



Climate Vulnerability, Risk and Adaptation Assessments: Helping Central Asian Countries Prepare an Effective Power Sector Response

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Aims and approach



“How can Uzbekistan, Kazakhstan, Kyrgyzstan and Turkmenistan best manage their future security of power supply in the face of a changing climate?”



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Central Asia electricity sector context



- Ageing assets; inefficient use of water and electricity
- Significant investments required – next few years and onwards
- Difficult transboundary energy and water sharing arrangements
- Subsidies on electricity and fuel
- Load shedding and blackouts
- Existing climatic vulnerabilities; climate change already being observed



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Key climate-related risks identified without adaptation action



1. Unmanaged climate change impacts on energy sector (supply and demand) affect countries' economic performance
2. Increased electricity demand
3. Increased competition between water users
4. Decreased water resource availability affects power production
5. Higher transmission and distribution losses
6. Increased extreme climate-related events damaging transmission systems

In summary, increased supply-demand imbalance due to climate change can affect energy security

Costs of climate change



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building climate resilience

- Climate change impacts likely to increase energy demand and reduce supply over time
- Increased supply-demand gap will require additional investments in energy assets and operations to maintain energy reliability
- Costs from extreme climate events could not be quantified
- From 2010 to 2050, *under-estimates* of costs from climate change under 'BAU' policies for electricity sector in each country are approx. USD 0.5 billion to 3 billion:
 - Foregone international revenues
 - Additional CAPEX and OPEX



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Building resilience:

1. Improved demand control



- Energy consumption is often inefficient:
 - Pumping irrigation water
 - Industry
 - Residential
- Improved demand-side management:
 - Significant economic benefits
 - More resilient against climate shocks
 - Reduce risks from future higher prices of carbon, water and energy



Building resilience:

2. Improved water management



- Inefficient water use in agriculture
- Significant opportunities for improvements
 - E.g. ensuring new plants adopt CCGT technology
- Dual benefits for energy sector climate resilience:
 - Less competition with energy sector for increasingly scarce water resources
 - Less energy demand for pumping irrigation water



Building resilience :

3. Improved efficiency of generation, transmission & distribution



- Ageing, inefficient assets increase vulnerability to climate change:
 - Electricity generation (TPPs, HPPs)
 - Transmission
 - Distribution
- Designed based on historic climate conditions
- Opportunities to build climate resilience into new assets or rehabilitation of existing assets



Building resilience:

4. Diversification of electricity supply

- Diversification of generation technologies is a good strategy for managing climate change risks
- Some technologies may benefit from climate change
 - e.g. Increased sunshine hours for solar



Thank you for your attention



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