Investing in Climate Resilient Infrastructure

Marie-Alexandra Veilleux-Laborie, Director – Morocco, EBRD

2017 Forum of the UNFCCC Standing Committee on Finance
“Mobilising Finance for Climate-Resilient Infrastructure”
Rabat, 6-7 September 2017
Infrastructure investment in the context of a changing and more variable climate
Global infrastructure investment needs are huge

To keep pace with projected growth, the world needs to invest $3.3 trillion in economic infrastructure annually by 2030...

A significant share is expected to take place in emerging economies – including EBRD CoOs.

---

### Average annual need, 2016–30, in constant 2015 dollars, $ trillion

<table>
<thead>
<tr>
<th>Category</th>
<th>Average annual need, 2016–30, $ trillion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ports</td>
<td>0.9</td>
</tr>
<tr>
<td>Airports</td>
<td>1.3</td>
</tr>
<tr>
<td>Rail</td>
<td>5.1</td>
</tr>
<tr>
<td>Water</td>
<td>7.5</td>
</tr>
<tr>
<td>Telecom</td>
<td>8.3</td>
</tr>
<tr>
<td>Roads</td>
<td>11.4</td>
</tr>
<tr>
<td>Power</td>
<td>14.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$49.1 trillion</strong></td>
</tr>
</tbody>
</table>

### Aggregate spending, 2016–30, $ trillion

<table>
<thead>
<tr>
<th>Category</th>
<th>Aggregate spending, 2016–30, $ trillion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ports</td>
<td>0.9</td>
</tr>
<tr>
<td>Airports</td>
<td>1.3</td>
</tr>
<tr>
<td>Rail</td>
<td>5.1</td>
</tr>
<tr>
<td>Water</td>
<td>7.5</td>
</tr>
<tr>
<td>Telecom</td>
<td>8.3</td>
</tr>
<tr>
<td>Roads</td>
<td>11.4</td>
</tr>
<tr>
<td>Power</td>
<td>14.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$49.1 trillion</strong></td>
</tr>
</tbody>
</table>

### Annual spending, % of GDP

- China: 29%
- Western Europe: 12%
- US & Canada: 22%
- Eastern Europe: 4%
- Latin America: 7%
- Middle East: 5%
- Other emerging Asia: 6%
- India: 6%
- Africa: 2%

Long-lived, fixed infrastructure assets are exposed to shifting climate conditions

<table>
<thead>
<tr>
<th>Infrastructure Type</th>
<th>Lifespan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Infrastructure (dams, reservoirs, sanitation facilities)</td>
<td>30-200 yr</td>
</tr>
<tr>
<td>Transportation (port, bridges)</td>
<td>30-200 yr</td>
</tr>
<tr>
<td>Buildings, housing (insulation, windows, buildings)</td>
<td>30-150 yr</td>
</tr>
<tr>
<td>Power plants (coal-fired, gas-fired, nuclear)</td>
<td>20-60 yr</td>
</tr>
<tr>
<td>Cars</td>
<td>15-20 yr</td>
</tr>
<tr>
<td>Building appliances</td>
<td>10-20 yr</td>
</tr>
<tr>
<td>Industrial boiler</td>
<td>10-30 yr</td>
</tr>
<tr>
<td>Cities, urbanisms, land use planning</td>
<td>&gt; 100 yr</td>
</tr>
</tbody>
</table>

Source: Corfee-Morlot et al. (2012).

Infrastructure is already vulnerable to extreme weather – climate change is a significant risk amplifier.

The long lifespan of infrastructure means that they will have to cope with shifting climate conditions over future decades: e.g. sea-level rise, shifts in temperature ranges and precipitation patterns.

Damages from climate hazard impacts to critical infrastructures in Europe could increase 10-fold by the end of the century (OECD, 2017).

- Drought and water scarcity
- Storm surge and increased coastal flooding
- Increased flooding events and intensity
We are entering a new era of changing climate conditions.
Lake Urmia Drying Up, 1984-2012
Infrastructure being built today needs to anticipate the climate conditions expected tomorrow

**Benefits of climate resilient infrastructure...**

Reduce exposure or sensitivity of systems to climate-related hazards.

Minimise the consequences of disruptions through robust design.

Benefit populations by reducing their vulnerability to climate shocks and disruptions, and safeguard their access to resources and services.

Benefit infrastructure owners, operators and investors by protecting investment returns, business continuity and regulatory compliance.

**OECD estimates that each $1 spent on climate change adaptation delivers four times its value in terms of potential damage avoided**
Innovation in Climate Resilient Infrastructure Financing
Experience from recent EBRD investments
Integrating climate resilience is a priority for infrastructure investment planning & delivery

Climate change risk: Identifying vulnerability

Potential impact on infrastructure

Adaptation measures to improve resilience

Benefits of climate resilient infrastructure

Bosnia and Herzegovina: Floods

Port of Cadiz: Sea level rise and coastal flooding

Adaptation measures to improve resilience

Benefits of climate resilient infrastructure
Climate resilience/climate change adaptation is part of EBRD’s **Green Economy Transition (GET)** approach

<table>
<thead>
<tr>
<th>Climate change mitigation</th>
<th>Climate change adaptation</th>
<th>Other environmental areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Energy efficiency measures across all sectors</td>
<td>• Access to water resources and water efficiency</td>
<td>• Resource efficiency measures</td>
</tr>
<tr>
<td>• Renewables in electricity, heating &amp; cooling, transport</td>
<td>• Improved land management and agricultural value chain</td>
<td>• Waste management and recycling</td>
</tr>
<tr>
<td>• Promoting carbon markets</td>
<td>• Reducing infrastructure vulnerability</td>
<td>• Water quality and wastewater treatment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Combating air pollution</td>
</tr>
</tbody>
</table>
Infrastructure is a major focus of the EBRD’s climate resilience investment operations.

**Corporates**
- Primary agriculture
- Agri value chains
- Industry & manufacturing
- Mining: extraction & processing

**Infrastructure**
- Water: water & wastewater, irrigation & desalination
- Energy: thermal, hydro, transmission
- Transport: ports, roads
- Urban: buildings, drainage

**Financial Institutions**
- GEFF financing
- Residential climate resilience financing
- Business climate resilience financing
- Agricultural climate resilience financing
€1.1 billion since 2011 of dedicated adaptation finance for infrastructure.

130 projects signed

€3.1 billion of total ABI

EBRD adaptation finance for infrastructure

Adaptation Finance
Total business volume
# adaptation projects

€ in million


Municipal & environmental Infrastructure 891
Power and Energy 141
Transport 97
Property and Tourism 25
Total 1,154

Infrastructure GET adaptation finance: by business area (€m)

Infrastructure GET adaptation finance: by region (€m)

<table>
<thead>
<tr>
<th>Region</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Asia</td>
<td>280</td>
</tr>
<tr>
<td>Central Europe and the Baltic states</td>
<td>39</td>
</tr>
<tr>
<td>Eastern Europe and the Caucasus</td>
<td>34</td>
</tr>
<tr>
<td>Russia</td>
<td>32</td>
</tr>
<tr>
<td>South and Eastern Mediterranean (SEMED)</td>
<td>326</td>
</tr>
<tr>
<td>South-Eastern Europe</td>
<td>314</td>
</tr>
<tr>
<td>Turkey</td>
<td>128</td>
</tr>
<tr>
<td>Total</td>
<td>1,154</td>
</tr>
</tbody>
</table>
Climate resilient water infrastructure
Increasing climate resilience of irrigation infrastructure in Morocco

CLIENT AND PROJECT
A loan to the Kingdom of Morocco for the Saïss Water Conservation project, which will finance a bulk water transfer scheme and help to prepare a Public-Private Partnership (PPP) with regards to the implementation of the new irrigation networks. The Project will shift the paradigm of water provisions for the Saïss irrigation system, switching from highly unsustainable groundwater to sustainable surface water resources.

CLIMATE RESILIENCE MEASURES
• Provision of critical irrigation infrastructure – a bulk water transfer scheme, to transfer 90-110 million m³ of surface water annually from the M’Dez dam to the Saïss Plain area.
• Technical and institutional capacity development
• Community involvement in water governance and improved awareness of climate resilience issues among end users of water services
• Scaling up of private sector involvement in the design, implementation, operation and maintenance of irrigation infrastructure (PPP structure)

FINANCIAL STRUCTURE
TOTAL Project Value: € 397.2 million
EBRD loan: € 120 million
of which GET adaptation: € 120 million
Morocco equity: € 149.2 million
GCF capex & TC grant: € 32 million
Saudi Arabia grant: € 70 million
Institutional Investor loan: € 36 million
Climate resilient transport: Roads
Bosnia & Herzegovina Roads: Flood Repair and Upgrade

CLIENT AND PROJECT
A €65 million loan provided to the Bosnian Roads Company for the repair and upgrade of 34 road sections that were heavily damaged by the unprecedented floods of 2014.

CLIMATE RESILIENCE MEASURES
The feasibility work for the project assessed the design of vulnerable road sections using climate change projections. The following climate resilience measures were recommended:

- the enhancement of drainage systems
- strengthening of vulnerable slopes, bridges and tunnels and deepening bridge abutments
- the installation of rock mattresses and other practices to reduce long-term erosion risks
- Widening and improving bypass roads

TECHNICAL ASSISTANCE
Supported with funds from the Central European Initiative, experts from the Swedish Transport Agency work together with the Road Company on:

- Strengthening collaboration and analysis of climate data with the Hydromet Institute & Sava River Basin agency
- Assessment of major climate risks and mapping out vulnerabilities in the road network
- Analysis of road design and best international practice

FINANCIAL STRUCTURE

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBRD loan</td>
<td>€65 million</td>
</tr>
<tr>
<td>Of which GET Adaptation</td>
<td>€35 million</td>
</tr>
<tr>
<td>World Bank loan</td>
<td>€50 million</td>
</tr>
<tr>
<td>EIB loan</td>
<td>€50 million</td>
</tr>
</tbody>
</table>
Climate resilient transport: Ports
Improving resilience to climate change in Morocco’s port sector

CLIENT AND PROJECT
Sovereign-guaranteed senior loan for the Nador West Med (NWM) project, which consists of a new deep-water port nearby the town of Nador. NWM is envisioned to accommodate a range of activities to be performed under concessions contracts. As covenants in the EBRD loan agreement, climate change adaptation measures are to be included in tender documents in both the construction and operation phase, and there is a requirement for contractors to verify that aspects of the design are robust to expected changes in sea level.

CLIMATE RESILIENCE MEASURES
• Installation of surfacing, mechanical and electrical equipment designed to withstand projected temperature extremes (>40 C)
• Installation of surface drainage design able to cope with extreme rainfall and overtopping
• Installation of storage facilities able to withstand extreme temperatures and weather
• Emergency Response Plan for extreme weather events.
• Coastal Erosion Monitoring Scheme for the local area (to provide early warning of climate-related impacts).
• Structured Asset Maintenance Programme

FINANCIAL STRUCTURE
TOTAL: €943mn
Sponsor Contribution: €468mn (in MAD)
EBRD: €200mn (€17mn GET ABI)
African Development Bank: €100mn
Arab Fund/FADES: €175mn (in KWD)
Enabling Environment for Scaling Up Investment in Climate Resilient Infrastructure
Emerging policy frameworks for climate resilient infrastructure

- Emerging regulatory frameworks climate resilient infrastructure in OECD countries
- Implications for infrastructure investments including PPPs
  - e.g. shifting new legal opinions on ‘force majeure’
New requirements for climate risk disclosure by investors

Investors are adopting frameworks for climate risk disclosure

Voluntary approaches such as the FSB Task Force on Climate Risk Disclosure

Mandatory approaches such as the French Energy Transition law article 173

More attention to physical risks to infrastructure assets in investors’ portfolios
Emerging guidelines and standards that promote climate resilience in infrastructure

Port infrastructure
PIANC Working Group 178 on Climate Change Adaptation for Ports and Navigation Infrastructure

Hydropower
International Hydropower Association

Roads
World Road Association - PIARC

Buildings
Chartered Institution of Building Services Engineers (CIBSE)

ISO 14090 Framework Standard on Climate Change Adaptation
(expected in early 2019)
Thank you for your attention!

Marie-Alexandra Veilleux-Laborie
Director – Morocco
EBRD Resident Office in Casablanca
veilleum@ebrd.com