Capacity Development Report

UZB: Takhiatash Power Plant Efficiency Improvement Project

Note: Prepared by the Consultant for the Asian Development Bank.

TA-8142 UZB Takhiatash Power Plant Efficiency Improvement Project – Assessment of Power Sector Structure and Commercialization

Capacity Development Report

May 2013

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Glossary of Terms

ADB	Asian Development Bank
CD	Capacity Development
GWh	Gigawatt/hours
IFRS	International Financial Reporting Standards
IFI	International Financial Institution
IT	Information Technology
KPI	Key Performance Indicator
kWh	Kilowatt/hour
MIS	Management Information Systems
MoF	Ministry of Finance
PES	Distribution companies
PIU	Project Implementation Unit
ToR	Terms of Reference
TPP	Thermal Power Plant
UE	Uzbekenergo SJSC

1 Introduction

The Asian Development Bank (ADB) has asked Ms. Lauren Pierce and Mr. Brian Leighs (the Consultants), as the Institutional Expert and Capacity Development Expert (Finance) under TA-8142 UZB: Takhiatash Power Plant Efficiency Improvement Project, to conduct due diligence of the Project with a focus on improving institutional and commercial aspects of Uzbekenergo, which can enhance its ability to attract external financing to fund future investment projects. This work involved:

- **A Sector Assessment.** The Consultants conducted a sector assessment which evaluated the current institutional and regulatory framework and managerial practices in the power sector, identifying areas for improvement
- **A Capacity Development Program.** The Consultants were tasked to prepare a Capacity Development Program, which propose areas for improvement in the institutional and regulatory framework and managerial practices of Uzbekenergo to further commercialize the power sector and increase the company's ability to attract external financing.

This Capacity Development Report provides the Consultants' recommendations on the Capacity Development Program. The report is structured as follows:

- Section 2 summarizes the key areas for improvement identified in the Sector Assessment
- Section 3 describes the Consultants' recommendations for addressing the issues identified in the Section 2 and indicates which recommendations will require support from the Capacity Development program under the Takhiatash TPP Efficiency Improvement project
- Section 4 describes the work plan for and cost of completing the Capacity Development Program
- Section 5 provides a preliminary design and monitoring framework for evaluating the proposed capacity development activities.

2 Key Challenges

The Sector Assessment described a number of challenges facing Uzbekenergo before it can begin to attract commercial financing. The challenges Uzbekenergo faces relate to:

- Implementing International Financial Reporting Standards (IFRS)
- Limited accountability for service quality and performance
- Limited ability to track company performance
- Issues with tariff methodology
- Limited information technology (IT) capacity

- Procedures and reporting for external and internal commercial transactions
- Poor coordination of capacity development activities under various donor-funded projects.

The subsections which follow describe each of the above challenges in further detail.

2.1 IFRS Implementation

IFRS reporting is an essential part of obtaining unqualified audit reports based on International Auditing Standards. This, in turn, is a critical step towards achieving an investment grade credit rating that will allow Uzbekenergo to attract financing in commercial debt markets.

Uzbekenergo currently lacks systems, processes, and staffing capacity needed to implement IFRS, including:

- **Integrated accounting system.** Currently, each subsidiary company of Uzbekenergo as well as each Project Implementation Unit (PIU) uses individual accounting systems that are not integrated. IFRS requires reporting financial statements for individual subsidiary companies as well as consolidated statements for the holding company. An integrated accounting system can greatly increase the speed of producing consolidated reports and improve accuracy by reducing the possibility of human error from manual consolidation.
- **Testing procedures for revaluing assets.** To comply with IFRS, Uzbekenergo should conduct impairment tests on financial, intellectual property, and other intangible assets on an annual basis. Similarly, Uzbekenergo may be required to conduct a fair market test on fixed assets if it is believed that the book value of assets does not reflect the fair market value.
- **Human resource capacity.** There is a shortage of IFRS qualified accountants in Uzbekistan as Uzbekistani universities only offer limited IFRS courses. Consequently, hiring local staff with this qualification is difficult. Furthermore, if UE was to successfully hire or internally train IFRS accountants they would be in high demand in the market and difficult to retain. Retention of IFRS qualified or trained staff will continue to be an issue where demand exceeds supply. This needs to be recognized in the HR pay scales established for these employees.

2.2 Limited Accountability for Service Quality and Performance

The institutional and regulatory framework for the power sector in Uzbekistan lacks an adequate mechanism for ensuring that Uzbekenergo maintains a certain level of service quality and reliability. Governments regulate tariffs and service quality to ensure that utilities do not exercise “monopoly power” by overcharging customers, or by skimping on services. While there is a fairly robust regulatory framework for setting tariffs in Uzbekistan, there is not a similar mechanism for monitoring and holding Uzbekenergo accountable for service quality standards.

Service quality is a growing concern in Uzbekistan as aging infrastructure and insufficient investments have increasingly resulted in power supply reliability problems in recent years. Sporadic failures of old transmission and distribution infrastructure and transmission capacity bottlenecks contribute to electricity supply disruptions. These problems are especially acute in the southern and western regions. Blackouts are common for 2-6 hours a day in these regions during winter months when load is highest. Rolling blackouts in other regions also occur occasionally during periods of peak demand.[1]

Service quality and reliability has a direct impact on the operational and financial health of a utility. First, outages and supply interruptions equate to foregone revenue for the utility and lead to faster deterioration of the utility's assets. Second, customers may put pressure on the regulator not to increase tariffs because of poor service quality, which further affects the revenue growth potential of the utility. Recent surveys indicate that poor service quality is an active concern for Uzbekenergo's customers. Power shortages were ranked as the third most significant obstacle for doing business according to the Doing Business Report (2009). An EBRD-World Bank Survey (2010) found that dissatisfaction with quality of electricity service was higher in Uzbekistan than in other CIS countries. More than one-third responded that they were highly dissatisfied with electricity supply services in the country.[2]

2.3 Corporate Governance

While there are no major gaps in the institutional structure of the sector, there is a general problem with the institutional effectiveness, in other words, governance, of Uzbekenergo. Limited accountability for and transparency in the operational and financial performance of the utility negatively affects the company's ability to attract external financing.

The limited accountability for performance stems from two key issues:

- **Lack of integrated, computerized system to track performance.** Uzbekenergo lacks a computerized system that integrates and consolidates information from each of its subsidiary companies. The internal control process lacks coordination between technical (e.g. physical/operational) and financial management. Currently, basic internal financial reporting requirements serve as the basis for performance evaluation by the Chairman and Board. Internal reports that are prepared are based on governmental reporting forms and developed in stand-alone computer systems.
- **Lack of managerial autonomy.** UE management lack autonomy to make commercial management decisions independent of key government entities (i.e. Ministry of Finance, Ministry of Economy, and Cabinet of Ministers). Performance is closely monitored by the Ministry of Finance and Ministry of Economy and, in cases, is influenced by government policy because of the sector's political and economic impact. It is not necessarily

[1] World Bank, Climate Vulnerability, Risk and Adaptation Assessments. Helping Countries Prepare an Effective Power Sector Response: Focus on Uzbekistan Draft Final Report, June 2012.

[2] EBRD- World Bank Life in Transition Survey 2006 and 2010.

a problem that company management, particularly for a state-owned company, are influenced by government policy. However, it becomes a problem, especially in the context of attracting external financing, when policy-based decisions affect the financial health of the company.

2.4 Issues with Tariff Methodology

The overall tariff setting methodology for intersectoral tariffs is sound. However, there are several issues with how certain components of the tariffs for companies are calculated as well as how the end-user tariff is developed.

Areas for improvement in the intersectoral tariff methodology include:

- **Depreciation charge.** The depreciation methodology for intersectoral tariffs is clear, but is based on the book value of fixed assets, which does not necessary reflect the true market value of the asset base.[3]
- **Profit margin.** The calculation of profit in the intersectoral tariff methodology is not clear and not consistent with international best practice in calculating a return on investment. An allowed rate of return for a regulated utility tends to stay relatively stable barring major shifts in debt or equity capital contributions. However, the rate of return for subsidiary companies at UE varies significantly from company to company and changes from year to year for certain companies. For example, the implied return on assets for Takhiatash TPP fluctuates drastically from 35 percent in 2009 to less than 1 percent in 2011.
- **Cost of Losses.** Additionally, accounting for the cost of technical and above normal technical and commercial losses in the tariff is unclear. There is a wide range of losses reported in the tariff forms of subsidiary distribution companies of Uzbekenergo from as low as 4.5 percent at Navoi PES to as high as 38.1 percent at Andijan PES in 2010. Investing in distribution rehabilitation and metering and improving management practices can help reduce these losses over time. However, in the interim period, Uzbekenergo needs revenue to cover the cost of these losses.

The lack of transparency in the methodology and calculation of the issues identified above creates uncertainty for investors regarding whether end-user tariffs fully cover the cost of replacing depreciated equipment, the financing costs associated with investments, and the operating and maintenance costs associated with losses. Failure to cover these costs results in a revenue gap. This can cause under-spending in non-critical areas, which, in turn leads to a delay in necessary capital expenditure and accumulation of accounts payable.

There are also a number of costs that the Ministry of Finance does not allow Uzbekenergo to include in the tariff calculation. These costs relate to non-core business expenditure of the company, such as sponsorships, legal fees, and other non-electricity-related costs. Generally, regulators do not allow utilities to include costs in the tariff that are not related to the provision of service. In this sense, the

[3] For example, depreciation for Takhiatash TPP is based on the book value of the asset multiplied by 2.5 percent, which implies a 40 year asset life.

Ministry of Finance's decision to exclude these costs is consistent with international best practice. However, the lack of revenue to cover these costs poses a concern if Uzbekenergo is required by the Government to carry out these activities, but must expend resources targeted for electricity production or sales to do so.

Additionally, the efficiency of end-user tariffs could be improved. First, the use of a uniform tariff for all customer categories does not recognize the differences in costs of serving different customer groups. Second, the single-part tariff for all customers (excluding large industrial customers) does not reflect the fact that cost structures differ for providing different services (e.g. energy, capacity) and costs differ depending on the time of use (e.g. peak/off-peak, winter/summer).

Tariffs which more accurately reflect costs lead to more efficient allocation of resources. Specifically, tariffs that reflect the cost of service lead customers to make efficient consumption decisions. This can have a real impact on costs as improving the efficiency of consumer behavior can reduce or delay investments associated with expansion to meet increasing demand.

Appendix A provides a more detailed regulatory assessment of the issues related to the tariff setting methodology for intersectoral and end-user tariffs.

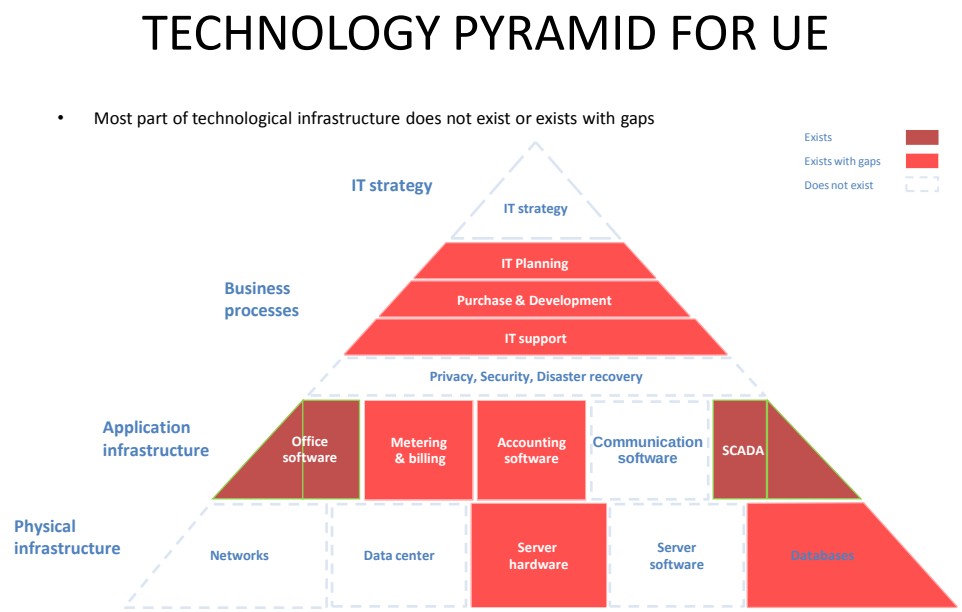
2.5 Outdated IT Infrastructure and Procedures

From discussions with senior managers at the Executive Office, there are some processes that do not exist and many gaps in processes that do exist regarding Uzbekenergo's Information Technology (IT) infrastructure and procedures.

Information Technology is considered a fundamental cornerstone function to reaching the goal of self-funding future asset upgrades and replacements. Access to commercial debt markets will require an investment grade credit rating (BBB or better) and to achieve this, the Rating Agencies will need to rely heavily on systems generated information on all parts of the business. The monthly and quarterly MIS reports will be critically analyzed as will future forecasts.

Detailed below is a pictorial view of the IT hierarchy that should be in place for a best practice organization. The color coding identifies where processes exist, where there are no processes or gaps in existing processes. These coding do not necessarily represent UE as this exercise has not been done.

Figure 2.1: Technology Pyramid Showing Necessary IT Infrastructure and Procedures



Source: Deloitte

2.6 External and Internal Billing and Collection Practices

There are a number of weaknesses in Uzbekenergo's commercial practices, beginning with the ways in which customers' meter data is collected, and the ways in which revenues and cash are accounted for between subsidiaries. The problems are:

- **Risks of continued commercial losses.** At many distribution companies, the same department and often the same individuals responsible for meter reading are also responsible for monitoring fraud, including meter tampering. Additionally, meter readings must be entered manually since the majority of meters are old, induction meters. An SMS system for entering metering data facilitates direct communication between the meter reader and the billing system, but meter readers can intentionally or inadvertently input incorrect metering data in the SMS message.
- **Delayed reconciliation between revenues and cash-flows.** As described in the interim report, cash disbursement to subsidiary companies is based on a monthly request for funds sent to the Chief Accountant. The monthly request for funds is based on the annual budget, which is, in turn, based on the annual contract for energy generated or delivered, not actual expenses. Internal invoicing therefore has little to do with actual cash-flows. Revenues and cash-flows are eventually reconciled, however, the fact that payment between subsidiary companies are not made on the basis of invoices received means that revenue and cash flow must be reconciled retroactively. This is done on a monthly basis by the Chief Accountant's department, but could create difficulty and unnecessarily

increase the workload for the accounting department as UE transitions its financial reporting practices to comply with IFRS.

- **Inadequate interface between external and internal systems.** The commercial billing system at the distribution company level tracks collections against individual invoices to end-users. However, detailed data on revenue billed, cash collected, and receivables outstanding based on customer categories are not provided to the Executive Office. As a result, the Executive Office cannot adequately track external accounts receivable from end-users against internal accounts receivable/payable between subsidiary companies.

2.7 Lack of Capacity Development Coordination

UE is undertaking an ambitious investment program with financing from multiple international financial institutions (IFIs). Each IFI loan includes capacity development activities geared toward furthering the commercialization of UE and increasing the company's ability to attract external financing.

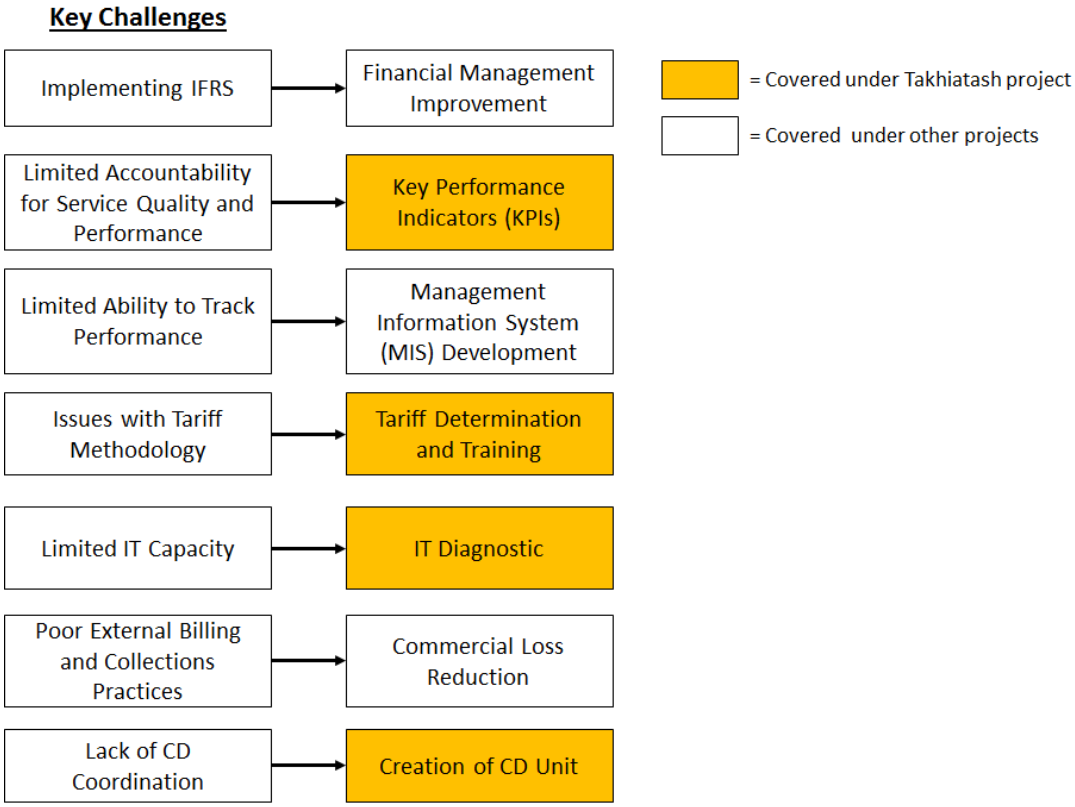
The capacity development activities of each IFI project are closely interconnected, both in terms of the sequencing of tasks and the ability to achieve the targeted results of each activity. For example, recalculating the depreciation charge in intersectoral tariffs will rely on the results of the fixed asset revaluation exercise being carried out under the Talimarjan project. Currently, UE does not have a centralized function within the Executive Office to manage and drive its various capacity development initiatives. Lack of coordination across these projects, including the ability to meet activity milestones, could jeopardize the outcome of many of the capacity development activities, which, in turn, will further delay UE's ability to access commercial financing.

3 Proposed Capacity Development Activities

The capacity development component of the Takhiatash Power Plant Efficiency Improvement Project in coordination with capacity development already planned under other IFI projects can address the key challenges identified in Section 2.

Figure 3.1 indicates capacity development activities that will address each of the key challenges.

Figure 3.1: Capacity Development Activities to Address Key Challenges



The capacity development activities under the Takhiatash TPP Efficiency Improvement Project have been developed with the following objectives listed in order of priority:

- Addressing the challenges facing Uzbekenergo identified in Section 2
- Avoiding duplication of activities funded under other IFI projects
- Developing activities that can be conducted simultaneously and, to the extent possible, independently from capacity development activities under other projects.

Table 3.1 shows how the capacity development activities proposed under the Takhiatash TPP Efficiency Improvement Project fit in with activities funded by other IFI projects.

Table 3.1: Capacity Development Activities under IFI Projects

		A	B	C	D
		ADB			WB
		Talimarjan CCGT	Takhiatash	AEMP2	Talimarjan TL
1 Service Quality Improvement					
KPI introduction	400,000		400,000		
2 Corporate management improvement					
Capacity development Unit establishment	600,000		600,000		
MIS turnkey (design, build, install, training)	6,000,000	6,000,000			
Cashflow management improvement	300,000	300,000			
3 IT system improvement and integration					
IT Diagnosis and strategy development	600,000		600,000		
4 Commercial loss reduction					
Meter monitoring and inspection	1,000,000			1,000,000	
Theft detection capacity improvement	1,000,000			1,000,000	
5 Full cost recovery tariff determination					
Tariff determination method and training	400,000		400,000		
6 Financial management improvement					
International Standard of Audit	1,500,000	1,000,000	500,000		
(Fixed asset revaluation)	1,500,000	1,500,000			
IFRS implementation strategy	400,000				400,000
IFRS pilot implementation and training	400,000				400,000
Internal audit capacity building	3,200,000				3,200,000
7 Safeguards capacity improvement					
environment	150,000	150,000			
social	150,000	150,000			
gender	150,000	150,000			
8 O&M capacity improvement					
LTSA training	150,000	150,000			
CCGT O&M	600,000	600,000			
Total	18,500,000	10,000,000	2,500,000	2,000,000	4,000,000

The following subsections describe specific tasks that will be covered by the capacity development activities under the Takhiatash TPP Efficiency Improvement Project as described in

Figure 3.1 and

Table 3.1.

3.1 Key Performance Indicators

Corporate governance at UE could be strengthened by establishing key performance indicators, setting targets for the indicators, and by establishing a framework for regularly monitoring Uzbekenergo's performance against the targets. The work would involve:

- **Deciding which indicators are important.** Uzbekenergo, Cabinet, Ministry of Finance, State Competition Committee, and other sector actors must first agree on the most relevant key performance indicators. These should include indicators of operational and financial performance as well as service quality indicators throughout the supply chain, from Generation-Transmission-Distribution-Billing-Payment. Table 3.2 provides examples of possible KPI focus areas.
- **Developing methodologies for estimating and measuring the indicators.** Even apparently simple indicators may be open to differing interpretation. Decisions must be made on what data should be collected, how often it should be collected, when (during what time of year) it should be collected, where (on the system) it should be collected to be representative, what equipment should be used, who should collect it. To allow for quick implementation, KPIs should be able to be accurately measured within existing IT and reporting systems. Decisions also have to be made about how the collected data should be used. For example, if the indicator is a ratio, the formula must be well-specified, and the way in which the formula is applied must be clear.
- **Establishing a data baseline and agreeing on targets.** Once the indicators are agreed, data must be collected to establish a baseline against which Uzbekenergo's performance can be measured. The baseline will also help establish reasonable targets for each indicator, and the evolution of those targets over time.
- **Developing a framework for monitoring and enforcing the indicators.** Once the indicators and targets are agreed, a framework needs to be developed for Uzbekenergo's subsidiaries to report on each indicator. An entity should be identified (for example, the technical regulator or an independent technical auditor hired by Ministry of Finance or Uzbekenergo's board of directors) to review Uzbekenergo reports and verify their accuracy. The framework should include a clear description of the consequences Uzbekenergo would face for missing targets. These may include, for example, financial penalties or tariff reductions. The framework should similarly consider how to reward superior performance, for example, through bonuses or public recognition.

Table 3.2: KPI examples

Business Unit	Accountability	KPI Measure	Current standard	Target

Business Unit	Accountability	KPI Measure	Current standard	Target
Generation	Asset Utilization	Actual GWh production v Available GWh capacity per month	% Currently achieved	KPI %
Generation	Operating Efficiency	Operating costs as a percentage of production	Soum/GWh achieved	Soum/GWh
Distribution	Network Reliability	Network availability	Unplanned outages hours/hours per month	KPI <5%
Distribution	Current asset management	Days Sales Outstanding	Month end accounts receivable balances/Daily average of last 90 days revenue	KPI 30-45 days
Distribution	Revenue Protection	Commercial Losses	GWhs purchased less GWhs sold less technical losses per month	<5%
Finance	Current Asset Management	Intercompany Receivables and Payables reconciliations	% of payments or receipts unreconciled at month end	<5%
Finance	People Skills Management	IFRS capability	# of IFRS Accountants employed	3-4

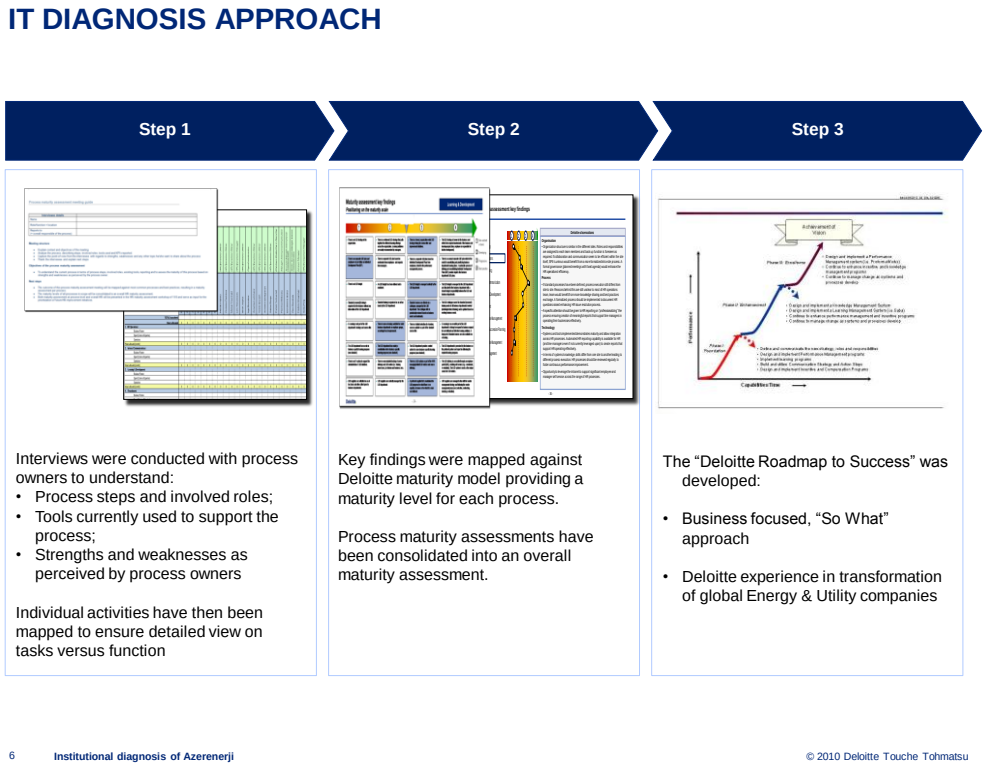
3.2 IT Diagnostic

Ideally a full corporate diagnosis should be completed over time, but this would go beyond the time frame and cost budget of this project. It is proposed that a limited corporate diagnosis be completed in the IT department.

The proposal is to engage external experts to conduct a high level review of this hierarchy of processes, identify those areas where there are significant gaps. Then in consultation with UE management, select 2 or 3 critical areas where a full diagnosis would provide the most tangible benefits. UE Management would expect the consultants/experts to assist with the implementation of the processes that fill the gaps. One obvious issue, for example, is that the predominant PC operating system used by Uzbekenergo is Microsoft XP. The latest information from Microsoft indicates that by mid-2014 XP will no longer be supported by Microsoft. This means that no Microsoft updates will be available for the system, which will make operating system vulnerable to cyber attacks. Replacement of the PC operating system must be part of the strategic plan.

Part of the IT Diagnosis review will also be to review the current IT Strategic Plan so that the IT support and infrastructure meets the demands of the organization over a 3-5 year time horizon. The Terms of Reference (ToR) will also review the IT Strategy for completeness and relevance and make recommendations for improvement. The Chart below illustrates the approach that was adopted in a similar project conducted by Deloitte and a similar level of detail would be specified in the ToR for Uzbekenergo.

Figure 3.2: Example of IT Diagnosis



Source: Deloitte

The IT Diagnosis would also involve an assessment of IT processes with the objective of helping Uzbekenergo transition from a "Basic" level of IT support to a

"progressive" level. For illustrative purposes definitions of these support processes are:

- **Basic.** "The management of facilities and equipment is dependent upon the skills and abilities of key individuals. Personnel can move within the facilities without restriction. Management does not monitor the facility environmental controls or the movement of personnel."
- **Progressive.** "Environmental and physical security requirements are documented, and access is strictly controlled and monitored. The recoverability of computing resources is incorporated into an organizational risk management process. The integrated information is used to optimize insurance coverage and related costs."

3.3 Tariff Determination and Training

Improving the tariff methodologies for intersectoral tariffs can help ensure that tariffs cover the full cost of service and provide a reasonable return to investors. Improving the end-user tariff methodology can help ensure that these costs are passed on to customers in a manner that promotes efficient consumption decisions, which, in turn, can positively impact the financial health of Uzbekenergo.

The following tariff-related capacity development activities could help address these issues:

- **Improving the methodology for estimating the revenue requirement.**[4] Resolution 239, which is a generic law regulating prices in all natural monopolies in Uzbekistan, serves as the basis for estimating the revenue requirement for Uzbekenergo. The Ministry of Finance with support from international consultants should revise the methodology for estimating the revenue requirement in order to more accurately and transparently include the following items in the tariff: i) the physical depreciation of physical assets, ii) the returns that would be required by lenders and equity investors, and iii) a reasonable level of technical losses. There is some flexibility in how these costs are included in the revenue requirement. These options should be presented by an international consultant and the methodology revised in line with an option that both meets international standards and fits within the Uzbekistan context. Depending on the preference of the Ministry of Finance, this methodology could be either formally established by law or informally established as internal tariff setting procedures within the Ministry of Finance.
- **Cost of Service Study to improve the tariff design.** Tariff design involves: i) determining how the revenue requirement should be allocated to different customer classes (known as revenue allocation), and ii) developing a tariff structure that achieves the stated regulatory objectives. International best practice in tariff design seeks to achieve the following objectives:

[4] Revenue requirement refers to the total revenue that subsidiary companies must recover through the tariff to cover their cost of service, including operating and maintenance costs as well as a reasonable return on investment.

- Efficiency: Tariffs are set to reflect the true cost of providing service to a given customer at a given location and point in time
- Simplicity: The tariff structure should be easily understood
- Continuity: Changes in the tariff structure should be made in a predictable and gradual manner. This is important in order to give customers an opportunity to change consumption patterns.
- Fairness: The tariff structure should not require a customer class to pay more than the costs of serving that class
- Earnings Stability: The company's earnings from tariffs should remain stable over a reasonable period.

A cost of service study is a first step in improving the tariff design in terms of revenue allocation and tariff structure. There are several options for carrying out a cost of service study. The two most commonly utilized are an embedded cost or average cost study and a marginal cost study. An embedded cost of service study is recommended in Uzbekistan given data availability constraints.[5] This capacity development activity should also include recommendations on revenue allocation and tariff structure based on the cost of service study results.

- **Implementation Plan.** End-user tariff levels may need to change significantly to account for the changes in the revenue requirement and changes in the tariff design. An implementation plan should be developed to help transition to the new methodologies and tariff structure in order to avoid one-time rate shock among end-users. The plan should be developed with a first priority of bringing the revenue requirement to cost-recovery levels and a second priority of improving the efficiency of revenue allocation and the tariff structure. The implementation plan developed by the international consultant should be agreed upon by both the Ministry of Finance and Uzbekenergo.
- **Training.** The Ministry of Finance and Uzbekenergo have strong tariff setting capacity. Some training, however, can help familiarize Ministry of Finance and Uzbekenergo staff with how to estimate the revenue requirement and end-user tariffs given the changes proposed to the revenue requirement methodology and tariff design.

3.4 Establish Capacity Development Unit

It is an important first step to identify and establish a Capacity Development Unit that can coordinate the capacity development activities under various IFI projects. This Unit should be located within the Executive Office of UE and managed by a senior person who has the authority and support of the Board. A capacity development consultant would be selected to direct the Unit's activities, including engaging with prospective advisors, issuing ToRs and where necessary engaging secondees from managers outside the Executive Office who have the necessary skills

[5] A marginal cost study has more detailed data requirements that may be difficult to meet given currently available data in Uzbekistan.

and experience to assist with specific programs. The consultant must speak Russian and English fluently and have previous experience managing similar capacity development activities in the electricity sector in other countries.

Deputy Chairman (Finance) Khakimov has agreed to oversee capacity development coordination within Uzbekenergo. The consultant would report either directly to the Deputy Chairman or to a senior manager at Uzbekenergo appointed by the Deputy Chairman to oversee the capacity development coordination. The Capacity Development Unit would preferably be located within an existing department of Uzbekenergo, such as the Investment Department headed by Jamshid Abdusalomov.

4 Work Plan and Budget

This section provides further detail on the capacity development activities to be covered by the Takhiatash TPP Efficiency Improvement Project. Section 4.1 shows the scope of the work for the Takhiatash capacity development, including the estimate cost, person-months, specific tasks, and milestones for each activity. Section 4.2 provides an indicative work plan demonstrating the expected schedule for each of the proposed activities.

4.1 Scope of Work

Table 4.1 shows the cost, person-months, specific tasks, and key milestones associated with each capacity development activity.

Table 4.1: Cost and Scope of Work of Capacity Development Activities Proposed under the Takhiatash TPP Efficiency Improvement Project *

Capacity Development Activity	Cost (US$ 1000)	Person-Months	Specific Tasks	Key Milestones
Capacity Development Unit	$600	20	▪ Coordinating project management for all capacity development activities, including: – Developing ToRs in consultation with relevant departments – Managing the appointment process – Monitoring consultants – Ensuring UE departmental support and provision of information – Reporting CD progress and issues to Deputy Chairman [and ADB] ▪ Sequencing and project timeline management	▪ Issue ToR: July 2013 ▪ Appoint Consultants: 4 months (October 2013) ▪ Project management to achieve milestones of individual capacity development activities: 24 months (20 person-months)
Key Performance Indicators	$400	12	▪ Phase 1: Develop KPIs – Identify and agree on relevant KPIs – Develop methodology for estimating and measuring KPIs ▪ Phase 2: Develop performance monitoring and accountability framework – Train staff in how to collect data and prepare KPI reports – Establish data baseline/agree on targets	▪ Issue ToR: July 2013 ▪ Appoint Consultants: 8 months (February 2014) ▪ Duration of project (including workshops, feedback with UE management) 3 months (May 2014) (2 man-months) ▪ Implementation 3 months (Aug 2014) (2 man-months)

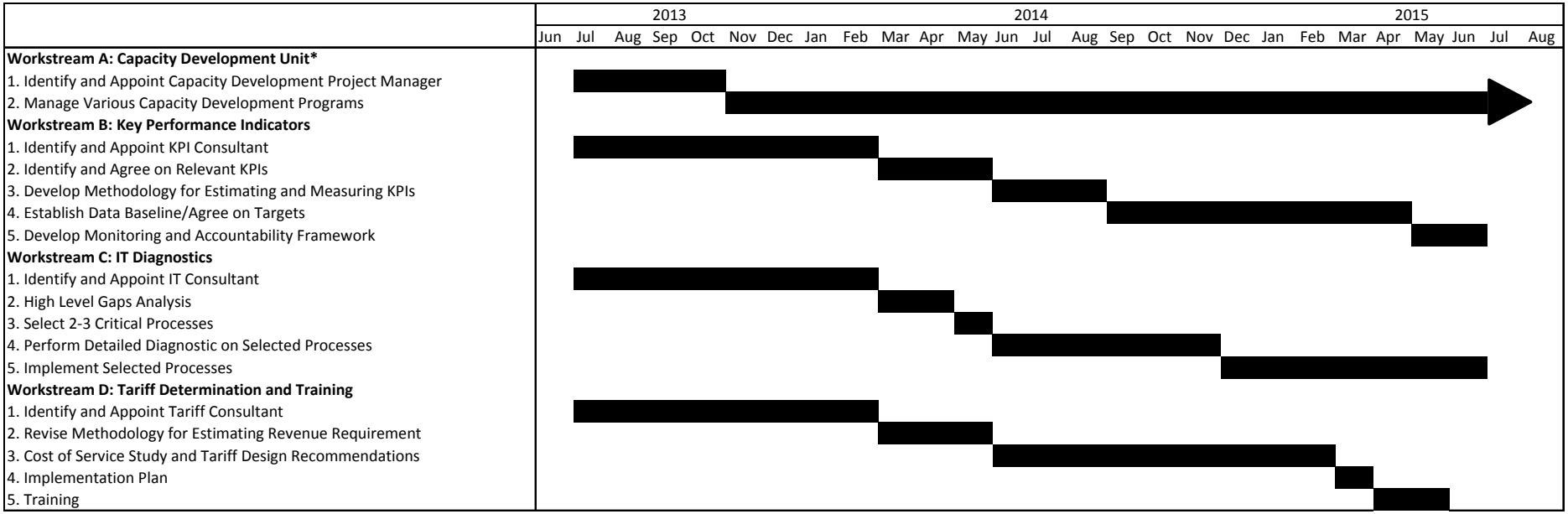
Capacity Development Activity	Cost (US$ 1000)	Person-Months	Specific Tasks	Key Milestones
			– Develop contractual framework for managing accountability	
IT Diagnostics	$600	15	▪ High level overview of IT processes ▪ Selection of 2-3 key process reviews ▪ Detailed review of the IT strategy and recommendations for improvement ▪ Implementation of the processes required to address the gaps identified	▪ Issue ToR: July 2013 ▪ Appoint Consultants: 8 months (Feb 2014) ▪ Diagnosis report completed Nov 2014 (9 man-months) ▪ Implementation completed May 2015 (6 man-months)
Tariff Determination and Training	$400	10	▪ Review methodology for estimating revenue requirement, including estimating profit and accounting for losses ▪ Carry out cost of service study ▪ Recommend improvements to revenue requirement methodology and tariff design ▪ Develop transition plan for implementing new tariffs ▪ Provide training to MoF and UE staff	▪ Issue ToR: July 2013 ▪ Appoint Consultants: 8 months (Feb 2014) ▪ Revise tariff methodology: 3 months (May 2014) ▪ Cost of Service Study delivered: 9 months (Feb 2015) ▪ Transition plan delivered: 1 month (Mar 2015) ▪ Training provided: 2 months (May 2015)
TOTAL	**$2,000**	**57**		

* Takhiatash Capacity Development budget also includes $500,000 for carrying out external audits in compliance with International Standard of Audits following the audits carried out under the ADB Talimarjan project.

4.2 Work Plan

Figure 4.1 shows the proposed work plan for implementing the four workstreams proposed under the Takhiatash TPP Efficiency Improvement Project. Note that the lines represent the time frame in which the work will be conducted, not necessarily the days of work.

Figure 4.1: Work Plan



*Capacity Development Unit workstream continues for two years to cover project management of capacity development activities under other IFI projects.

Appendix A: **Regulatory Assessment**

The regulatory assessment focuses primarily on the tariff setting and tariff implementation framework. This section is structured as follows:

- Section A.1 provides an overview of current regulatory practice in the electricity sector in Uzbekistan, including the process and methodology for setting tariffs
- Section A.2 discusses the gaps in the tariff setting framework for both intersectoral and end-user tariffs.

Economic regulation involves setting and enforcing tariffs as well as service quality standards. Uzbekistan's regulatory framework lacks a mechanism to set and enforce service quality standards. As such, this issue is not discussed in greater detail in this section. However, options for addressing the lack of a regulatory framework for ensuring a certain level of service quality are discussed in Section 3.1.

A.1 Regulatory Overview

Resolution 239 of the Cabinet of Ministers is the primary legal document providing a methodology and framework for implementing electricity tariffs for Uzbekenergo. The Resolution is not electricity-specific, but is instead a general regulatory framework for setting tariffs for any regulated monopoly entity in Uzbekistan. The following subsections describe:

- The process for setting electricity tariffs
- The methodology used for setting electricity tariffs.

A.1.1 Tariff Setting Process

Two types of tariffs exist in Uzbekistan: intersectoral tariffs and end-user tariffs. Intersectoral tariffs refer to the tariffs set for individual subsidiary companies of Uzbekenergo and are the basis for purchase and sale between individual companies. Separate intersectoral tariffs are set for each generation company, the transmission company, and each distribution company reflecting their cost of service. End-user tariffs refer to the price at which electricity is sold to customers. End-user tariffs are set for ten different customer categories, but since 2009 have been set at the same tariff for all group except large industrial customers and advertising/illumination customers.

Intersectoral tariffs are calculated by Uzbekenergo and submitted to the Ministry of Finance for approval. Uzbekenergo submits eleven regulatory accounting forms to the Ministry of Finance, which are used to justify the calculation of the intersectoral tariffs for each company. These forms include the following information:

- Financial statements of the company
- Production, labor, and overhead expenses
- Depreciation of fixed assets, including the original and residual value of assets, the expected life of the assets, and the year of commissioning

- Cost of financing activities of the company and calculation of net profit, including the approved schedules of repayment of principal and interest for loans
- Production of goods sold, in other words, the amount of electricity generated or transmitted by the company
- The investment program for the company, including the need for settlement funds to implement it (if any)
- The need for government subsidies or state support (if any).

The Ministry of Finance reviews these forms and checks Uzbekenergo's calculation of company tariffs for accuracy and to ensure that only reasonable costs are included in company tariffs. This review process can involve several rounds of iteration to agree on the investment plans and returns expected for each company. Once company tariffs are set, the Ministry of Finance calculates end-user tariffs based on the total revenue requirement for the sector and the forecasted electricity sales developed by Uzbekenergo in conjunction with the Ministry of Economy.

A.1.2 Tariff Setting Methodology

Tariffs are calculated for each company according to the following methodology:

$$T = \frac{RR}{S}$$

$$RR = C + D + F + T_x + P$$

Where:

T = Tariff for the subsidiary company

S = Electricity produced or delivered (kWh) by the company

RR = Revenue requirement for the company

C = Operating expenses

D = Depreciation

F = Cost of financing activities

T_x = Taxes

P = Allowed net profit

According to Resolution 239, operating expenses are based on technical standardized costs for raw materials, heat, electricity, labor and other costs. If technical standardized costs do not exist for a certain expenditure category, then information from the previous four fiscal quarters and forecasts of expected price changes are used to estimate costs. Depreciation is calculated based on the original value of assets and the expected life of the asset. Taxes include local taxes and profit tax. Allowed net profit, according to the Resolution, includes:

- Return of principal on loans
- Other financing of capital investments, such as own funds

- Payment of dividends, not exceeding 25 percent of the authorized capital of the company.

It is unclear why the cost of financing activities is differentiated separately from financing costs recovered through allowed net profit.

Based on the tariff worksheets provided by Uzbekenergo, it appears as if the Ministry of Finance calculates the total wholesale revenue requirement based on the total revenue requirement[6] for all generation companies in the sector, including generators not owned by Uzbekenergo, and for the transmission company, Uzelectroset. Power purchase costs are set at different levels for each distribution company. This is likely done so that the sum of power purchase costs and the revenue requirement for the distribution company divided by the electricity supplied by that company is equal to the average cost of service as shown in the following equation:

$$Average\ CoS = \frac{PP^1 + D^1{}_{RR}}{S^1} = \frac{PP^2 + D^2{}_{RR}}{S^2} = \frac{PP^3 + D^3{}_{RR}}{S^3} = \cdots = \frac{PP^x + D^x{}_{RR}}{S^x}$$

Where:

CoS = Cost of Service

PP^x = Power Purchase Cost

$D^x{}_{RR}$ = Distribution Revenue Requirement

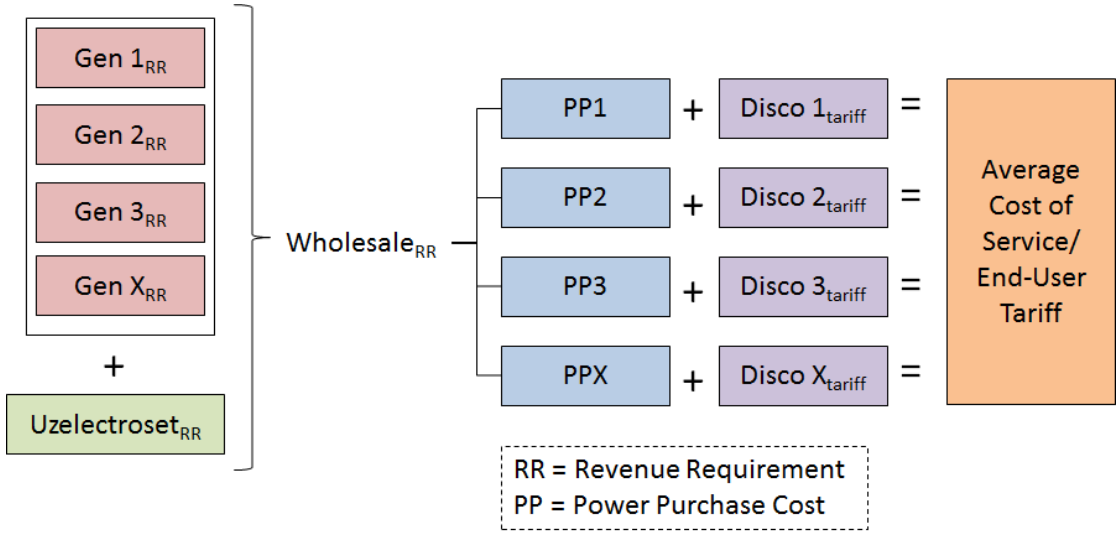
S^x = Electricity sold (kWh)

The cost of distribution varies by region because of the size of the network and number of customers served by the company. This method of charging different power purchase prices to distribution companies creates a cross-subsidy of distribution costs between regions in order to allow for geographically uniform end-user tariffs. The Ministry of Finance sets end-user tariffs for eight of the ten customer categories equal to the average cost of service. The sum of power purchase costs for all distribution companies less the cost of losses is equal to the wholesale revenue requirement for the sector.

[6] The revenue requirement for a given company is the revenue required to cover that company's costs, including allowed profit. The revenue requirement divided by the kWh sold by the company is equal to the company's tariff.

Appendix Figure A.1 demonstrates the relationship between the revenue requirement for each segment of power sector operations and the end-user tariff.

Appendix Figure A.1: Development of End-User Tariffs from Intersectoral Tariffs



A.1.3 Tariff Implementation

Tariffs are generally set according to the methodology described in Section A.1.2. Appendix Table A.1 shows the breakdown of costs by major category of expenditure for several of the largest thermal power plants in Uzbekistan. It also demonstrates how these costs were built up to the revenue requirement and the generation tariff in 2010.

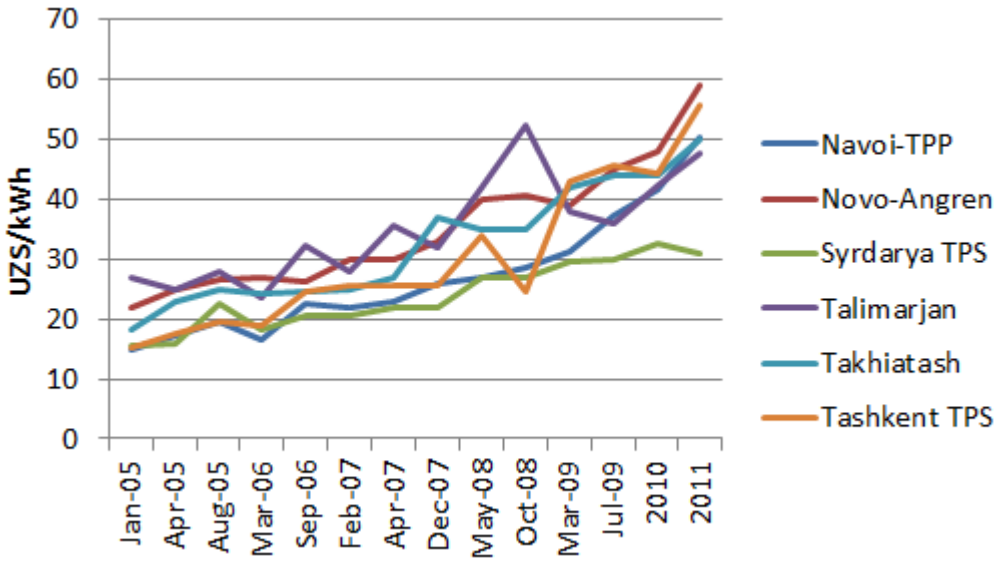
Appendix Table A.1: Development of Generation Tariff for Largest Thermal Power Plants in Uzbekistan (2010)

	(thousand UZS)	Angren	Navoi	Novo-Angren	Syrdarya	Talimarjan	Takhiatash	Tashkent TPS
1	Raw materials and supplies	4,890,232	11,637,508	15,561,457	16,641,945	5,841,638	8,277,198	31,014,000
2	Fuel	22,566,099	195,914,470	132,719,257	306,153,918	103,301,093	72,865,122	141,202,100
3	Salaries	5,343,296	9,443,814	12,657,434	15,651,670	9,975,825	6,925,226	8,886,400
4	Depreciation	1,375,450	3,045,670	4,016,407	2,937,208	23,196,372	1,322,993	1,039,300
5	Repairs	4,750,128	19,062,338	10,885,016	8,902,588	6,260,049	5,360,521	7,216,700
6	Financing Activities	-	209	688,210	277	22,464	-	-
7	Other Costs	2,394,076	6,974,759	8,504,207	11,528,123	25,414,621	4,427,246	6,304,500
8	Taxes	1,757,685	11,770,318	9,079,810	16,997,868	13,007,663	5,017,160	8,693,000
9	Profit	205,259	11,487,778	11,445,576	3,851,627	2,840,569	1,250,582	3,865,200
10	Total Costs (1+2+3+4+5+6+7+8+9)	43,282,225	269,336,864	205,557,374	382,665,224	189,860,294	105,446,048	208,221,200
11	Total Revenue Requirement[7]	39,999,858	234,513,770	202,187,250	381,758,673	188,826,801	105,053,361	207,535,367
12	Total Revenue Requirement, incl. VAT	47,999,830	281,416,524	242,624,700	458,110,408	226,592,161	126,064,033	249,042,440
13	Total Generation (thousand kWh)	358,182	6,774,366	5,060,124	14,042,742	5,379,232	2,866,089	5,635,900
14	Generation Tariff (12/13, UZS/kWh)	134	42	48	33	42	44	44

[7] The total revenue requirement is equal to total costs minus heating and other non-electricity related costs.

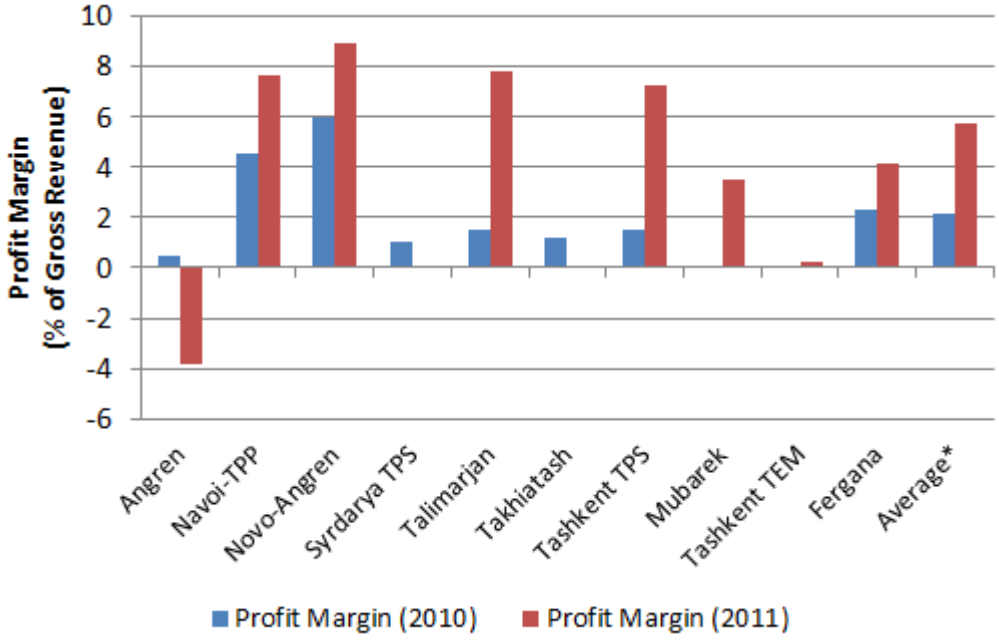
Generation tariffs have increased steadily from 2005 to 2011; however, there has been fluctuation from period to period of tariff setting. Appendix Figure A.2 shows the development of generation tariffs from 2005-2011 for the thermal power plants shown in Appendix Table A.1 (excluding Angren TPP).

Appendix Figure A.2: Generation Tariffs for Several Large TPPs, 2005-2011



Profit margins increased on average from 2010 to 2011, but showed less consistency across plants. Data was not available to assess why there may have been such fluctuation in allowed profit for many of the companies.

Appendix Figure A.3: Profit Margin for Thermal Power Plants, 2010-2011



*Average profit margin is weighted by electricity sales.

The wholesale revenue requirement was roughly equal to the power purchase costs of all subsidiary distribution companies of Uzbekenergo in 2010. The 0.3 percent difference is likely due to the different source data on generation from hydropower plants that was used to estimate the power purchase costs for those plants. Appendix Table A.2 shows how the sum of revenue requirements for generation and transmission companies is roughly equal to the power purchase costs of distribution companies in 2010.

Appendix Table A.2: Comparison of Wholesale Revenue Requirement to Power Purchase Costs of Distribution Companies

Revenue Requirement			Power Purchase Costs (excl. cost of losses)	
Angren	39,999,858		65,045,616	Andijan PES
Navoi-TPP	234,513,770		100,681,654	Bukhoro PES
Novo-Angren	202,187,250		135,920,022	Ferghana PES
Syrdarya TPS	381,758,873		40,647,950	Jizzak PES
Talimarjan	188,826,801		21,243,727	Karakalpak PES
Takhiatash	105,053,361		195,184,872	Kashkadarya PES
Tashkent TPS	210,246,200		79,323,071	Namangan PES
Mubarek	3,577,857		348,213,870	Navoi PES
Tashkent TEM	4,033,667		101,250,842	Samarqand PES
Fergana	13,705,622		29,030,779	Sirdarya PES
UE HPPs	43,696,400		72,415,542	Surchandarya PES
Non-UE HPPs	70,284,200		159,199,269	Tashkent city PES
Uzelectroset	150,670,663		275,680,278	Tashkent PES
			29,014,450	Xorezm PES
Total Wholesale Revenue Requirement	1,648,554,522		1,652,851,942	Total Power Purchase Costs for All Discos

PES = Distribution Companies

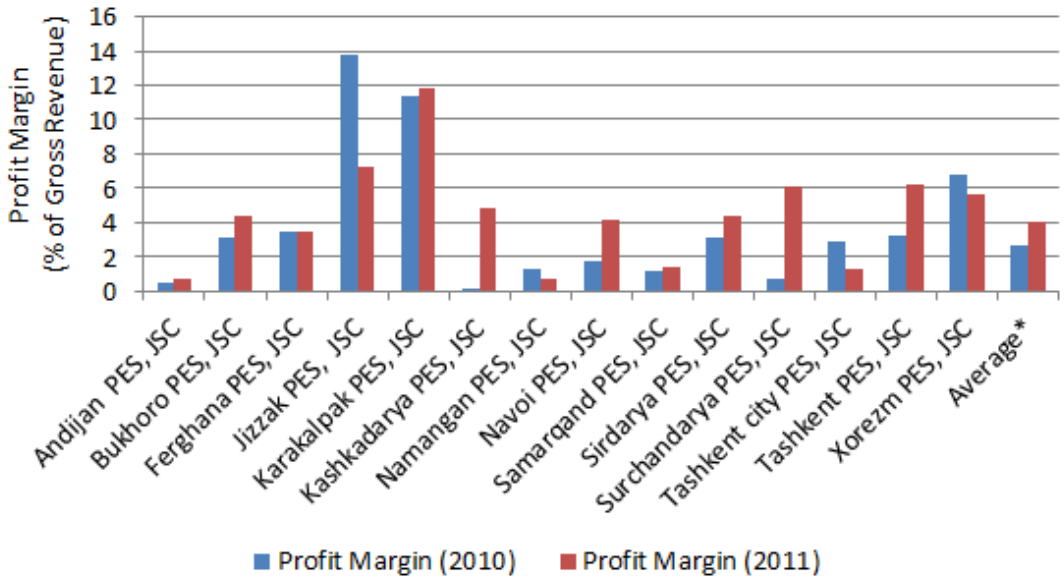
As mentioned in Section A.1.2, power purchase costs are set at different levels for each distribution company so that the average cost of service is roughly equal across all geographic regions serviced by subsidiary distribution companies. As shown in Appendix Table A.3, power purchase costs range from 27.3 som per kWh consumed for Karakalpak PES to 51.3 som per kWh consumed for Navoi PES. This is done so that the average cost of service for all distribution companies is within one som of the end-user tariff, which in 2010 was 70 som per kWh. Appendix Table A.3 shows the development of end-user tariffs for several subsidiary distribution companies of Uzbekenergo.

Appendix Table A.3: Development of End-User Tariffs for Select Distribution Companies in Uzbekistan (2010)

	Andijan PES	Bukhoro PES	Ferghana PES	Karakalpak PES	Kashkadarya PES	Namangan PES	Navoi PES	Tashkent PES
Power Purchase Costs (excl. cost of losses)	65,045,616	100,681,654	135,920,022	21,243,727	195,184,872	79,323,071	348,213,870	275,680,278
Raw materials and supplies	2,281,754	283,409	596,033	387,912	517,602	498,979	391,360	1,763,226
Fuel	333,754	230,342	180,542	198,076	545,140	284,995	171,107	230,076
Salaries	12,241,776	6,422,005	16,901,809	7,584,297	19,688,164	12,017,072	10,740,931	18,889,869
Depreciation	1,451,797	1,161,763	2,199,552	587,996	3,111,637	2,298,040	1,143,442	6,606,679
Repairs	993,595	433,695	358,828	95,500	459,703	188,907	218,826	838,646
Other Costs	34,061,286	17,093,418	31,470,058	10,437,718	29,397,195	25,909,229	18,750,730	44,176,437
Taxes	4,239,978	4,196,976	6,913,520	2,644,709	7,142,377	4,498,904	10,277,387	13,307,085
Profit	544,856	4,006,168	5,575,580	4,745,524	294,477	1,599,538	6,704,391	11,665,648
Total Costs	121,194,412	134,509,430	200,115,944	47,925,459	256,341,167	126,618,735	396,612,044	373,157,944
Total Distribution Revenue Requirement (excl. non-electricity costs)	117,982,427	133,031,937	194,902,262	46,012,934	252,288,839	123,752,441	393,985,085	365,430,946
Total Distribution RR, incl. VAT	141,578,912	159,638,324	233,882,714	55,215,521	302,746,607	148,502,929	472,782,102	438,517,135
Total Sales (thousand kWh)	1,993,951	2,263,006	3,283,731	777,874	4,294,307	2,101,813	6,787,823	6,262,276
Power Purchase Cost/kWh sold	32.62	44.49	41.39	27.31	45.45	37.74	51.30	44.02
Distribution Cost/kWh sold	38.38	26.05	29.83	43.67	25.05	32.91	18.35	26.00
Average Cost of Service	71.00	70.54	71.22	70.98	70.50	70.65	69.65	70.03

Profit margins for distribution increased on average from 2010 to 2011, but were inconsistent from company to company. Jizzak PES and Karakalpak PES, two of the smallest distribution companies in terms of kWh sold, had significantly higher profit margins than the other 15 companies. Andijan PES had the lowest profit margins at 0.12 percent in 2010 and 0.7 percent in 2011. Appendix Figure A.4 shows the range of profit margins at the 15 subsidiary distribution companies of Uzbekenergo from 2010 to 2011.

Appendix Figure A.4: Profit Margin for Distribution Companies, 2010-2011



*Average weighted by kWh sold

A.2 Regulatory Gaps

The overall tariff setting methodology for intersectoral tariffs is sound. However, there are several issues with how certain components of the tariffs for companies are calculated as well as how the end-user tariff is developed. The following two subsections discussed these issues in greater detail.

A.2.1 Issues with Intersectoral Tariff

The calculation of profit in the intersectoral tariff methodology is not clear and not consistent with international best practice in calculating a return on investment. Typically in a cost-plus tariff methodology, which is what is used in Uzbekistan, the revenue requirement is based on operating costs, depreciation, and a “fair” return on investment. The return on investment is typically calculated based on the allowed rate of return and the regulatory asset base (RAB), where the regulatory asset base includes the depreciated value of fixed assets and may include an allowance for working capital. The following formula shows the calculation used in many developed and developing countries to calculate the revenue requirement for a regulated natural monopoly:

$$RR = OPEX + D + r * RAB + T$$

Where:

RR = Revenue requirement for the company

OPEX = Operating expenses

D = Depreciation

r = Rate of return

RAB = Regulatory Asset Base, including depreciated value of fixed assets and allowance for working capital and excluding capital contributions (in the form of grant or subsidies)

T = Taxes

Uzbekenergo does not use this rate of return approach when calculating the profit margin for subsidiary companies. Appendix Table A.4 demonstrates a detailed analysis of the depreciation and profit components of the generation tariff for Takhiatash TPP. Information available on the profit and depreciation components of the tariff as well as the residual and original value of fixed assets was used to determine the implied depreciation rate and rate of return. As the analysis shows, the depreciation component of the tariff is predictably set based on the original asset value and an expected asset life of 40 years (straight-line depreciation rate equal to 2.5 percent). An allowed rate of return for a regulated utility tends to stay relatively stable barring major shifts in debt or equity capital contributions. The implied return on assets for Takhiatash TPP, however, fluctuates drastically from 35 percent in 2009 to less than 1 percent in 2011.

Appendix Table A.4: Depreciation and Profit in Generation Tariff for Takhiatash TPP[8]

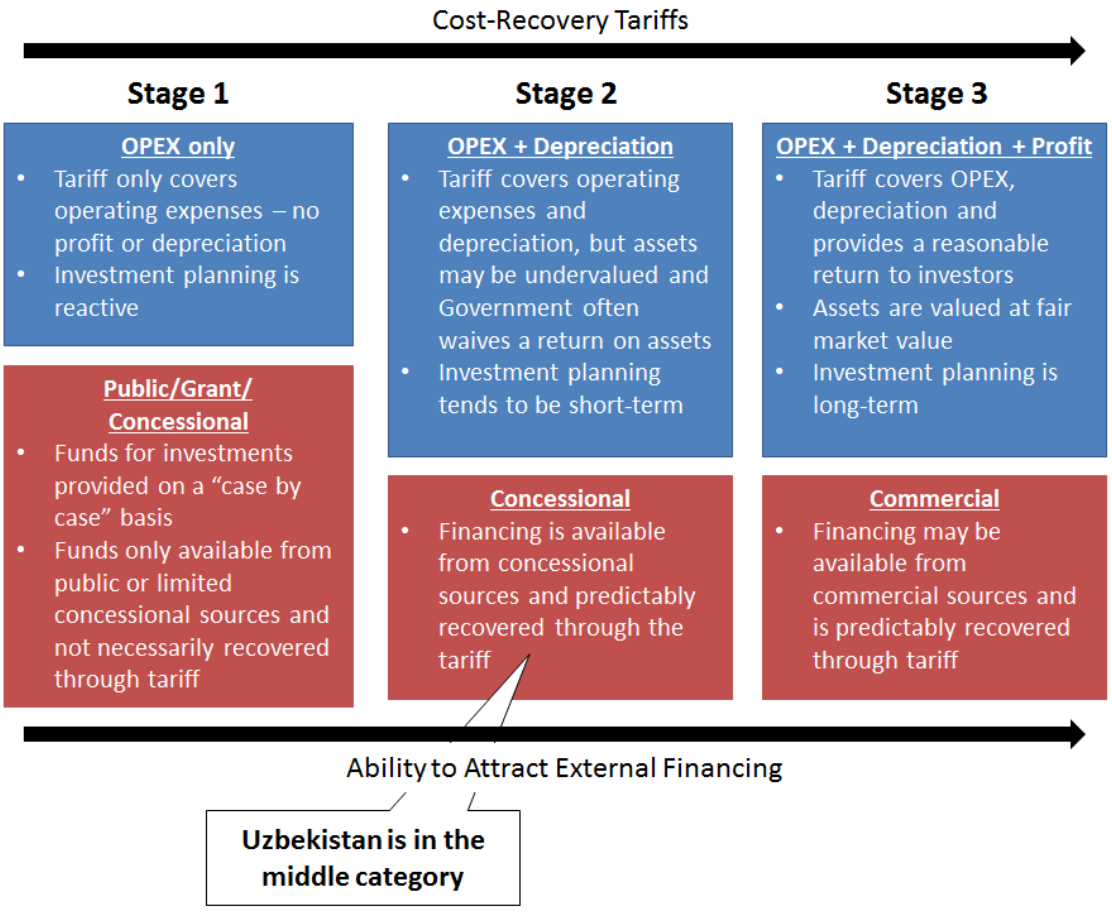
		2009	2010	2011
1	Revenue	94,450,334	105,053,361	127,507,347
2	Profit Margin	11.69%	1.20%	0.06%
3	Residual Asset Value	29,162,821	32,718,933	37,869,444
4	Original Asset Value	48,086,855	53,050,552	60,422,942
5	Depreciation	1,214,631	1,322,993	1,518,587
6	Profit	9,678,018	1,250,582	80,164
7	Realized Rate of Return (6/(3-5))	34.63%	3.98%	0.22%
8	Realized Depreciation Rate (5/4)	2.53%	2.49%	2.51%

A strong tariff methodology that includes a recognizable mechanism for providing a return on investment is important for attracting external financing. Appendix Figure A.5 shows the stages of tariff setting and the sources of financing that may be available in each stage. In Stage 1, the tariff only recovers the utility's operating

[8] This calculation could only be carried out for Takhiatash TPP as balance sheet data were not available for other subsidiary companies.

expenses. Investments are made reactively on a "case by case" basis and funds provided for investment, which are only available from public or limited concessional sources, are not reliably recovered through the tariff. In Stage 2, the tariff covers operating expenses and depreciation, but assets may be undervalued and the return on assets is unpredictable. As a result, investment planning is short-term and financing tends to be only available from concessional sources. Concessional debt financing that is secured from international financial institutions and bilateral donors is generally recovered through the tariff. However, the lack of consistency in returns from year to year does not provide sufficient stability to attract commercial financing. In Stage 3, the tariff covers operating expenses, depreciation and a reasonable return on assets that are fairly valued. Consistently allowing a reasonable return on assets increases investor confidence in the regulatory regime and can eventually support the utility's ability to attract external commercial financing.

Appendix Figure A.5: Relationship between Tariff Methodology and Ability to Attract Financing



Tariff setting practices in Uzbekistan currently fall into Stage 2. The Ministry of Finance includes operating expenses and depreciation in the tariff and has indicated that concessional loans from IFIs are fully recovered through tariff. However, Uzbekenergo's assets are old and heavily depreciated. As a result, the depreciation component of the tariff does not actually provide sufficient funds to cover the replacement cost of the asset. Additionally, the lack of a transparent mechanism for

providing a return on invested capital limits Uzbekenergo's ability to attract commercial financing. Improving the tariff methodology will not single-handedly address this issue. However, consistent application of an improved methodology over time can help increase investor confidence in the institutional and regulatory environment in the Uzbekistan power sector.

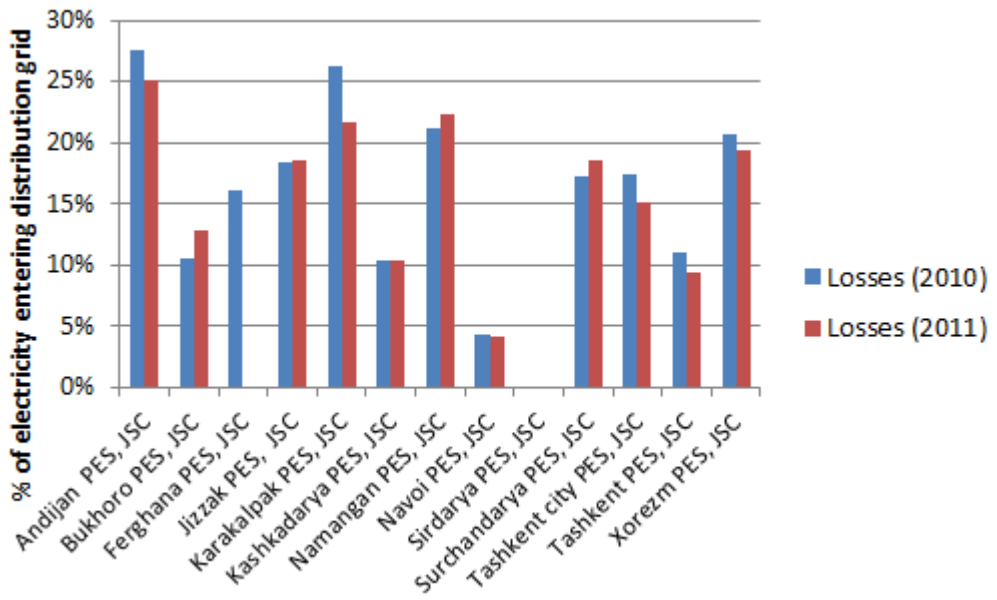
A.2.2 Issues with End-User Tariff

Based on tariff calculation forms provided by Uzbekenergo, it does not appear as if losses are properly included in the sector revenue requirement. The tariff forms include line items for losses in physical (thousand kWh) and monetary (thousand som) terms for distribution companies. However, the cost of losses does not appear to be included in the revenue requirement which serves as the basis for calculating the end-user tariff.

Losses in whole, or at least in part, must be included in the tariff to ensure that the company recovers sufficient revenue to cover its costs. Some level of technical losses is unavoidable and should always be included in the tariff calculation. There is flexibility regarding how much of the cost of commercial losses and inefficient technical losses are included in the tariff. In the long-term, it is unfair to place the cost burden of commercial losses and inefficient technical losses on consumers. However, in the short-term, it is not financially prudent to fully eliminate these costs from the tariff calculation. Reducing these losses takes time and, in many cases, requires investment. Eliminating the allowance for above normal technical losses before the company has had time to make investments and improve management practices to reduce these losses creates a revenue gap that can further impair the operational and financial performance of the utility.

In Uzbekistan, the cost of losses, including a reasonable level of technical losses, does not appear to be included in the tariff calculation. In 2010 and 2011, this amounted to 9.8 and 7.2 percent, respectively, of the cost of production that was not included in end-user tariffs. There is a wide range of losses reported in the tariff forms of subsidiary companies of Uzbekenergo from as low as 4.1 percent at Navoi PES to as high as 27.6 percent at Andijan PES in 2010. Appendix Figure A.6 shows the level of losses reported by subsidiary distribution companies of Uzbekenergo in the tariff forms for 2010 and 2011.

Appendix Figure A.6: Reported Losses at Subsidiary Distribution Companies of Uzbekenergo*



*Data were not available for Samarkand PES

High losses at some of the companies result from inefficient distribution equipment and/or commercial theft. Investing in distribution rehabilitation and metering and improving management practices can help reduce these losses over time. However, in the interim period, Uzbekenergo needs revenue to cover the cost of these losses. Otherwise, the revenue gap results in under-spending in non-critical areas, which, in turn leads to a delay in necessary capital expenditure and accumulation of accounts payable.

Additionally, the efficiency of the end-user tariff structure in Uzbekistan could be improved. Best practice in tariff regulation seeks to achieve economic efficiency by recovering revenue from customers based on how that customer contributes to the company's costs. There are different approaches, such as embedded cost pricing and marginal cost pricing, to determine how to allocate costs to customer classes. Some amount of cross-subsidization is unavoidable as it is impossible to accurately allocate the cost of providing different services to each customer. However, failure to reflect differences in the cost of service for different customer groups or for providing different services (energy, capacity, and ancillary services) leads to improper price signals and inefficient consumption.

In Uzbekistan, the efficiency of end-user tariffs could be improved in two key ways. First, the uniform tariff applied to eight of ten customer classes in Uzbekistan does not reflect the fact that it costs more to serve some customer groups than others. For example, it generally costs more to serve residential customers than commercial or industrial customers because commercial or industrial customers do not use low voltage distribution facilities and so do not contribute to the cost of building,

operating and maintaining these facilities. Second, the single-part tariff for all customers (excluding large industrial customers) does not reflect the fact that cost structures differ for providing different services (e.g. energy, capacity) and costs differ depending on the time of use (e.g. peak/off-peak, winter/summer).

Tariffs which more accurately reflect costs lead to more efficient allocation of resources. Specifically, tariffs that reflect the cost of service lead customers to make efficient consumption decisions. This can have a real impact on costs as improving the efficiency of consumer behavior can reduce or delay investments associated with expansion to meet increasing demand.