

Climate Resilient Hydropower

Mr Anvar Homidov, Chief Technical Advisor, PPCR Secretariat, Tajikistan

Dr Craig Davies, Head of Climate Resilience Investments, EBRD

2017 Forum of the UNFCCC Standing Committee on Finance

“Mobilising Finance for Climate-Resilient Infrastructure”

Rabat, 6-7 September 2017



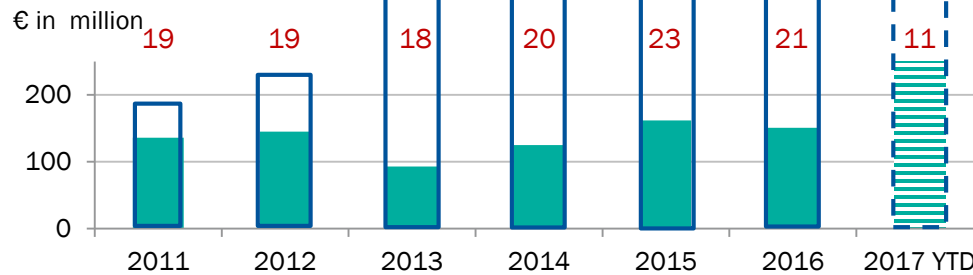
European Bank
for Reconstruction and Development

EBRD adaptation finance for infrastructure



European Bank
for Reconstruction and Development

Adaptation Finance
Total business volume
adaptation projects

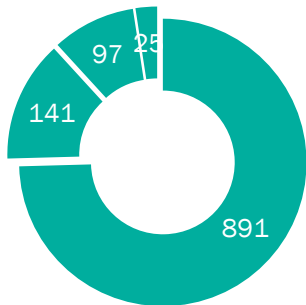


€1.1 billion since 2011 of dedicated adaptation finance for infrastructure.

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 Hydropower



Climate change – a risk amplifier to Tajikistan's hydropower sector



European Bank
for Reconstruction and Development

Energy sector is a national priority:

- Poverty Reduction Strategy
 - Increase availability of affordable energy
 - Use energy resources as platform for economic growth
- Tajikistan's Strategic Programme for Climate Resilience

Hydropower is a major source of clean energy in Tajikistan:

- Tajikistan derives more than 98% of its electricity from hydropower
- Only around 5GW of 40GW hydropower potential is currently being captured

Hydropower is sensitive to climatic variability and climate change:

- Climate change will impact hydrology
- Hydropower operators are concerned about hydrological shifts affecting hydropower facilities

Hydropower is critical to Tajikistan's development: economic growth, livelihoods and living standards – but is threatened by climate change



Qairokkum: Planning ahead for a changing climate

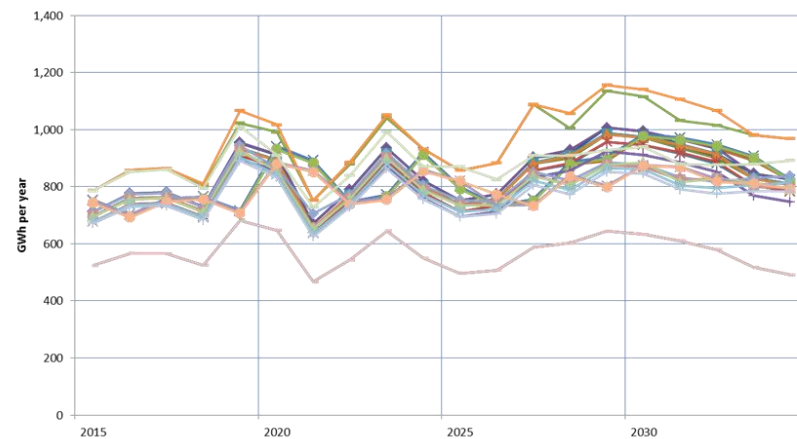


European Bank
for Reconstruction and Development

- Built in 1956, Qairokkum is the major energy generation facility in Northern Tajikistan (126 MW), which supplies 500,000 households with electricity. It is owned and operated by Barki Tojik
- Projected climate change impacts pose risks on the plant's ability to generate electricity - specifically **shifting temperatures and precipitation affecting glaciers and rivers**
- Feasibility work and preparation for planned HPP rehabilitation with **focus on understanding, and analysing the impacts of climate change, and integrating it in the infrastructure design**



Location



Modelled future energy generation

HydroScenario		Alternative		
		6 N - 170 MW	7 N - 210 MW	4 N 2 O - 150 MW
Regression Model REG	central	177	143	177
	hot-dry	171	137	171
	warm-wet	171	137	171
Snowmelt Runoff Model SRM	central	170	136	169
	hot-dry	163	129	165
	warm-wet	168	134	168
Watershed Bal. Model WBM	central	157	122	161
	hot-dry	83	48	93
	warm-wet	212	183	199

Performance of different designs over range of scenarios

Climate resilient upgrade of Qairokkum HPP

PROJECT

- Rehabilitation and upgrade of dam structure and turbine and hydro-electric equipment, resulting in a capacity increase from 126MW to 170MW.

CLIMATE RESILIENCE MEASURES

- Climate resilient design of upgrade by modelling future hydrology under a range of climate change scenarios and hydrological models
 - ⇒ Turbine upgrade and spillway capacities adjusted to optimise power generation and safety across range of CC scenarios
- Capacity building on climate and hydrological data collection & usage, reservoir management and dam safety, supported by twinning with world-leading HP operator Hydro Quebec
 - ⇒ Innovative replicable model for integrating climate resilience in HPP
 - ⇒ Potential transformative sector-wide impact by introducing best international practice for climate resilience



FINANCIAL STRUCTURE

Total finance	US\$197 million
EBRD loan	US\$88 million
EIB loan	US\$38 million
GCF grant	US\$23 million
concessional loan	US\$27 million
CIF (PPCR) grant	US\$11 million
concessional loan	US\$10 million





Thank you for your attention!

Anvar Homidov (PPCR Tajikistan)

Anvar.homidov@gmail.com

Craig Davies (EBRD)

DaviesC@ebrd.com