td>
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<td>Groundwater recharge systems</td>
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<td>Riparian wetlands</td>
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<td>Stormwater management</td>
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<td>Flood defences</td>
<td>Earthen defense systems &amp; structures</td>
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<td>Ecological retention, current force reduction mechanisms</td>
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<td></td>
<td>Relocation of assets from floodplains / “room for the river”</td>
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<td>Early warning systems</td>
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<td>Drought defences</td>
<td>Aquifer / groundwater storage (pumped)</td>
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<td>Recharge zone management</td>
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<td>Wetland storage</td>
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<td>Snowpack management</td>
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<td></td>
<td>Evaporation reduction efforts</td>
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<tr>
<td>Water treatment</td>
<td>Natural filtration / recycling systems (e.g. wetlands, watersheds, forests)</td>
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<td></td>
<td>Engineered natural filtration / settling systems</td>
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<td></td>
<td>Forest for water quality management</td>
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<td>Sub-sector</td>
<td>Assets</td>
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</table>
| Urban stormwater management | Green roofs  
Permeable surfaces (parks, roads, etc.) and evapotranspiration systems  
Groundwater recharge  
Rainwater harvesting  
Constructed ecological retention ponds  
Forests for water quality management?  
Erosion control systems? |
| Ecological restoration / management | “Blue carbon” — peatland, estuaries, other ecological carbon storage systems  
Erosion control systems  
Hydrological restoration  
Freshwater fisheries |
What have we seen so far?

<table>
<thead>
<tr>
<th>Green bonds w/NBS features</th>
<th>Proceeds</th>
<th>USD</th>
<th>year</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>State of Massachusetts</td>
<td>River revitalisation, habitat restoration,</td>
<td>100m</td>
<td>2016</td>
<td>AA+</td>
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<tr>
<td></td>
<td>wetland remediation</td>
<td></td>
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<tr>
<td>San Francisco Public Utility</td>
<td>Sewer system/green infra</td>
<td>240m</td>
<td>2016</td>
<td>AAA</td>
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<tr>
<td>Nordic Investment Bank</td>
<td>Waste water/biodiversity</td>
<td>500m</td>
<td>2014</td>
<td>AAA</td>
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</table>

San Francisco Makes History With New Water Bond

The city is leveraging the power of green bonds by issuing the first certified under the Water Climate Bonds Standard to help fund projects to repair the city's aging water infrastructure, including the stormwater and sewer systems.
THANK YOU!

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