



ADB TA 8727-REG

CAREC: Study for Power Sector Financing Road Map

Mobilizing Financing for Priority Projects

Kyrgyz Republic

September 2016

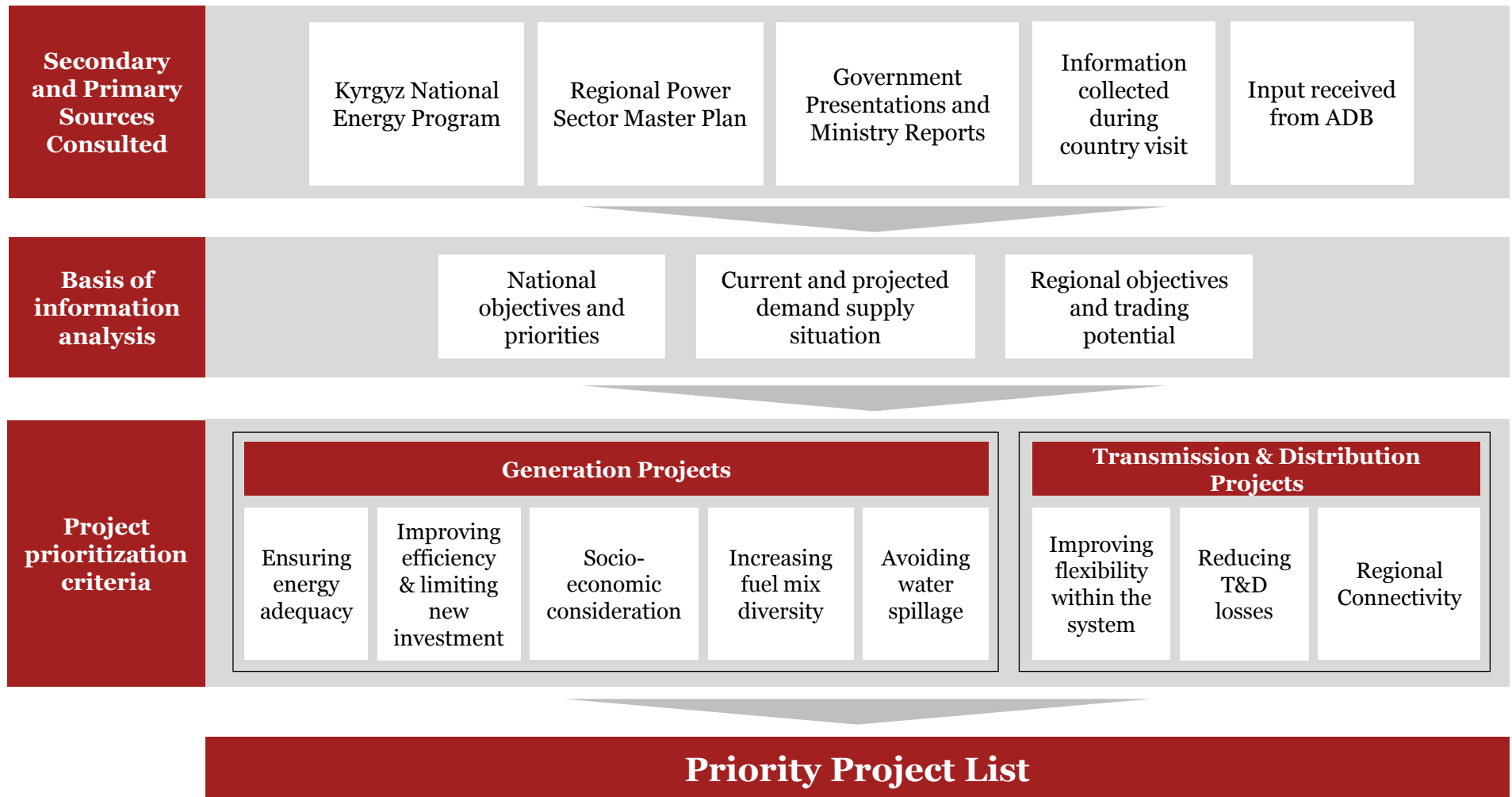
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Section 1

Priority Project Selection Criteria

Key considerations for project prioritization



Project selection criteria – Generation projects (1/2)

Ensuring energy adequacy

- Addressing severe winter shortages and leveraging power surplus during summers.
- Reliability of supply decreases in winter, with network load almost thrice the summer load levels.

Improving efficiency and limiting new investments

- Existing generations assets are aged and deterioration level is almost 50%.
- Power plants operate at capacities much lower than rated.

Socio-economic considerations

- Proportion of households spending >10% of their budgets on energy is significantly below regional average at less than 25% due to lack of access to energy.
- Poor power service quality impacts business environment in Kyrgyz Republic.
- Kyrgyz Republic is among the poorest countries globally in terms of the ease of getting electricity in IFC's Doing Business Index.

Project selection criteria – Generation projects (2/2)

Avoiding Water Spillage

- Water is usually spilled from reservoirs during summer seasons.
- Leveraging high inflow during summer season to generate power will help boost power exports.

Increasing fuel mix diversity

- Diversification is the key to address winter shortages and improve supply situation in the northern region.
- Hydropower dominated generation mix leads to decrease in generation levels during winters.
- Northern region relies on a single 666 MW TPP and a 40 MW HPP resulting in a skewed distribution of generation assets and subsequent demand-supply gap.

Project selection criteria – Transmission and distribution projects

Reducing transmission losses/Rehabilitation of existing infrastructure

- Almost 50% of the NESK's substations are over 25 years old, and 18% of the lines are over 40 years old which results in huge losses.
- The distribution company (SE) has reported that 85% of 0.4 kV distribution lines and electrical equipment are in urgent need of repair.

Improving flexibility within the system

- Improving flexibility is key to addressing this skewed power demand in the country.
- 60% of the power is consumed in the north while 81% of the aggregate generation capacity is located in the south.

Regional Connectivity

- Regional connectivity is important to transmit the surplus power during the summer to the neighboring countries.
- Improving regional connectivity will help transmit surplus power efficiently to neighboring countries.

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, and captive power projects.
- * Details pertaining to information source for investment requirement for priority projects are provided in the full country report.

List of generation projects (1/4)

S.No	Project	Brief Description and Benefits	Project Selection Criteria					Investment Requirement (USD Mn)
			Ensuring energy adequacy	Improving efficiency and limiting new investments	Socio-economic considerations	Avoiding Water Spillage	Increasing fuel mix diversity	
1.	Kambarata- 1	1900 MW HPP on the Naryn river in the central region of Kyrgyz Republic. Will regulate the flow of electricity and water regime in Central Asia and help meet the winter electricity demand.	✓	-	✓	✓	-	2,300
2.	Upper Naryn HPP Cascade	Consists of 4 HPPs with total capacity of 237 MW on the Naryn river. Electricity produced will be supplied to the domestic market and also towards exports.	✓	-	✓	✓	-	800

List of generation projects (2/4)

S.No	Project	Brief Description and Benefits	Project Selection Criteria					Investment Requirement (USD Mn)
			Ensuring energy adequacy	Improving efficiency and limiting new investments	Socio-economic considerations	Avoiding Water Spillage	Increasing fuel mix diversity	
3.	Oruktam HPP	100 MW HPP on the upper Naryn cascade with an average power output of 580 million kWh. Will increase economic efficiency of the HPS construction located below the Naryn cascade.	✓	✓	✓	✓	-	240
4.	Toguz-tor HPP	243 MW power plant with a power production capacity of 915 Mn kWh in the western part. Will ensure the region is self-sufficient and also have a cascading effect on the socio-economic development.	✓	-	✓	✓	-	335

List of generation projects (3/4)

S.No	Project	Brief Description and Benefits	Project Selection Criteria					Investment Requirement (USD Mn)
			Ensuring energy adequacy	Improving efficiency and limiting new investments	Socio-economic considerations	Avoiding Water Spillage	Increasing fuel mix diversity	
5.	Sary-Djaz HPP	1200 MW HPP on Sary-Djaz river. Will help to achieve energy independence and also from a power export standpoint.	✓	-	✓	✓	-	1200
6.	Utschkurgans kaja HPP	Active hydro power project on the Naryn River in Uch-Kurgansk, Kyrgyz Republic with a capacity of 180 MW. Needs to be rehabilitated and modernized to increase its available capacity which will reduce the probability of outages in the region.	✓	✓	✓	✓	-	96

List of generation projects (4/4)

S.No	Project	Brief Description and Benefits	Project Selection Criteria					Investment Requirement (USD Mn)
			Ensuring energy adequacy	Improving efficiency and limiting new investments	Socio-economic considerations	Avoiding Water Spillage	Increasing fuel mix diversity	
7.	Kara-Keche Thermal Power Plant	Kara-Keche TPP Unit 1 will operate on coal extracted from the Kavaksky lignite basin. Improved energy security by reducing dependence on hydropower. The Kara –Keche coal-fired TPP is required to supply electricity during winters.	✓	-	✓	✓	✓	2300
8.	Small HPPs, Tar River	Set of small HPPs with an installed capacity of 62 MW with an annual power generation of 232 Mn kWh.	✓	-	✓	✓	-	130

List of transmission and distribution projects

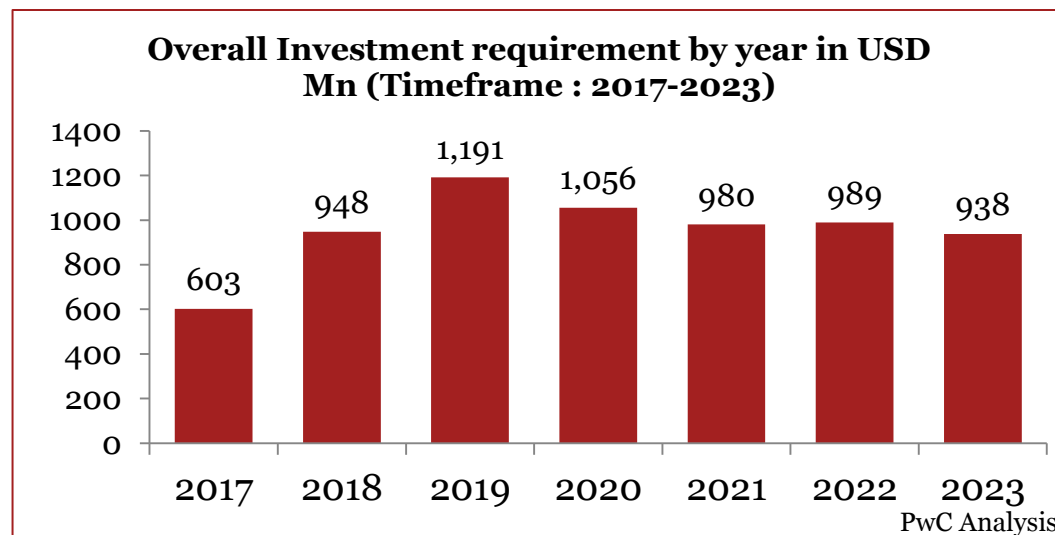
S.No	Project	Brief Description and Benefits	Project Selection Criteria			Investment Requirement (USD Mn)
			Reducing transmission losses/ Rehabilitation existing infrastructure	Improving flexibility within the system	Regional Connectivity	
1.	Rehabilitation of substation and transmission lines (R&M)	Ageing transmission lines needs to be rehabilitated across south Kazakhstan to improve overall connectivity between the various region across Kyrgyz Republic.	✓	✓	-	190
2.	Investments required towards Metering/ Billing	This involves installation of an automatic metering and data acquisition systems across various regions.	✓	✓	-	60

Other key energy sector programs not considered as priority

No.	Project	Investment Required (USD Mn)
1.	Orto-Tokoi HPP(20MW), Chu River (on the basis of reservoir) in Issyk-Kul Region	25
2.	Kara-Kul HPP (18MW) Kara-Kul Town, Karasu River (left) in Zhalal-Abad Region	25
3.	Kirov HPP, Talas River (on the basis of reservoir) in Talas region	24
4.	Oi-Alma HPP, 1 May Village, Karakulzha River	18.4
5.	Chon-Aksu HPP, Cho-Ak-Suu River	27.2

Estimated investment requirement for 2017-2023

- Based on the priority projects list, estimated investment requirement is USD 7,651 million.
- Investment requirement between 2017 and 2023 is estimated at **USD 6,704 million** or **88%** of the total estimated investment plan for priority projects.
- Key assumptions
 - TPPs to commence construction in 2017 with a completion period of 7 years;
 - HPPs to commence construction in 2017 with a completion period of 8 years;
 - Kambarta-1 to commence construction in 2017 with a completion period of 10 years;
 - T&D & HPP rehabilitation and sHPP projects to commence in 2020 with a completion period of 4 years.



Investment Phasing

Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
HPPs	10%	10%	15%	15%	12%	15%	13%	10%		
HPP rehab/ T&D Projects & sHPPs				15%	25%	30%	30%			
TPPs	10%	20%	20%	16%	14%	10%	10%			
Mega HPPs	15%	10%	15%	10%	10%	10%	10%	10%	11%	9%

Section 3

Potential Sources of Funding for Financing Priority Projects

Investment plan and financing sources for 2017-2023

A snapshot

**Estimated Requirement
(USD 6,705 mn)**

**Estimated Funding Gap
(USD 5,333 mn)**

Likely source: private sector and assistance from other countries

**Estimated Funding from Development Partners
(USD 1,370 mn)**

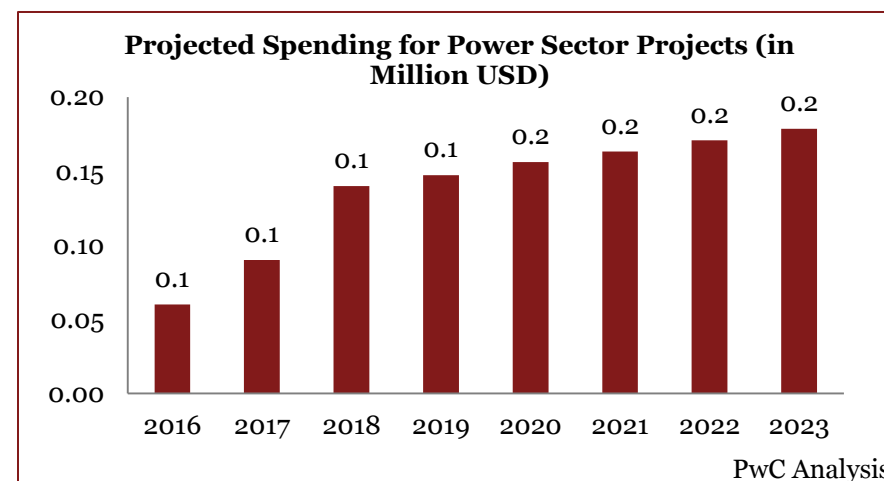
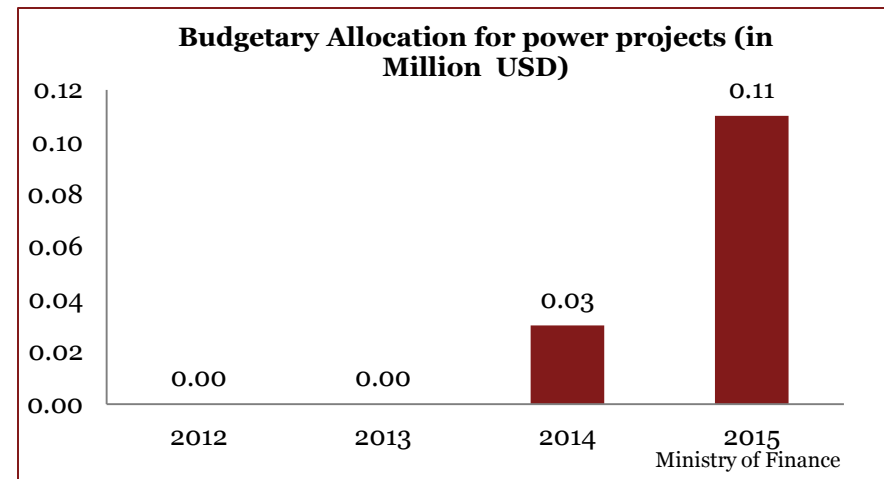
Estimated Government Budgetary Support (USD 1 mn)

Investment plan and funding pattern from 2017-2023

National government

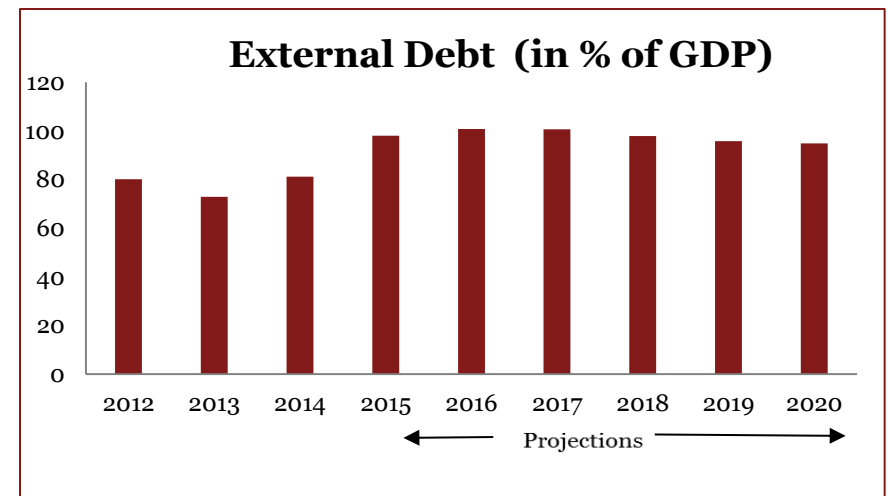
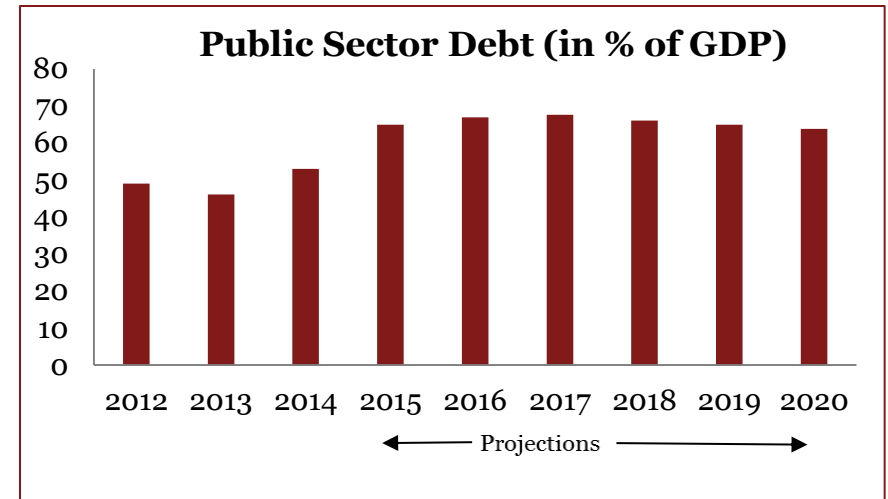
Estimate of government spending towards the power sector

- Government budgetary support over 2017-2023 is estimated at **USD 1 Mn** (for capital projects) based on the following assumptions:
 - The budgetary support was assumed to be 0.001 % of GDP based on trend between 2013 to 2015;
 - Average GDP growth of 4.6% till 2023 (as per IMF projections till 2020);
 - In the past the support from government to power sector has been low and generally comes as counterpart financing for development partner funded projects.
- Since the global crisis in 2009, the budget allocation towards power sector depended mostly on external assistance.



Maximum government borrowing

- Among CAREC member countries, Kyrgyz Republic has one of the largest Public debt to GDP ratio.
 - As per IMF projections, total value of public debt is expected to be about 65.7% of GDP on an average till 2020.
 - The external debt is expected to be close to 98% of GDP on an average during the medium term as per the IMF projections.
- The medium term debt strategy (MTDS) for 2015–17 promotes borrowing to projects which boosts growth and promote social development in the country.
- Based on the above considerations and assumptions, the average net borrowing by the Government of Kyrgyz Republic is estimated to be around USD **450 mn** per year across all sectors.



Assistance from Development Partners

Estimates of support from ADB, World Bank and other development partners

- Based on Country Partnership Strategies/ Country Operations Business Plan, funding from key partners for power sector projects is estimated to **be USD 1370 mn** over 2017-2023
 - ADB and WB is estimated to fund around **USD 245 mn** and **USD 175 mn** respectively
 - USD 125 mn per year is the past trend of financing by other development partners (mainly China Exim Bank, IDB, KfW, USAID, etc.); estimate over 2017-23 is **USD 950 USD**.

WB estimates

Year	Amount (in \$ mn)	Remarks
2016	12	Based on the Country partnership strategy
2017	15	
2018	25	Increase in lending by 25% for the next CPS and based on the committed pipeline
2019	25	
2020	25	
2021	25	Increase in lending by 20% for the next CPS
2022	30	
2023	30	
Total	175	

ADB estimates

Year	Amount (in \$ mn)	Remarks
2016	110	Based on COBP
2017	0	
2018	25	Based on the average proposed lending for 2015-2018
2019	40	
2020	40	
2021	40	Increase in lending by 25% based on past trends
2022	50	
2023	50	
Total	245	

Assistance from Development Partners

Current support in power sector and envisaged trends

No	Sector	Current Degree of Support	Expected Trend	Comments
1	Power Generation	High	↑	Assistance for development partners have been directed towards rehabilitation and maintenance of power generation assets with new projects being undertaken through bilateral support from China & Russia.
2	Power Transmission	High	↑	Transmission networks need to improve across the country as well to improve regional connectivity. This will require substantial support from the multilateral funding in the short to medium term.
3	Renewable Energy	Low	↑	With several small hydro power plants, the role of multilateral funding agencies will be pivotal in development of Kyrgyz Republic's vast RE potential.

Other governments and private investors

China

- The China-Kyrgyz Republic bilateral cooperation has been increasing in the past few years.
- The Datka-Kemin power transmission line, which allowed the country to have its first major independent transmission line, was built with Chinese assistance.
- It is expected that over the medium term cooperation with Chinese enterprises in hydropower and energy space will be strengthened.

Russia

- Russia has been active in the Kyrgyz Republic's energy (mainly hydroelectric power plants), gas, and oil industries.
- In January 2016, the Kyrgyz parliament revoked an agreement with Russia to construct key projects such as the Kambarata-1 facility and building the four smaller HPPs with a combined output of 237.7 MW on the Upper Naryn cascade.
- Given the economic crisis, Russia seems unlikely to invest substantially in the Kyrgyz Power Sector in the short-term.

Czech Republic

- The government of Kyrgyz Republic and Czech companies are on the verge of reaching an agreement towards construction of small hydro power plants (HPPs)
- Czech company Geen General Energy plans to build 4-5 hydropower plants with total capacity of up to 65 MW in the Kyrgyz Republic with an estimated investment of USD 80 Mn. These include projects on the Papan reservoir, Kichi-Kemin river, the Noorus and Kegety rivers.
- DC-Master Management plans to construct 10 sHPPs with an aggregate total capacity of 107 MW which will include projects on the Kirov reservoir, Chu River, Cascade of HPPs on Tyup and other projects.

Envisaged funding probability of priority generation projects

Projects	National Government	Other Governments	Assistance from Development Partners	Private investment
Kambarata-1	Low	High	Medium	Low
Upper Naryn HPP Cascade	Low	High	High	Low
Oruktam HPP	Medium	Medium	Medium	Low
Toguz-tor HPP	Low	Medium	High	Low
Sary-Djaz HPP	Medium	Low	High	Low
Utschkurganskaja HPP	Low	Medium	High	Low
Kara-Keche Thermal Power Plant	Low	High	Low	Medium
sHPPs on Tar River	Medium	Low	Medium	Medium

Envisaged funding probability of priority transmission projects

Projects	National Government	Other Governments	Assistance from Development Partners	Private investment
Rehabilitation of substation and transmission lines	Medium	Low	High	Low
Investments required towards Metering/Billing projects	Low	Low	High	Low

Section 4

Barriers to Private Investment and Mitigation Measures

Regulatory barriers

Aspects	Issues	Probable Mitigation Measures
Capacity of Sector Regulator	<ul style="list-style-type: none"> • The regulatory body is not provided with complete authority (like setting performance standards, issuing penalties etc.). • The State Agency for Regulating the Fuel and Energy Sector, is the regulatory body, but there are no clear regulations specifying the process of constitution and required competency of the regulator. 	<ul style="list-style-type: none"> • Guidelines for selection of members of the regulatory body may be framed ensuring autonomy, independence and competence of the regulator. • More autonomy may be provided to ensure effective enforcement of regulations.

Investment barriers

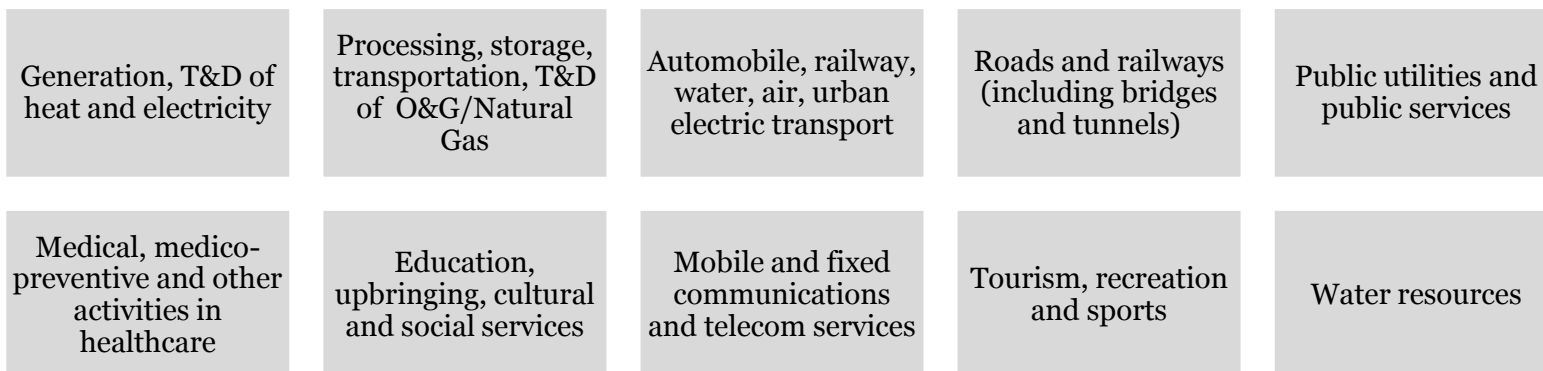
Aspects	Issues	Probable Mitigation Measures
<p>Tariff determination and cash distribution</p>	<ul style="list-style-type: none"> • Article 21 of the Electricity Law, 1997 indicates that electricity tariffs should be cost reflective. However, more efforts needs to be taken to make tariff cost reflective. • Due to lack of appropriate tariff determination regulations as well as intervention in tariff determination due to socio-political reasons, the tariff for domestic consumers is much lower than the cost of supply. This has resulted in poor financial condition of the four distribution companies. • The distribution companies lack funds for making investments to improve quality of supply. • There is no regulation or framework to manage the distribution of funds received by the distribution companies to the other stakeholders like generation and transmission companies. • The power sector receives substantial direct and indirect subsidies, which are not sustainable and may have serious macroeconomic and fiscal consequences. 	<ul style="list-style-type: none"> • Transparency in tariff setting. For example, public consultation and clear performance based regulations may be put in place to boost investor confidence. These need to be framed after extensive stakeholder discussions and research. • Regular review/ audit of the distribution companies may be undertaken to identify the areas of revenue loss; appropriate measures may be taken to increase operational efficiency and ensure cost recovery of tariffs. • Guidelines may be provided for sharing of revenue among the various power companies and also sharing of losses incurred through shortfall of revenue.

PPP in Kyrgyz Republic

Support for PPP and the Project Development Support Facility:

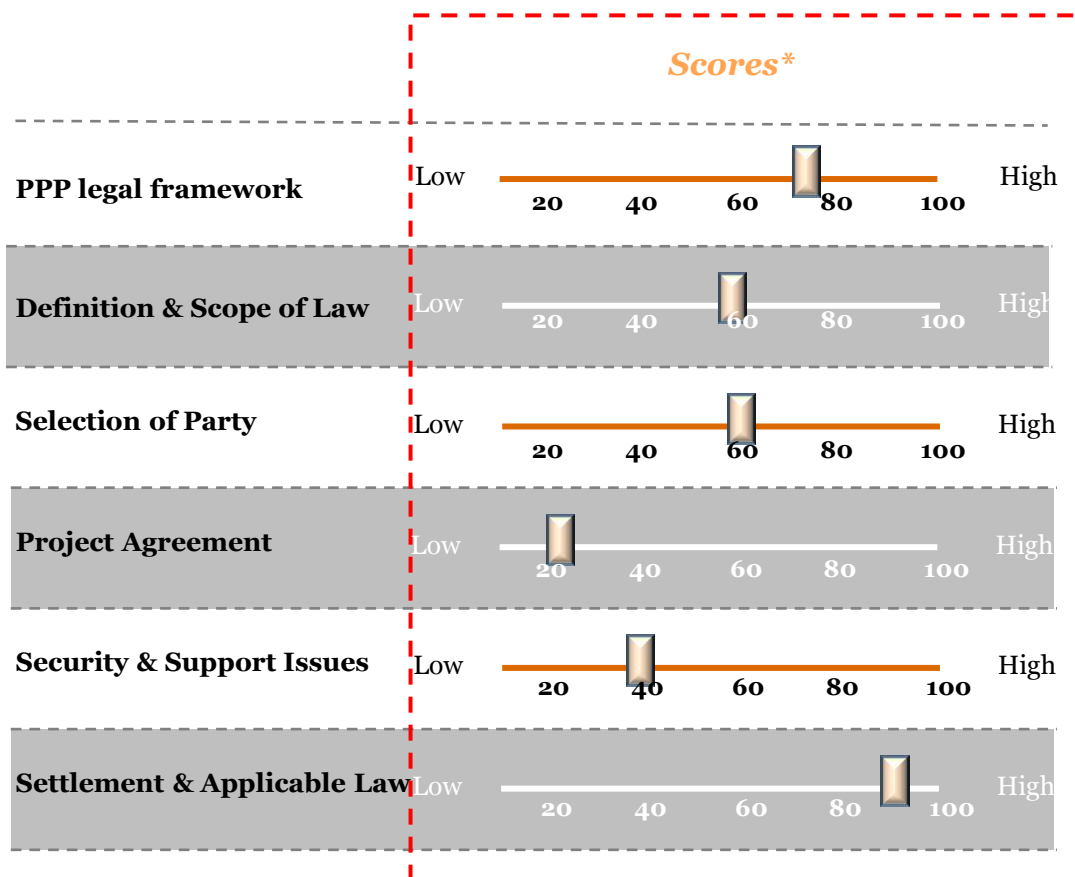
- The Law of the Kyrgyz Republic PPP was adopted in 2012.
- The Kyrgyz Government has expressed its interest in establishing and promoting PPPs in its National Strategy on Sustainable Development of the Kyrgyz Republic for the period of 2013-2017.
- By 2020, the government plans to award around 20 PPP contracts to private partners with a total capital value of around 20 Billion Soms (USD 400 Million) across infrastructure , energy, transport and other sectors.
- The Project Development Support Facility (PSDF) is considered as a special financing unit to successfully and competently assist PPP projects across Kyrgyz Republic.
- Through yearly allocations from the state budget, PDSF allotted almost USD 2 million in 2014 and estimated USD 1 million each in 2015 and 2016 towards developing PPP projects.

The Government's thrust areas for PPP is creation of new infrastructure and development and renovation of existing assets. Key focus areas for PPP are the following:



Scope for improving PPP framework

Quality of the PPP legislative framework in the Kyrgyz Republic



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)

PPP Law does not define the list of applicable PPP forms (e.g. BOOT, BOO etc.);

The existing regulation on PPP is silent about the terms of renewal or extension of the PPP agreement. However it states that the terms and conditions with regard to its extension shall be stipulated in the PPP agreement;

Law doesn't provide for (or at least does not prevent) compensation of the Private Party for losses incurred as a result of termination on the grounds of public interest for losses incurred as a result of public authority acts;

The law needs to clarify on allowing the private party to create security interests over the project assets, rights and proceeds or other valuable guarantees;

The Law doesn't provide much clarity about the step-in right of the lenders is case of default by the private party. While the law generally allows step-in rights it does not specifically mention that this can be exercised in the case of default for the private party.

Appendix 1

Macroeconomic indicators

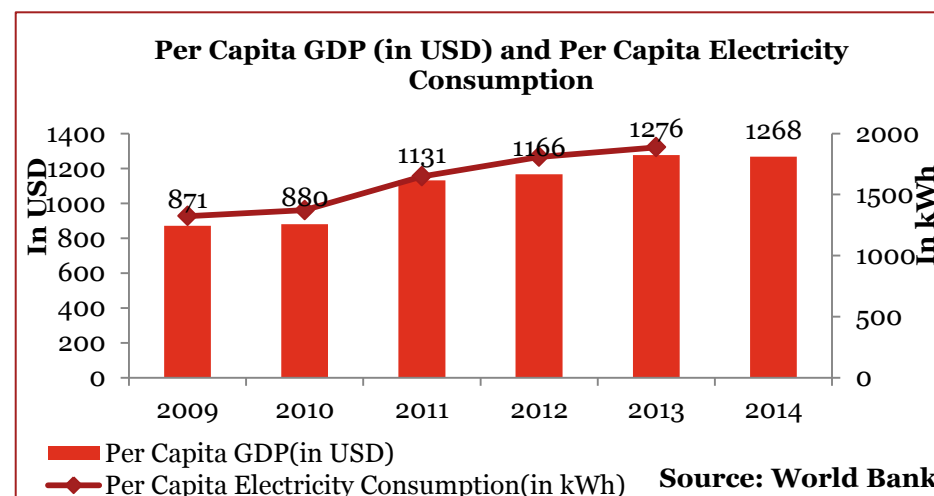
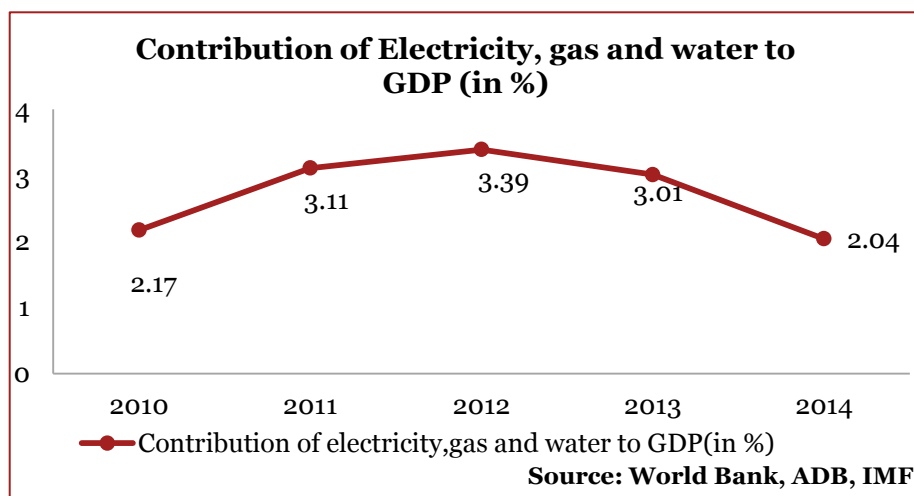
Macroeconomic overview – Historical (1/2)

- Weak and poor institutions, political uncertainty, and a challenging business environment still continuous to affect the economic development of the country.
- Growth is expected to remain positive, in the medium term due to increasing trade as the Kyrgyz Republic has joined the Eurasian Economic Union (EEU).
- The economy remains vulnerable to shocks from its largest enterprise, the Kumtor gold mine.
- Besides, with metals and metallurgy being the main factors driving growth and gold remaining the principal output, the industrial sector is expected to grow by about 10% annually in the medium term.
- Maintaining a sound banking sector is crucial for the growth of the country. Rapid credit growth, combined with high dollarization and a weaker Som, sets down the banking sector at a higher risks.

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

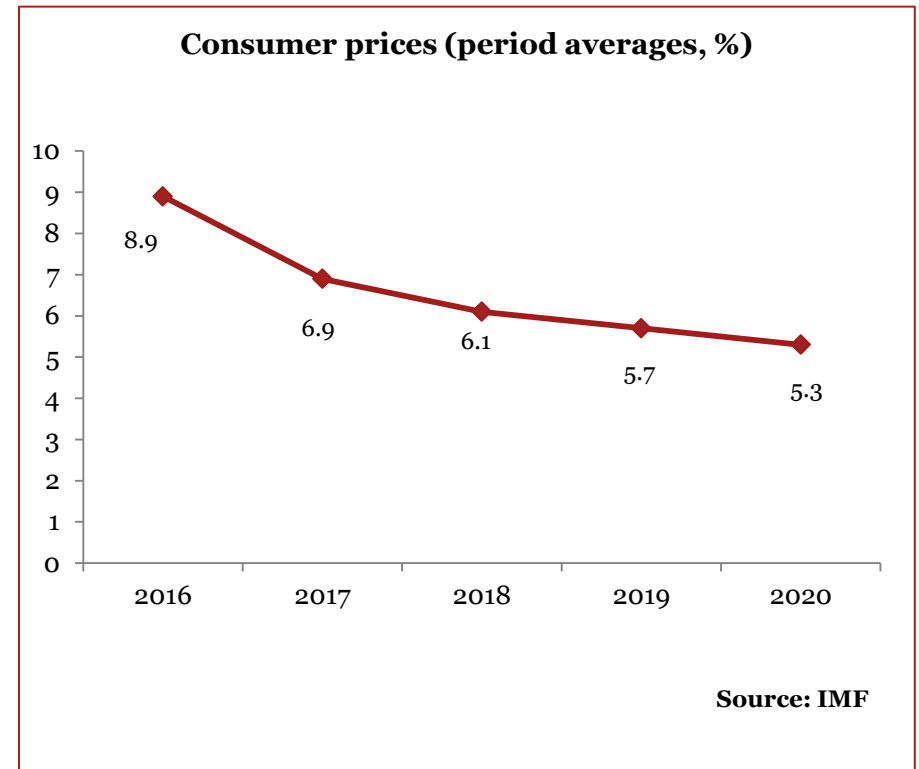
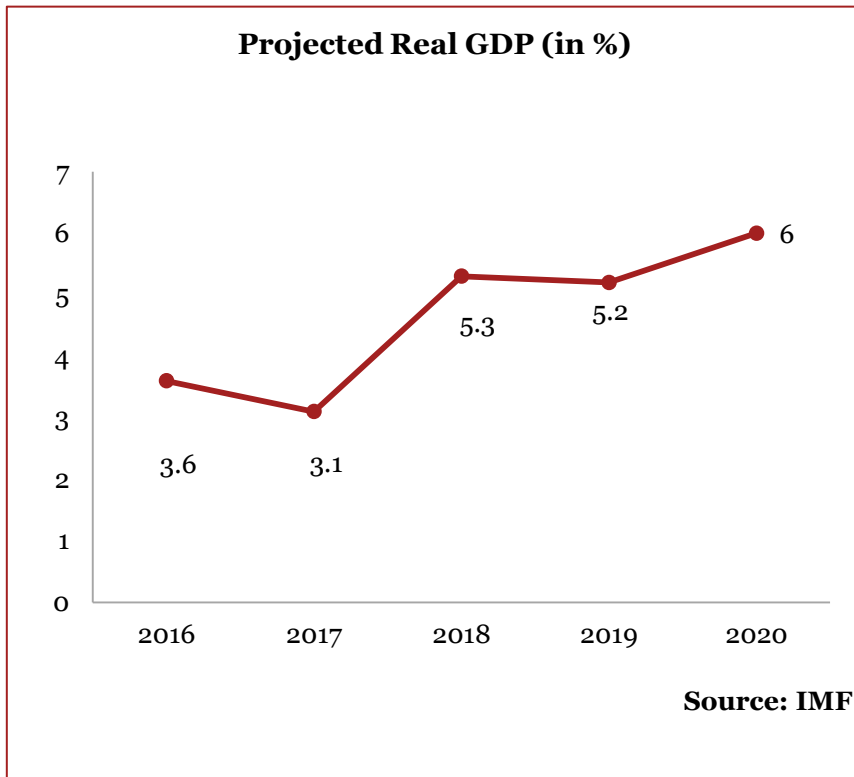
Year	Overall GDP growth	Agriculture	Industry	Services
2008	8.4	0.9	14	11
2009	2.9	6.7	-0.3	2.3
2010	-0.5	-2.6	2.5	-1.1
2011	6.0	1.9	7.0	6.9
2012	-0.1	1.2	-11.7	6.5
2013	10.9	2.6	30.5	4.7
2014	4.0	-0.5	5.7	4.6
2015	3.5	6.2	1.4	3.7

Macroeconomic overview – Historical (2/2)



- The energy/power sector is an important contributor to the Kyrgyz economy, accounting for roughly 3% of GDP and 16% of industrial production.
- The Kyrgyz Republic has been re-classified from a low income country to a lower-middle income country with the per capita income having increased almost 50% in the last 5 years.
- The country's huge dependence on gold, remittances, and foreign aid acts as an hindrance to achieve a sustainable and inclusive growth in the economy.

Macroeconomic overview – Future Outlook



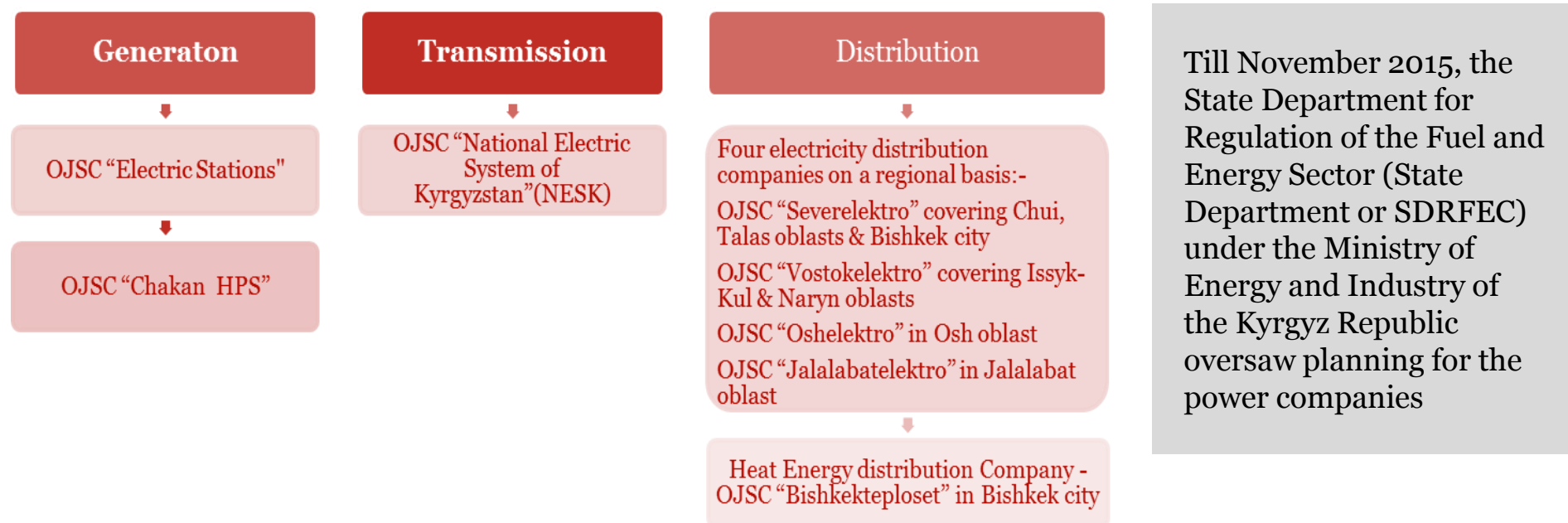
Appendix 2

Industry structure & institutional arrangement

Industry structure and institutional arrangement

Structure before Jan'2016

- Power sector in Kyrgyz Republic was unbundled into generation, transmission & distribution segments.
- The sector was restructured in 2001, and OJSC “Kyrgyzenergo”, which acted as a sole authority within a single vertically integrated system.



Industry structure and institutional arrangement

Current structure

In November 2015 the Kyrgyz government proposed establishing the National Energy Holding Company OJSC in place of the Ministry of Energy and Industry.

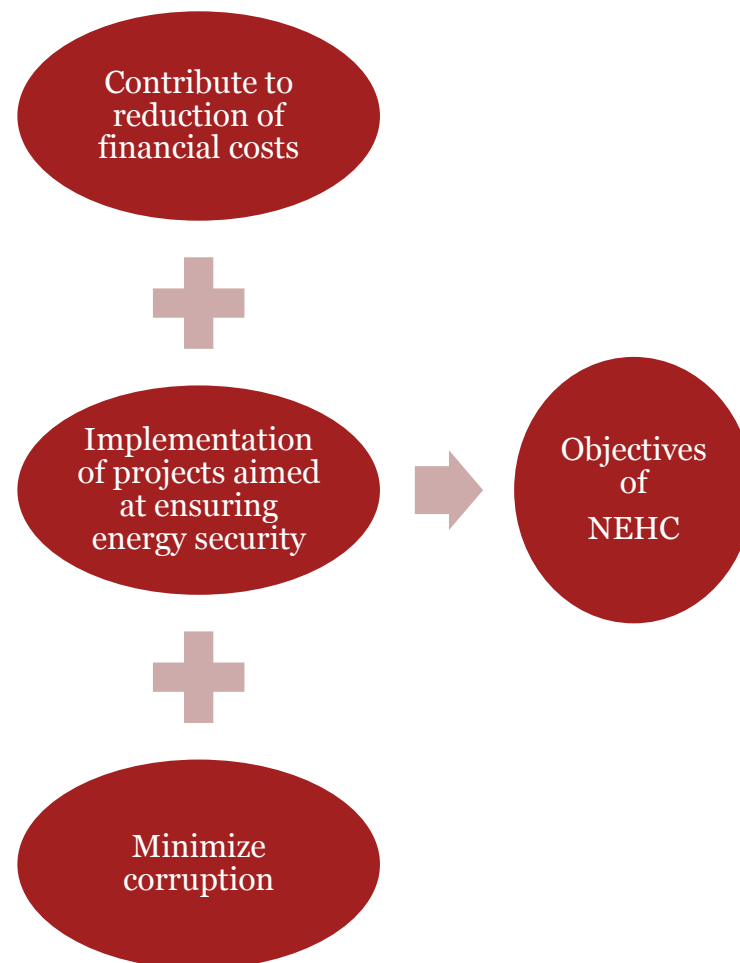
A National Energy Holding Company, established in February 2016, aimed at managing the energy sector and make it open and transparent.

National Energy Holding Company OJSC will be 100% state-owned enterprise.

This company is to be responsible for management and promotion of the energy sector of the country.

80.49% of shares of 9 JSCs Electric Power Stations, NESK, distribution companies, Bishkek heating network, and all shares of the Chakan Hydro Power Plant and the newly established Kyrgyz Energy Settlement Center are to be transferred to the Energy Holding.

Economy Ministry will oversee the functions of Energy Holding company.



Appendix 3

Demand-Supply Situation

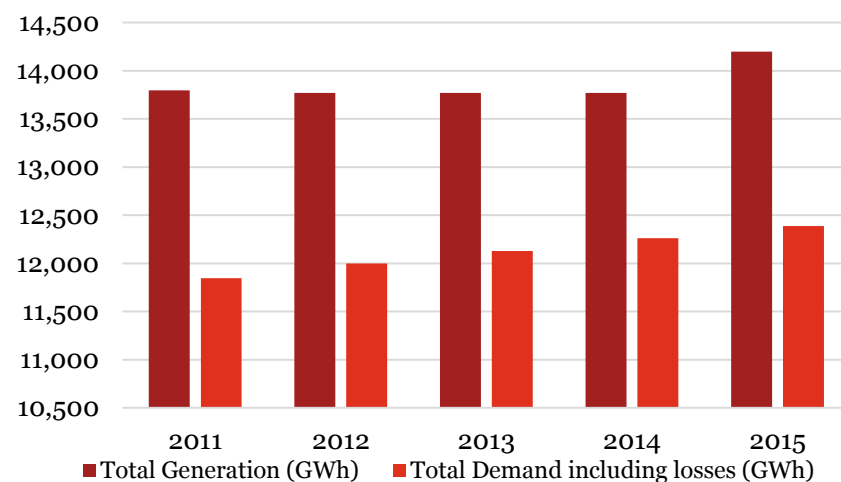
Demand Supply (1/4)

The Kyrgyz power sector faces a major challenge in the form of a widening gap between available winter generation capacity and winter demand.

HPPs in Kyrgyz Republic see the highest electricity generation during summer when the water flow in rivers is high.

During the period from 1990 to 2011, the maximum load on the grid has increased as a whole throughout the country by 1,214 MWs, including in the north by 784 MW and in the south by 430 MW.

Kyrgyz Power Demand vis a vis Generation

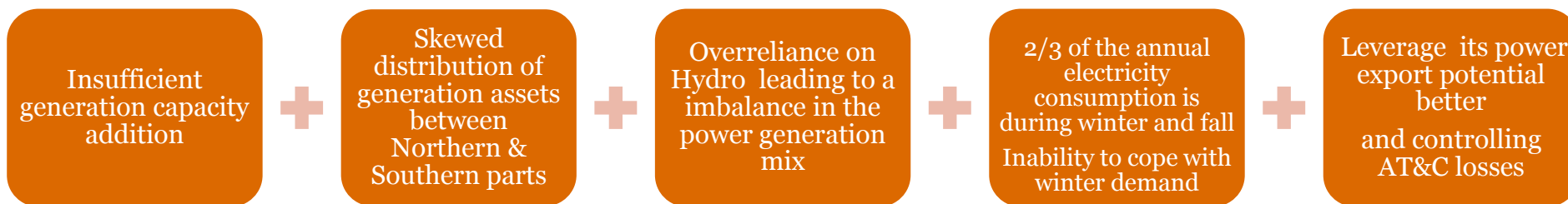


Source: PSMP and IEA

Widening gap between available capacity and peak demand and available winter generation and winter consumption calls for improving peaking capacity and firm base load capacity.

Demand Supply (2/4)

Key Issues



Available hydropower resources are equivalent to potential capacity of 18,500 MW of which only around 15% (2,950 MW) has been harnessed.

HPPs were installed during the Soviet era and are in need of urgent rehabilitation and modernization

More than 60% of the power demand can be attributed to the northern region having limited power generation facilities while the southern region with 81 % of the power generation has a lower power demand unlike the northern part.

During winter season, Kazakhstan and Uzbekistan, which export power and gas to Kyrgyz Republic, curtail their supplies due to the drop in air temperature, and increase domestic gas consumption

Kyrgyz Republic electricity production over the year (GWh)

Year→ Fuel Type↓	2007	2008	2009	2010	2011	2012	2013
Coal	1,595	1,335	386	604	635	728	786
Oil	114	108	400	207	231	180	101
Gas	385	222	80	181	153	81	27
Hydro	12,736	10,124	10,217	11,108	14,139	14,179	13,097

Source: IEA

Demand Supply (3/4)

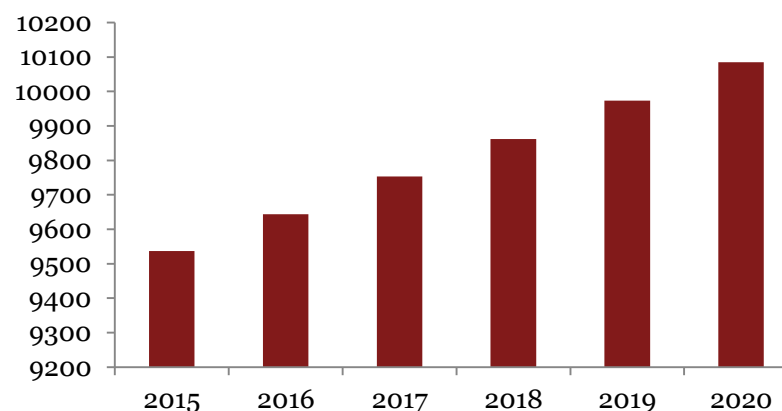
Gap between winter consumption and available generation during winter could touch 1,300 GWh in 2020 and reach 2,500 GWh in 2030 from current level of 1,055 GWh.

While Toktogul has a reservoir capacity but fully discharging of water can have adverse impact on ecology and irrigation.

Gap between peak demand and available capacity could reach 650 MW by 2020, and 1,300 MW by 2030 if there is no new generation investment or if demand-side management measures are not undertaken.

HPPs will continue to form the mainstay of Kyrgyz's power generation accounting for 86% of the power generated in 2022.

Kyrgyz Net demand forecast (in GWh)



Source: Power Sector Regional Master Plan - CAREC

Seasonal demand supply gap can be met through development of thermal power generation and regional integration.

Demand Supply (4/4)

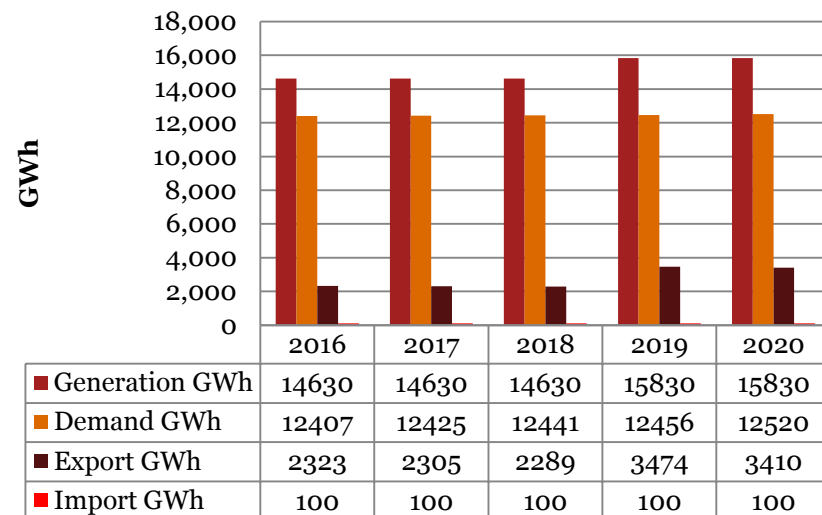
Additional investment is required for developing new thermal generation assets, inter-regional link to export surplus power during summer.

This will also help address winter demand efficiently through regional power trade by importing more power during winters.

Export demand is projected to grow, especially if the CASA-1000 transmission line connecting the power grids of Tajikistan, the Kyrgyz Republic, Pakistan and Afghanistan becomes online.

Once the CASA project is completed as scheduled, the line would increase export potential from the Kyrgyz Republic to 3,024 GWh by 2022.

Energy Generation/Demand vis a vis Exports



Kyrgyz Republic will be power surplus in future with seasonal export and import.

The export volume will increase with commissioning of new plants and increase in generation.

Thank you!

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