ADB TA 8727-REG

CAREC: Study for Power Sector Financing Road Map

Mobilizing Financing for Priority Projects

Tajikistan

September 2016

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Section 1
Priority Project Selection Criteria

Key considerations for project prioritization

Country consultation and secondary sources

- Regional Power Sector Master Plan
- Minister of Energy and Water Resources reports and presentations
- Ministry of Energy and Industry of reports and presentations
- Barji Tojik website and presentations
- Input received from ADB

Basis of information analysis

- National objectives and priorities
- Current and projected demand supply situation
- Current and projected demand supply situation

Project prioritization criteria

Generation Projects

- Ensuring energy adequacy
- Socio-economic consideration
- Avoiding water spillage

Transmission and Distribution Projects

- Reducing T&D losses/ rehab of existing infrastructure
- Improving flexibility within the system
- Regional Connectivity

Priority Project List

Project selection criteria – Generation projects

Ensuring energy adequacy

- Seasonal generation imbalances with surplus power in summer but winter deficits.
- Acute energy deficit that radically limits electricity supply during winter.
- Winter shortages impact economy; energy costs amount to almost 60% of GDP.
- Currently only 4-5% of Tajikistan's total hydropower potential has been exploited.
- Tajik's latent hydropower potential, if efficiently leveraged, can successfully meet domestic power requirements.

Socio-economic considerations

- Socio-economic implications of projects is key for prioritization.
- Despite high electrification rate (over 90%), actual access to electricity is considerably low and unreliable.
- Unreliable power supply has negative impact on the overall economy, health and environment of the country.

Avoiding Water Spillage

- Idle water discharge is a huge potential loss of power generated.
- Despite power surplus in summers, water is frequently spilled from reservoirs.
- Loss due to water spillages is estimated to be between USD 90-225 Mn annually.

Project selection criteria – Transmission & distribution projects

Reducing transmission losses/ Rehabilitation of existing infrastructure

- T&D losses is at 17.2% of generated electricity.
- More than 50% of the equipment, distribution grids and substations need systematic maintenance and rehabilitation.
- Govt. envisages reducing energy losses by up to 10% in power grid by 2030.

Improving flexibility within the system

- Reliability of the power supply in winter season needs to be addressed.
- Focus on improving T&D facilities in regions with heavy power demand.

Regional Connectivity

- Current transmission capacity inadequate to transmit surplus power generated during summer.
- According to WB estimates ~3 Billion kWh of electricity (18.5% of current total generation) can be exported to other CAREC member countries.
- Linking Tajikistan power system with Afghanistan is a current government priority

Section 2
List of Priority Projects and Investment Requirement

* Types of projects not considered in the list of priority projects are projects that have achieved financial closure, captive power projects and generation projects (< 100 MW) including renewable generation projects.

* Details pertaining to information source for investment requirement for priority projects are provided in the country report.

List of generation projects (1/2)

S.No.	Project	Project Selection Criteria			Investment Requirement (USD Mn)
		Ensuring energy adequacy	Socio-economic considerations	Avoiding Water Spillage	
1.	Zarafshon HPP, 160 MW	✓	✓	✓	320
2.	Dupulin HPP, 90 MW	✓	✓	✓	180
3.	Nurobod-2 HPP, 160 MW	✓	✓	✓	400
4.	Sangor HPP, 160 MW	✓	✓	✓	320
5.	Shurab HPP, 850 MW	✓	✓	✓	1500
6.	Fondarya HPP, 160 MW	✓	✓	✓	321
7.	Oburdon HPP, 120 MW	✓	✓	✓	240

List of generation projects (2/2)

S.No.	Project	Project Selection Criteria			Investment Requirement (USD Mn)
		Ensuring energy adequacy	Socio-economic considerations	Avoiding Water Spillage	
8.	Sangiston HPP, 140 MW	✓	✓	✓	320
9.	Ayni HPP, 160 MW	✓	✓	✓	180
10.	Sanobod HPP, 125 MW	✓	✓	✓	400
11.	Urfatin HPP, 160 MW	✓	✓	✓	320
12.	Shtiyon HPP, 160 MW	✓	✓	✓	1500
13.	Nurobod-1 HPP, 150 MW	✓	✓	✓	321
14.	Fon-Yagnob HPP, 500 MW	✓	✓	✓	240

List of transmission projects (1/2)

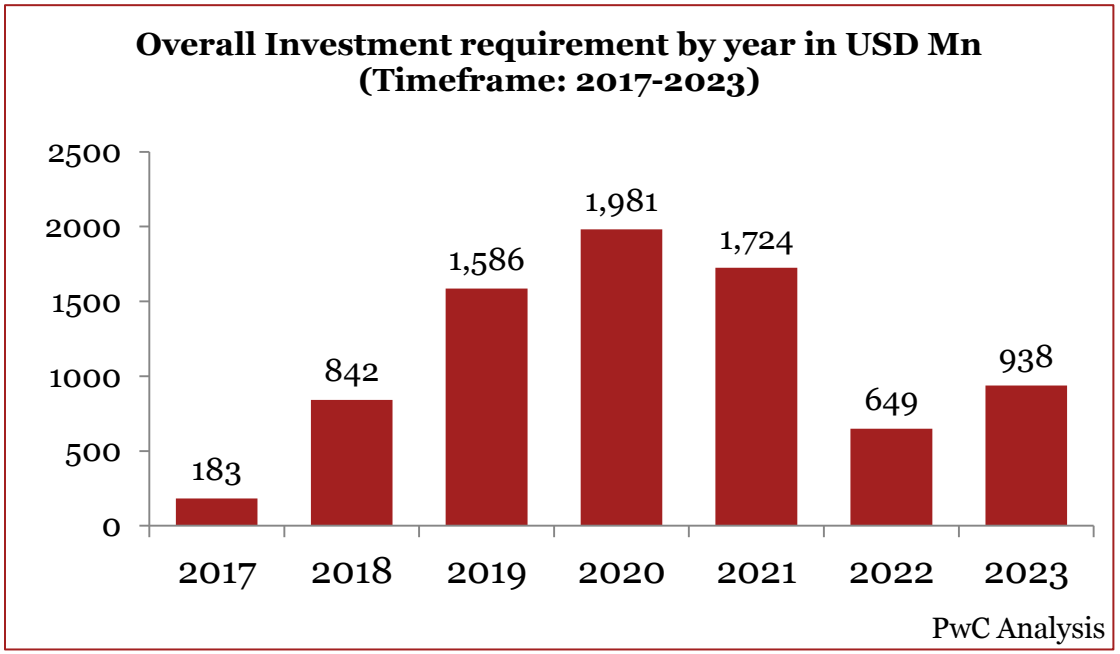
S.No	Project	Brief Description and Benefits	Project Selection Criteria			Investment Requirement (USD Mn)
			Reducing transmission losses/ rehabilitation of existing infrastructure	Improving flexibility within the system	Regional Connectivity	
1.	500 kV Overhead Power Transmission Line Rogun-Jirgatal-Kyrgyzstan-China	Proposed 500 kV Over Head Transmission Line «Rogun Hydro Power Plant -Jirgatal- Sary Tash (Kyrgyz) – Ulugchay (People's Republic of China) of approx. 550 km to transmit power towards China via Kyrgyzstan.	-	✓	✓	160
2.	500 kV Overhead Power Transmission Line Rogun-Sangtuda- Kunduz-Puli Khumri –Kabul	585 km Over Head Transmission Line is proposed to transmit generated electricity to the large settlements of Afghanistan, in accordance with Sangtuda and Roghun Hydro Power Plants Power Output Scheme.	-	✓	✓	158
3.	500 kV Overhead Power Transmission Line - Rogun - Kunduz-Puli Khumri - Kabul- Jelalabod-Peshawar	1100 km long 500 kV OHTL to transmit ~4 Bn kWh power towards Pakistan and Afghanistan.	-	✓	✓	296

List of transmission projects (2/2)

S.No	Project	Brief Description and Benefits	Project Selection Criteria			Investment Requirement (USD Mn)
			Reducing transmission losses/ rehabilitation of existing infrastructure	Improving flexibility within the system	Regional Connectivity	
4.	CT - 7: Obi Garm 500 kV substation with network integration	Proposed 500 kV substation required to evacuate the power from Rogun HPP. They will also establish a transmission line ring within Tajikistan, improve the reliability of the network and help in reduction of overall T&D losses	✓	✓	✓	741
5.	CT 8 : Sangtuda 1 ; 500 kv substation with network integration	500 kV OHTL and substation to transmit power from the Sangtuda power plant. This TL is key to ensure connectivity within Tajikistan which will further boost power transmission during summer season and increase power exports	-	✓	✓	106
6.	CT 9 : Regar-Sangtuda 500 kV Power Transmission Project	500 kV OHTL linking Regar with Sangtuda. Construction of the TL will allow for easy power exchange from Tajikistan to Afghanistan and Pakistan	-	✓	✓	60

Estimated investment requirement for 2017-2023

- Based on the priority projects list estimated investment requirement is **USD 6,966 million**.
- Key assumptions:
  - HPPs to commence construction in two phases - the first in 2017 and the second in 2018 with a completion period of 4 years;
  - T&D projects to commence in 2018 with a completion period of 4 years.



Investment phasing

Year	2017	2018	2019	2020	2021	2022	2023
HPPs	10%	10%	15%	15%	12%	15%	13%
HPPs – Phase 1	15%	25%	30%	30%			
HPPs – Phase 2		15%	25%	30%	30%		

Section 3
Potential Sources of Funding for Financing Priority Projects

Investment plan and financing sources for 2017-2023
A snapshot

Estimated Requirement (USD 6,966 mn)

Estimated Funding Gap (USD 1,638 mn)

Likely source: private sector and assistance from other countries

Estimated Funding from Development Partners (USD 922 mn)

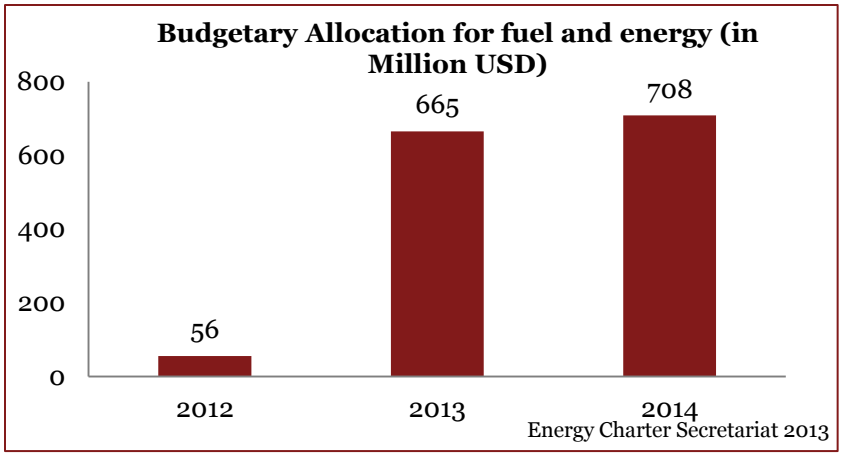
Estimated Government Budgetary Support (USD 4,406 mn)

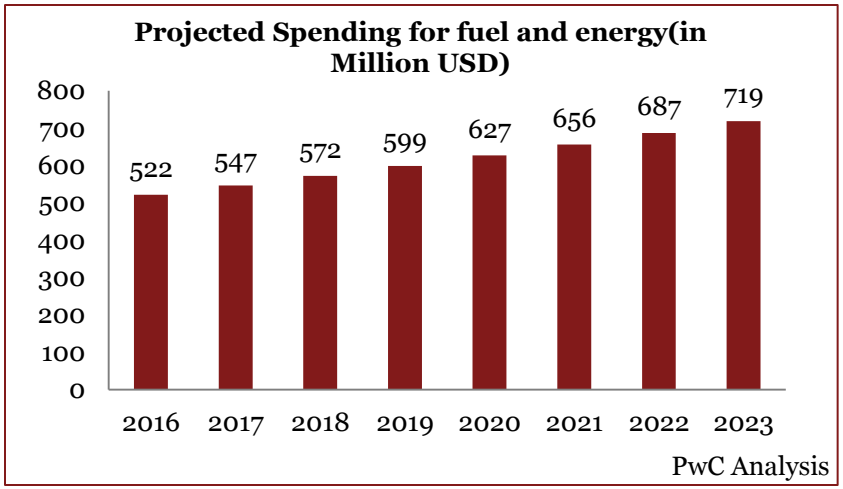
Investment plan and funding pattern, 2017-2023

National government

Estimate of government spending towards the power sector

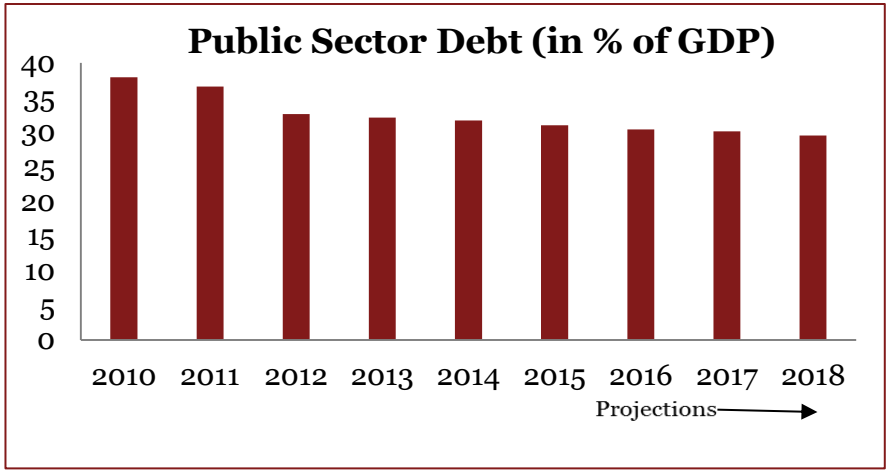
- Government budgetary support over 2015-2023 is estimated at over **USD 4,406 Mn** based on the following assumptions:
  - Average GDP growth of 4.7% till 2023 (as per IMF projections till 2020).
  - The budgetary support is assumed to be 5.4% of GDP based on trend between 2012 to 2014.
- It is expected that the government will increase investment towards rehabilitation and modernization of existing HPPs, substations and transmission lines and as well as construction of new transmission lines.
- "Long Term Program of Building Small Hydroelectric Power Stations 2008 -2020" is undertaken by the government to increase the power generation in the country.

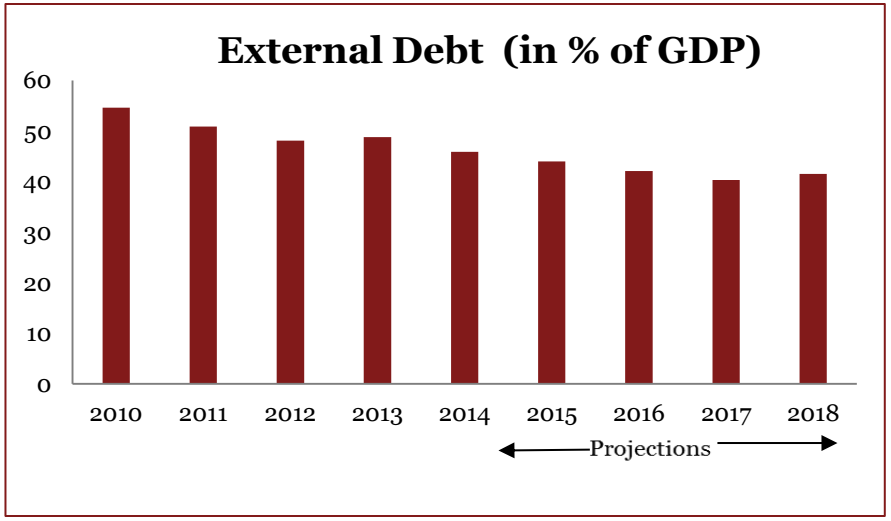




Maximum government borrowing

- The 2013 Debt Sustainability Analysis (DSA) reduced the risk of debt distress from high to moderate.
- The government raised the public debt limit from 40% of GDP in nominal terms to 40% of GDP in NPV terms in their new debt management strategy.
- The Chinese Export-Import Bank remained the largest creditor to Tajikistan, with its loans representing around 43.1% of total external public debt as of January, 2015.
- As per IMF projections total value of public debt is expected to decrease, post which it will reduce and remain close to **~29.5% of GDP till 2018**.
- Based on such assumptions the average net borrowing by the Government of Tajikistan could be around **USD 500 mn** per year.





Source: IMF

Assistance from Development Partners

Estimates of support from ADB, World Bank and other donors

- Based on Country Partnership Strategies/ Country Operations Business Plan, funding from key donors for power sector projects is estimated to be **USD 922 mn** over 2017-2023
- ADB and WB is estimated to fund around **USD 170 mn** and **USD 52 mn** respectively
- **USD 100 mn** per year is the past trend of financing by other development partners (mainly China Exim Bank, EBRD, IDB, KfW, etc.); estimate over 2017-23 is **USD 700 mn**

WB estimates

Year	Amount (in $ mn)	Remarks
2016	5	Based on average of country partnership strategy in the past
2017	5	
2018	5	
2019	8	Increase in lending by 60% for the next CPS
2020	8	
2021	8	
2022	8	
2023	10	Increase in lending by 25%
Total	**52**	

ADB estimates

Year	Amount (in $ mn)	Remarks
2016	0	Based on COBP
2017	65	
2018	0	
2019	20	Based on the average proposed lending for 2014-2018 Increase in lending by 25% based on past trends
2020	20	
2021	20	
2022	20	
2023	25	Increase of lending by 25% in the next CPS
Total	**170**	

Assistance from Development Partners

Current support in power sector and envisaged trends

No	Sector	Current Degree of Support	Expected Trend	Comments
1	Power Generation	Medium	↑	Since most of the power generation in Tajikistan is under government ownership with development partner assistance. The trend is envisaged to continue.
2	Power Transmission	Medium	↑	Transmission sector requires more support from multilateral financing institutions as the government plans to construct more transmission lines by 2020 to improve the regional connectivity for power.
3	Renewable Energy	Low	↑	Currently the requirement for development partner assistance is low but it may arise in near future as the government plans to efficiently use the renewable energy sources.

Other governments and private investors

Russia

- In 2012, Russia and Tajikistan signed agreements on cooperation on the supply of petroleum products, energy among many spheres.
- Russia expressed support for the implementation of the CASA-1000 project, as well as Tajikistan's efforts to use its hydropower capacity to promote regional development.
- Earlier a number of agreements were signed on implementation of bilateral large-scale economic projects in hydropower, mining gas, oil and minerals between Tajikistan and Russia.
- Russia made direct investments in Tajikistan for many projects with one of the largest investment being hydroelectric power station "Sangtuda-1 " which was put into operation in 2008 .

Iran

- Investments were channelized into construction of Sangtuda-2 which was co-funded by the Government of Iran, Iranian Company 'Sangob' and Government of Tajikistan.

China

- China has been one of the major investors in the electricity sector of Tajikistan.
- One of the biggest Chinese financed projects was reconstruction of Dhushanbe–Chanak highway which included installation of high voltage power transmission lines North-South and Lolazor-Khalton.
- Another proposed project which is supposed to have financing from China is 500 kV OHL Rogun-Jirgatal-Kyrgyzstan-China.

Kazakhstan

- Kazakhstan has interest in the rich hydro energy resources of Tajikistan.

Private Investors

- Other private players involved in energy sector include Inter Rao ESS, Pamir Energy

Envisaged funding probability of priority generation projects

Projects	National Government	Other Governments	Development Partner Assistance	Private investment
Zarafshon HPP	Low	Medium	High	Low
Dupulin HPP	Low	Medium	High	Low
Nurobod-2 HPP	Low	High	Medium	Low
Sangor HPP	Low	Medium	High	Low
Shurab HPP	Low	High	High	Low
Fondarya HPP	Low	Medium	High	Low
Oburdon HPP	Low	High	Low	Low
Sangiston HPP	Low	Low	High	Low

Envisaged funding probability of priority generation projects

Projects	National Government	Other Governments	Development Partner Assistance	Private investment
Ayni HPP	Low	Medium	High	Low
Sanobod HPP	Low	Medium	High	Low
Urfatin HPP	Low	Medium	High	Low
Shtiyon HPP	Low	Medium	High	Low
Nurobod-1 HPP	Low	High	High	Low
Fon-Yagnob HPP	Low	Medium	High	Low

Envisaged funding probability of priority transmission projects

Projects	National Government	Other Governments	Development Partner Assistance	Private investment
500 kV Overhead Power Transmission Line Rogun-jirgatal-Kyrgyzstan-China	Medium	Medium	High	Low
500 kV Overhead Power Transmission Line Rogun-Sangtuda- Kunduz- Puli Khumri -Kabul	Low	Low	High	Low
500 kV Overhead Power Transmission Line - Rogun - Kunduz-Puli Khumri - Kabul- Jelalabod- Peshovar	Medium	Low	High	Low
CT - 7 : Obi Garm 500 kV substation with network integration	Low	Medium	High	Low
CT 8 : Sangtuda 1 ; 500 kv substation with network integration	Low	Medium	High	Low
CT 9 : Regar-Sangtuda 500 kV Power Transmission Project	Low	Medium	High	Low

Section 4
Barriers to Private Investment and Mitigation Measures

Key barriers and mitigation measures

Aspects	Issues	Probable Mitigation Measures
Independence and autonomy of regulator	• The process of regulating the electricity sector is divided between various agencies, particularly Government, Ministry of Energy and Industry and Anti -Monopoly Enforcement Agency with lack of clarity on roles and responsibilities and overlapping roles.	• The jurisdiction and exact roles & responsibilities of the regulatory bodies may clearly defined. • The regulator may be given more autonomy and independence to avoid any conflict of interest with the government and improve investment climate.
Absence of a clear tariff determination methodology	• According to Article 15 of the Law of Energy of Tajikistan, 2000, the prices and tariff for energy sector products and services will be based on negotiation whereas the Law on natural monopolies suggests that all segments of electricity sector including power generation and distribution are obliged to sell their product and services under centrally determined price.	• It is important for the regulatory authorities to develop a tariff determination methodology considering the cost recovery aspect to encourage private investment. • Performance based long term tariff determination rules and regulations may be framed by the regulator to address such issues.

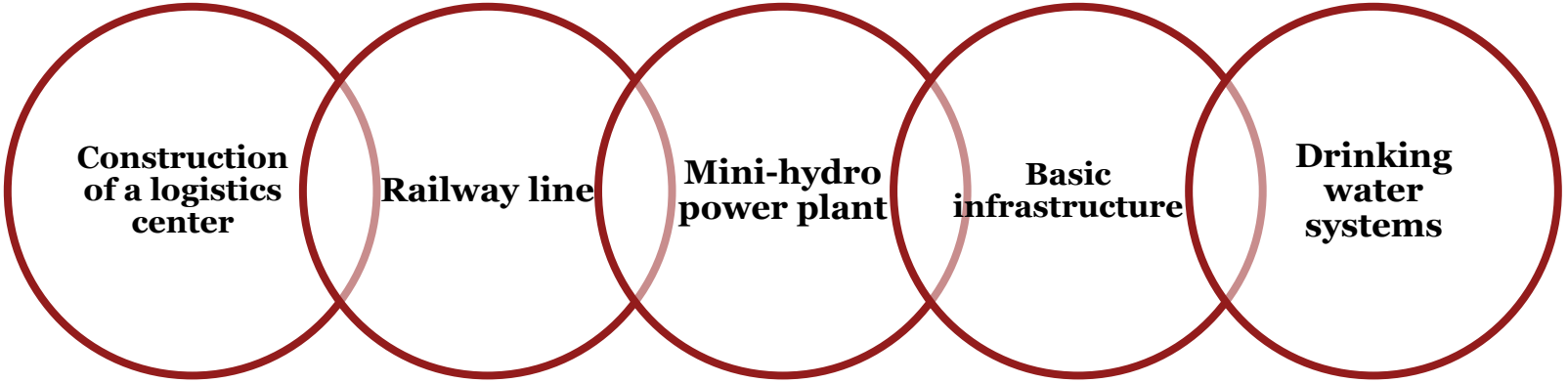
Tools to attract private sector investment

Legal acts pertaining to PPP development in Tajikistan

- PPP Law approved December 28, 2012
- Government Regulation "On the determination of the authorized government body on PPP of the Government of the Republic of Tajikistan" No. 250, June 3, 2013,
- Government Regulation "On the establishment of the State Institution" Projects implementation Unit of PPP July 2, 2013, No. 289
- Government Regulation "About Public-Private Partnerships Council July 2, 2013, No.290

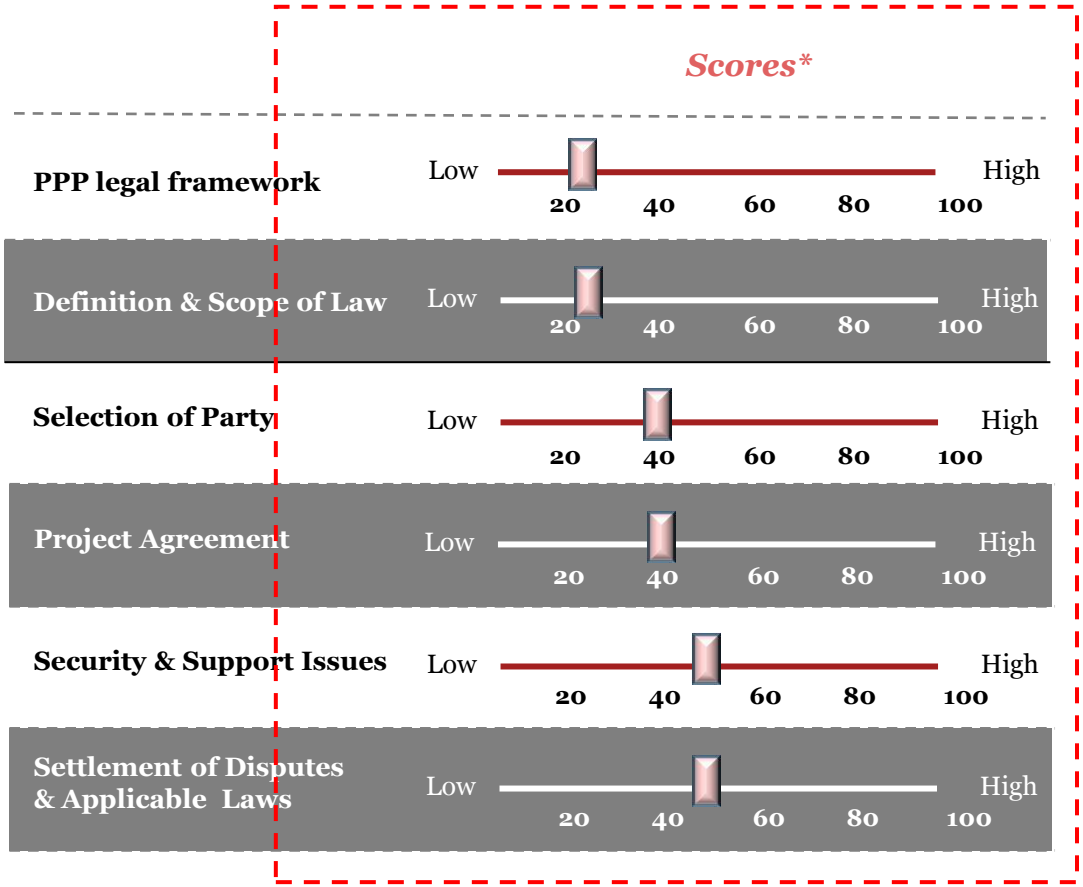
- PPP is a relatively new concept in Tajikistan, with only two completed PPP infrastructure projects to date:
  - the Pamir Power Plant and
  - the Dushanbe-Chanak toll road

Key focus areas for PPP in Tajikistan



Scope for improving PPP framework

Quality of the PPP legislative framework in Tajikistan



Law is silent on the provision if a Private Party can create security interests over the project assets, rights and proceeds or other valuable guarantees related to the project;

The regulation doesn't mention any government support to the Contracting Authority to ensure proper implementation of the project;

The law doesn't clarify the kinds of financial support (tax and custom benefit, etc.) government would provide to the contracting authority for PPP implementation;

The Law doesn't specify the step-in right of the lenders in case of default by the private party;

The Law doesn't permit internal arbitration. Any dispute between the concessionaire and the concession provider to be settled as per the laws of Republic of Tajikistan;

The law doesn't include any provision to provide compensation to the Private Party for losses incurred as a result of termination due to public authority acts.

*Source: EBRD (the right extreme of each scale (100) represents an ideal score in line with international standards such as the UNCITRAL Legislative Guide for Privately Financed Infrastructure projects. The higher the score the more closely concessions laws of the country approximate these standards)

Appendix 1
Macroeconomic indicators

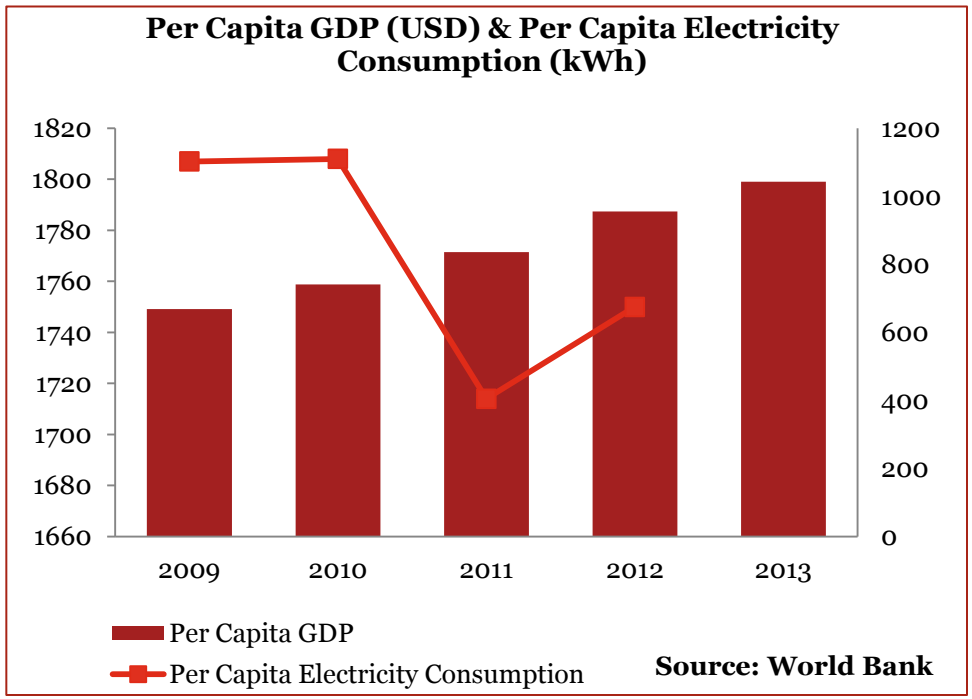
Macroeconomic overview – Historical (1/2)

- Higher global prices for aluminum and cotton, stronger remittance inflows, higher hydroelectricity production has helped boost industrial activity and supported a robust growth since 2010.
- With remittances equaling to 42.7% of GDP, Tajikistan remains the most remittance-dependent country in the world.
- Aluminum and cotton fiber have contributed to about two-thirds of Tajikistan's exports. Hence, the economy is highly vulnerable to external shocks especially from commodity prices.
- Tajikistan has gone ahead with commercialization of financial institutions to reduce its vulnerability to external factors in the absence of sustainable international reserves.

GDP by sectors (in %) (Source: ADB Outlook)

Year	Overall GDP growth	Agriculture	Industry	Services
2008	7.9	7.8	-8.9	12
2009	3.9	10.5	-6.5	9.5
2010	6.5	6.8	9.7	4.6
2011	7.4	7.9	5.7	11
2012	7.5	10.4	10.4	14.5
2013	7.4	7.6	3.9	19.3
2014	6.7	4.5	13.3	1
2015	6	3.2	11.2	-7

Macroeconomic overview – Historical (2/2)

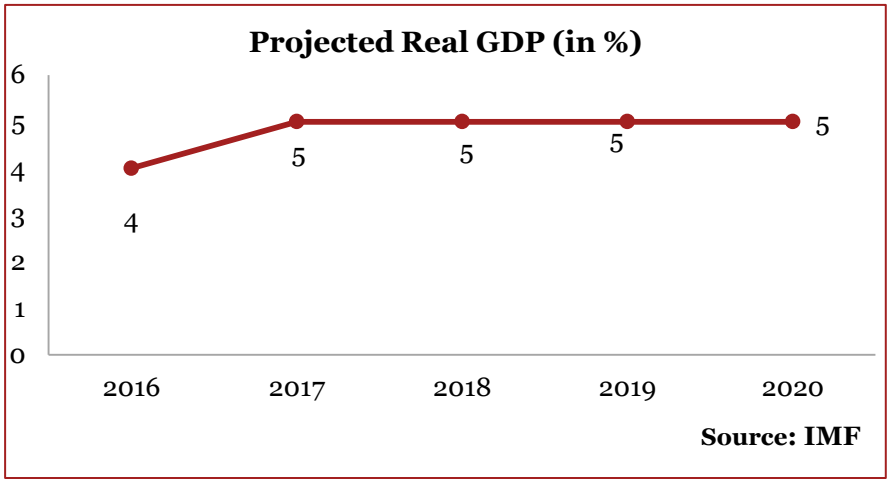


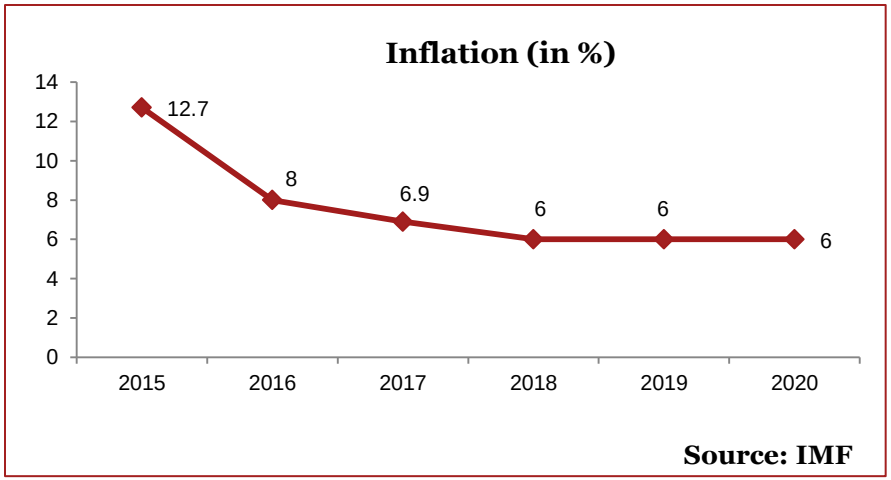
- Electricity generation accounts for 5% of Tajikistan's GDP.
- More than 96% of Tajikistan's households are connected to the electricity grid, however about 70% of the population currently suffers from blackouts during winters.
- As estimated by the World Bank the winter shortage leads to an economic loss of some USD 200 Million per year, which is about 3% of the gross domestic product (GDP).

Tajikistan's pace of poverty reduction in the past 15 years has been among the top 10% in the world with the national poverty rate falling from 96% in 1999 to 36% in 2013.

Macroeconomic overview – Future Outlook

- Growth is projected to fall to around 4% in 2016 as recession is envisaged to continue in the Russian Federation and activity remains weak with respect to other trading partners.
- Inflation is expected to remain high as depreciation of currency increases the price of imported goods.
- Growth in the medium term to be driven by investments of USD 6 Billion from 2015-2017 from China and export of surplus summer energy under CASA Electricity Transmission and Trade Project among others.
- National Development Strategy 2030 of Tajikistan's government aims to boost economic activity by securing stable access to energy resources, achieving self-sufficiency in food production, etc.





Appendix 2
Industry structure & institutional arrangement

Industry structure and institutional arrangements (1/2)

The Power sector in Tajikistan is dominated by 'Barji Tojik' Open Joint Stock Holding Company' (BT OJSHC).

Barji Tojik is a wholly state owned & vertically integrated power utility.

Barji Tojik is responsible for 95% of the total power generation and also own & operates the transmission & distribution network in the entire country except the Gorno-Badakhshan Autonomous Oblast (GBAO) region.

Tajikistan's power grid consists of three separate electricity systems: the northern region, the southern region, & the Gorno-Badakhshan region.

The northern grid operates in the Sughd region and a separate grid caters to the southern region.

Both these systems are linked to Uzbekistan while the southern grid is also linked with the Kyrgyz republic

Industry structure and institutional arrangements (2/2)

National Development Council under the President of the Republic of Tajikistan

Key Political Institutions

- Majlisi Oli of the Republic of Tajikistan,
- President of the Republic of Tajikistan,
- Government of the Republic of Tajikistan,
- Ministry of Energy and Industry,
- Ministry of Economical Development and Trade

Regulatory Bodies

- Government of the Republic of Tajikistan
- Ministry of Energy and Water Resources of the Republic of Tajikistan,
- Antimonopoly Service under the Government
- Gosstandart

Generation companies	Transmission Companies	Distribution Companies
• Barki Tojik • Pamir Energy • JSC Sangtuda 1 • JSC Saghtuda 2 • Private and public owners of micro, mini & SHPs	• Barki Tojik • Pamir Energy • Distribution network of wholesale customers/consumers	• Barki Tojik • Pamir Energy • Departmental Distribution networks

Barji Tojik is a wholly state owned & vertically integrated power utility

The implementation of the state energy policy and planning are vested in the authorized state body of the Republic of Tajikistan, the Ministry of Energy and Industry of the Republic of Tajikistan.

Appendix 3
Demand-Supply Situation

Demand-Supply Situation (1/2)

Tajikistan Power Generation (Mn kWh)

Plant Type	2010	2011	2012	2013
Hydro-power plants	16,400	16,200	16,900	17,071
Gas-turbine power plants	35	38	74	44
Imports	432	172	114	117
Exports	286	197	775	1,061

Source: IEA

Tajikistan experiences surplus electricity during summers but grapples with power shortages during the winter months

Almost 1/3 of the installed capacity is unavailable during winters due to significantly reduced availability of water and reduced flow

Lowest levels in electricity generation is observed during autumn and winter season when Tajikistan faces acute energy deficit and has to radically limit electricity which impacts economic development

Impact of energy shortages in winter on overall economy is profound with the share of energy costs amounting to almost 60% of GDP

Seasonal Imbalances and a skewed generation mix resulting in demand-supply imbalance during winter

Huge shortages during winters on account of reduced flow of rivers

+

Inability to leverage power surplus during summers due to water spillage

+

Skewed Energy Mix- Needs a hydro-thermal balance

+

No proper mechanism to export surplus during summers and import during winter.

Insufficient regional transmission capacity

Demand-Supply Situation (2/2)

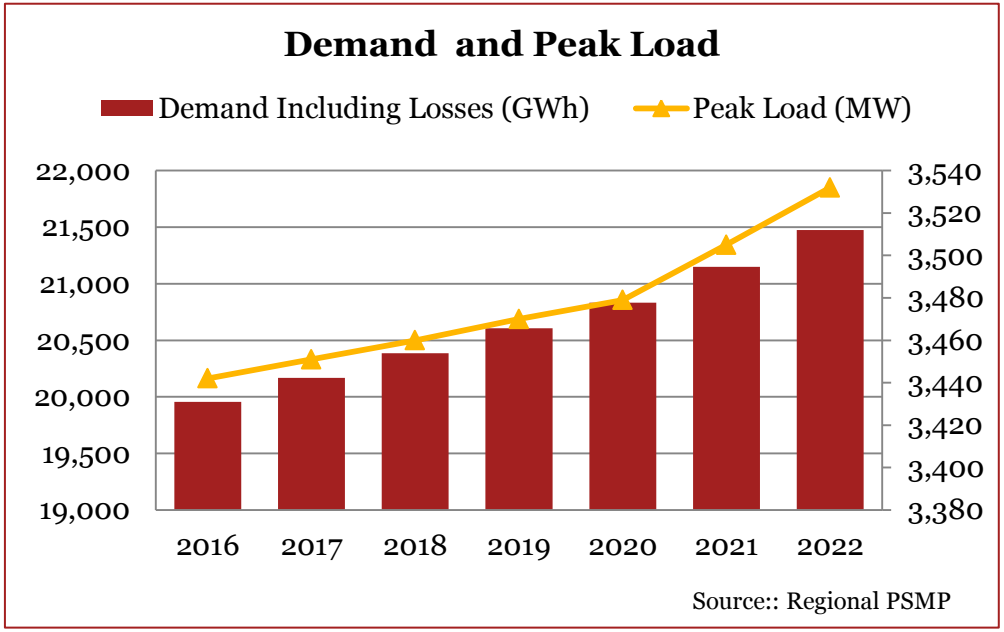
Only 4-5% of Tajikistan's total hydropower potential has been currently exploited.

Widespread opportunity for the future development of unused power generation source.

Latent hydropower potential, if leveraged, can far outstrip its own domestic power requirements.

Power supply scenario is steady during the summer seasons and a surplus power of 3.0 to 7.5 Billion kWh is usually available.

Focus is on reducing expensive fuel imports in order to cover around 70% of its energy demand.



- Focus on decreasing energy imports coupled with an undeveloped coal sector entails that Tajikistan needs to rely heavily on hydro based power generation.
- Hydro will continue to form the mainstay of Tajikistan's power generation mix

Thank you!

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