

Investing in Climate Resilient Infrastructure

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“*Mobilising Finance for Climate-Resilient Infrastructure*”
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Infrastructure investment in the context of a changing and more variable climate

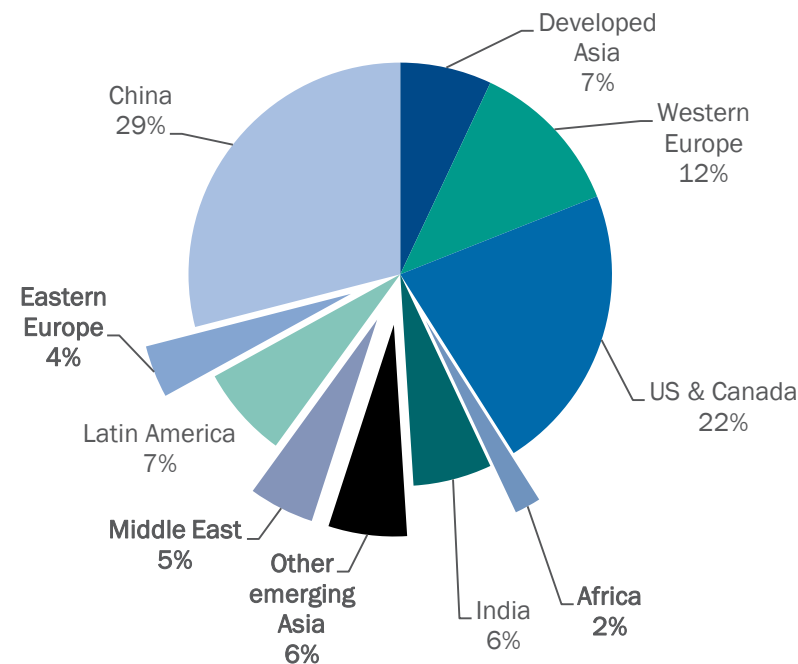
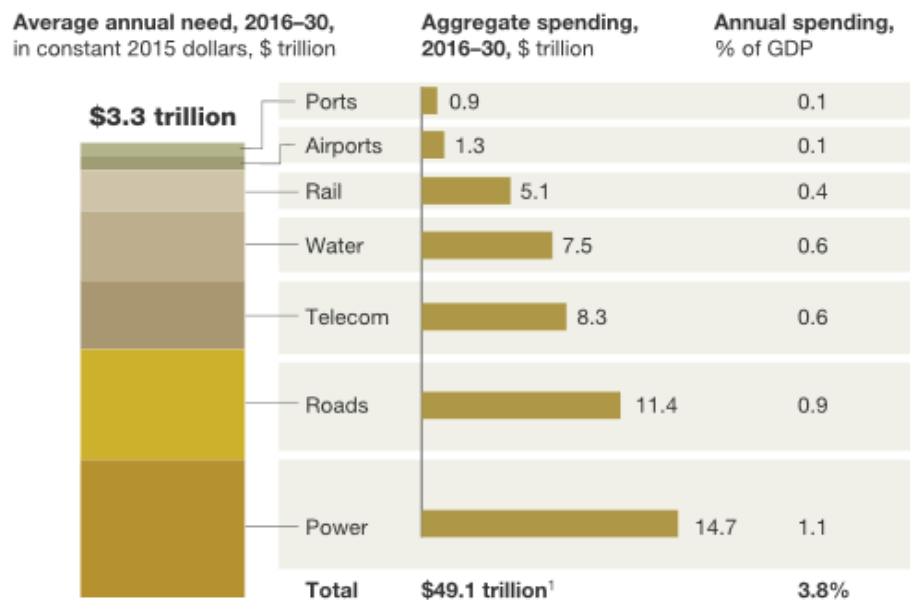


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Global infrastructure investment needs are huge

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.



Reference: *Bridging global infrastructure gaps* (2016) McKinsey Global Institute

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

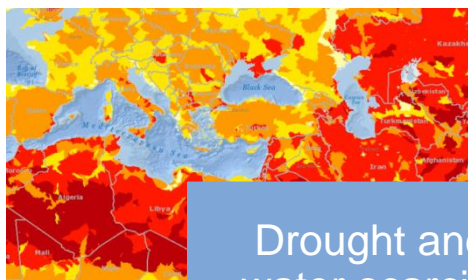
	Lifespan
Water infrastructure (dams, reservoirs, sanitation facilities)	30-200 yr
Transportation (port, bridges)	30-200 yr
Buildings, housing (insulation, windows, buildings)	30-150 yr
Power plants (coal-fired, gas-fired, nuclear)	20-60 yr
Cars	15-20 yr
Building appliances	10-20 yr
Industrial boiler	10-30 yr
Cities, urbanisms, land use planning	> 100 yr

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

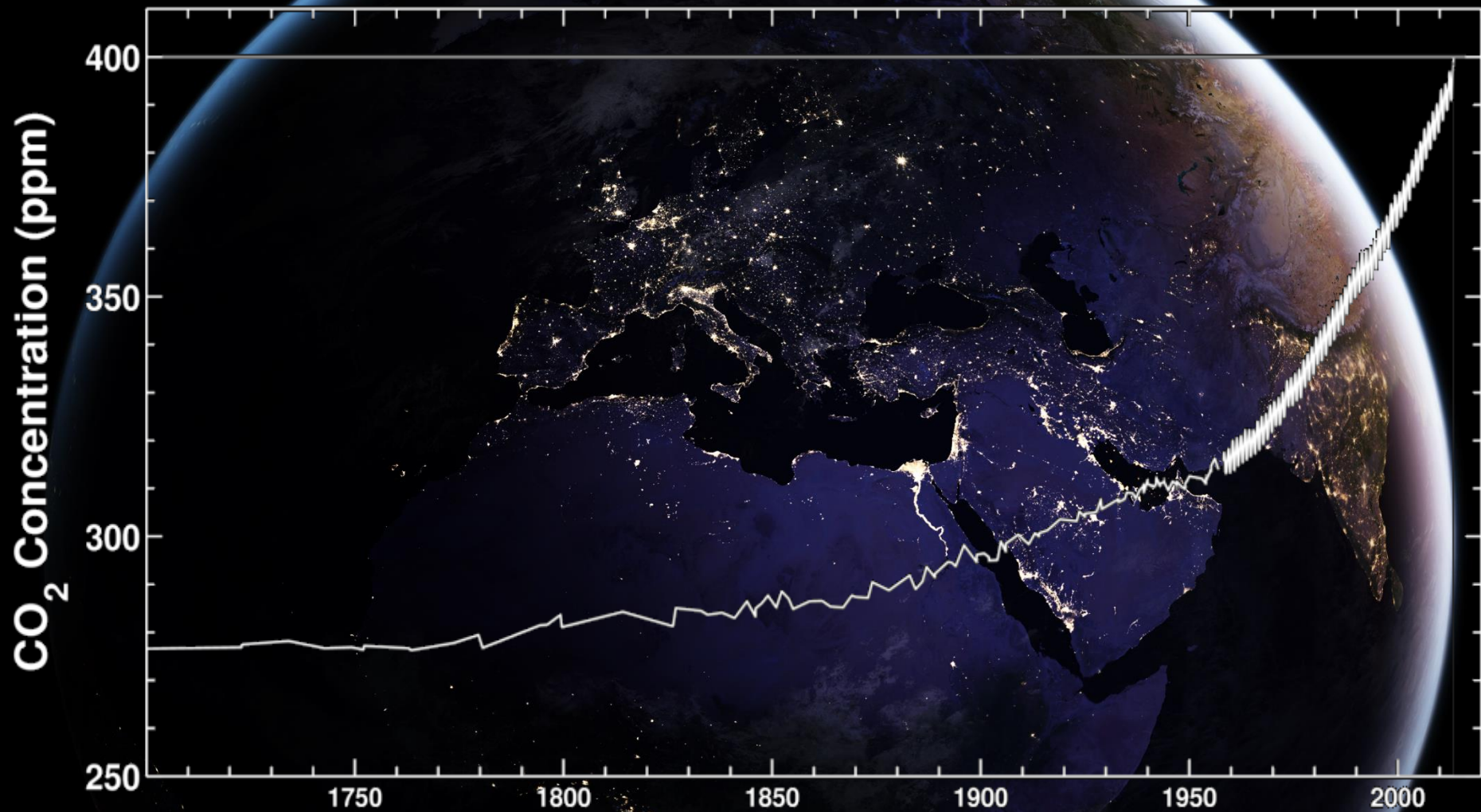


Storm surge and
increased coastal
flooding



Increased flooding
events and
intensity

We are entering a new era of **changing climate conditions**





Columbia Glacier Retreat, 1984-2011



Google

1984

Lake Urmia Drying Up, 1984-2012

Infrastructure being built today needs to anticipate the climate conditions expected tomorrow



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Benefits of climate resilient infrastructure...



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

*OECD estimates that each \$1 spent on climate change adaptation delivers **four times its value** in terms of potential damage avoided*



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.

**Innovation in Climate Resilient
Infrastructure Financing**
Experience from recent EBRD investments



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Integrating climate resilience is a priority for infrastructure investment planning & delivery



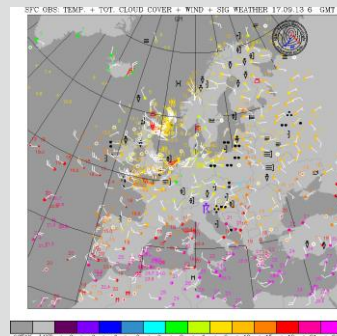
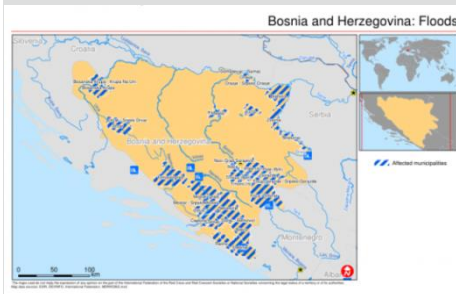
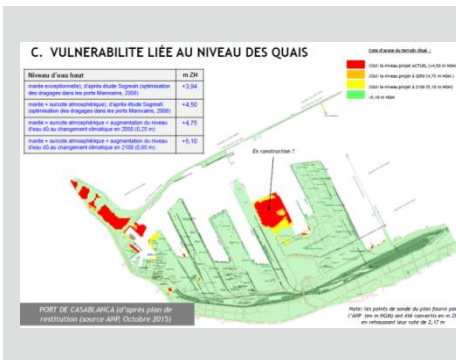
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Climate change risk:
Identifying vulnerability

Potential impact on
infrastructure

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



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Climate change mitigation	Climate change adaptation	Other environmental areas
<ul style="list-style-type: none">• Energy efficiency measures across all sectors• Renewables in electricity, heating & cooling, transport• Promoting carbon markets	<ul style="list-style-type: none">• Access to water resources and water efficiency• Improved land management and agricultural value chain• Reducing infrastructure vulnerability	<ul style="list-style-type: none">• Resource efficiency measures• Waste management and recycling• Water quality and wastewater treatment• Combating air pollution

Infrastructure is a major focus of the EBRD's climate resilience investment operations



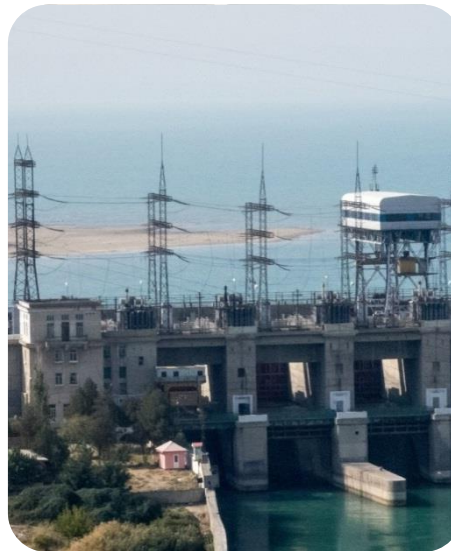
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Corporates



- 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



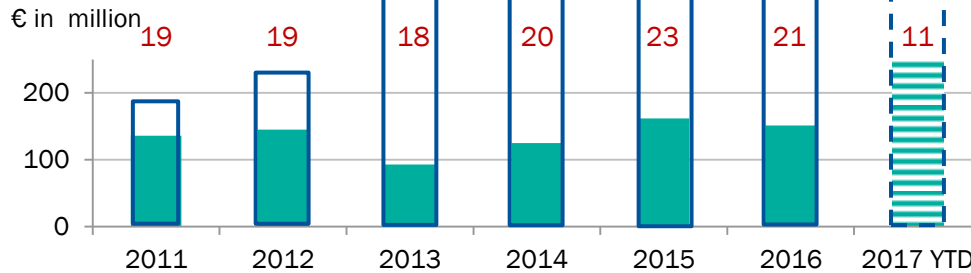
- GEF financing
- Residential climate resilience financing
- Business climate resilience financing
- Agricultural climate resilience financing

EBRD adaptation finance for infrastructure



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Adaptation Finance
Total business volume
adaptation projects

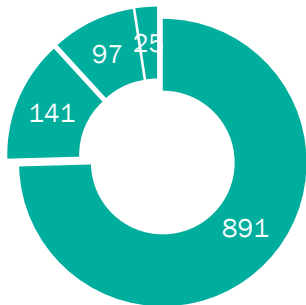


€1.1 billion since 2011 of dedicated adaptation finance for infrastructure.

130 projects signed

€3.1 billion of total ABI

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



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

Infrastructure GET adaptation finance: by region (€m)

Central Asia	280
Central Europe and the Baltic states	39
Eastern Europe and the Caucasus	34
Russia	32
South and Eastern Mediterranean (SEMED)	326
South-Eastern Europe	314
Turkey	128
Total	1,154

Climate resilient water infrastructure



Increasing climate resilience of irrigation infrastructure in Morocco



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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 section 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

EBRD loan	€65 million
<i>Of which GET Adaptation</i>	€35 million
World Bank loan	€50 million
EIB loan	€50 million



Climate resilient transport: Ports



Improving resilience to climate change in Morocco's port sector



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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**




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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’

OECD publishing

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No. 121

Climate-resilient infrastructure


GETTING THE POLICIES RIGHT

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JEL Classification: H54, O18, Q54



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PPIAF
Enabling Infrastructure Investment

Climate Risks and Resilience in Infrastructure PPPs: Issues to be Considered

Satishash Sundararajan (Senior Infrastructure Finance Specialist), Numan Sanyogdas (Climate & Energy Portfolio Coordinator)

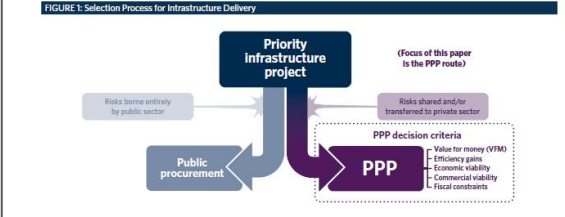


1.0 INFRASTRUCTURE PPPs AND CLIMATE RISKS
Infrastructure assets are characterized by large irreversible investments with a long lifespan and limited alternative uses. In a typical infrastructure planning and public-investment-management context, governments first identify priority infrastructure projects through sector and spatial planning exercises, and then decide on the optimal delivery mode through conventional public procurements or public-private partnerships (PPPs). Figure 1 briefly illustrates this decision process!

Climate change has contributed to a rise in extreme weather events - including typhoons. A young boy digs some possessions through the flooded streets of Metro Manila on 28 September 2009 after Typhoon Ketsana (Ondy) hit the Philippines.

Photo by Asian Development Bank

FIGURE 1: Selection Process for Infrastructure Delivery



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graph TD
    A[Public procurement] --> B[Priority infrastructure project]
    B --> C[Risks borne entirely by public sector]
    B --> D[Risks shared and/or transferred to private sector]
    D --> E[PPP decision criteria]
    E --> F[PPP]
```

Public procurement

Priority infrastructure project

Risks borne entirely by public sector

Risks shared and/or transferred to private sector

PPP decision criteria

- Value for money (VfM)
- Efficiency gains
- Economic viability
- Commercial viability
- Fiscal constraints

PPP

New requirements for climate risk disclosure by investors



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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!

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