



# Report and Recommendation of the President to the Board of Directors

---

Project Number: 43151  
March 2010

## Proposed Loans and Administration of Loan Republic of Uzbekistan: Talimarjan Power Project

## CURRENCY EQUIVALENTS

(as of 5 March 2010)

Currency Unit	–	sum (SUM)
SUM1.00	=	\$0.0006493
\$1.00	=	SUM1,540.03

## ABBREVIATIONS

ADB	–	Asian Development Bank
CAREC	–	Central Asia Regional Economic Cooperation
CCGT	–	combined cycle gas turbine
CDM	–	Clean Development Mechanism
EPC	–	engineering, procurement, and construction
HRSG	–	heat recovery steam generator
JICA	–	Japan International Cooperation Agency
KMC	–	Karshi Main Canal
LIBOR	–	London interbank offered rate
OCR	–	ordinary capital resources
PMU	–	project management unit
TPP	–	thermal power plant
UFRD	–	Fund for Reconstruction and Development of the Republic of Uzbekistan

## WEIGHTS AND MEASURES

GWh	–	gigawatt-hour (1 million kilowatt-hours)
km	–	kilometer (1,000 meters)
kWh	–	kilowatt-hour
kV	–	kilovolt (1,000 volts)
m <sup>3</sup>	–	cubic meter
mtCO <sub>2</sub> e	–	million ton of carbon dioxide equivalent
MW	–	megawatt (1,000 kilowatts)
TWh	–	terawatt-hour (1,000 gigawatt-hours)

## NOTES

- (i) The fiscal year (FY) of the government and its agencies ends on 31 December.
- (ii) In this report, "\$" refers to US dollars.

<b>Vice-President</b>	X. Zhao, Operations 1
<b>Director General</b>	J. Miranda, Central and West Asia Department (CWRD)
<b>Director</b>	P. Song, Energy and Natural Resources Division, CWRD
<b>Team leader</b>	B. Byambasaikhan, Energy Specialist, CWRD
<b>Team members</b>	B. Konysbayev, Counsel, Office of the General Counsel
	M. Kunzer, Senior Environment Specialist, CWRD
	J. Liston, Principal Energy Specialist, CWRD
	K. Mitsuhashi, Energy Specialist, CWRD
	R. Nadyrshin, Portfolio Management Officer, CWRD
	S. Roth, Social Development Specialist (Gender and Development), CWRD
	I. Setyawati, Social Development Specialist, CWRD

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

## CONTENTS

	<b>Page</b>
I. THE PROPOSAL	1
II. THE PROJECT	1
A. Rationale	1
B. Project Impact and Outcome	3
C. Outputs	3
D. Investment and Financing Plans	4
E. Implementation Arrangements	5
III. DUE DILIGENCE	6
A. Technical	6
B. Economic and Financial	7
C. Governance	8
D. Poverty, Social, and Gender	8
E. Safeguards	9
F. Risks and Mitigating Measures	9
IV. ASSURANCES AND CONDITIONS	10
V. RECOMMENDATION	10
APPENDIXES	
1. Design and Monitoring Framework	11
2. List of Linked Documents	13

## I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on (i) two proposed loans; and (ii) proposed administration of a loan extended by the Japan International Cooperation Agency (JICA), all to the Republic of Uzbekistan (Uzbekistan) for the Talimarjan Power Project. A design and monitoring framework is in Appendix 1.

## II. THE PROJECT

### A. Rationale

2. Uzbekistan's economy grew at an annual average rate of 7% during 2004–2006 and 9% in 2007–2008. Despite the global financial and economic crisis, growth prospects for 2010 and beyond are expected to be within a range of 8%–9%. The country has taken a gradual rather than rapid shock approach to reform, and the response to the crisis was swift, balanced, and successful.

3. Uzbekistan has the most industrialized and energy intensive economy in Central Asia. For each dollar of gross domestic product, Uzbekistan uses 60% more energy than Azerbaijan and Kazakhstan, and four times more than the world average;<sup>1</sup> this stems from (i) aging and dilapidated energy infrastructure, (ii) a low technological base, (iii) lack of investment, and (iv) inefficiency.

4. Energy efficiency is now a top strategic priority for Uzbekistan, as well as for the Asian Development Bank (ADB),<sup>2</sup> and represents the best means (in terms of reducing cost and carbon intensity) to achieve energy security. It reduces the currently high levels of energy intensity, and increases energy productivity. The social and economic benefits are also high. Consumers spend less, power generation and dispatch costs fall and the financial return to the utilities increase. Increased revenues underpin more investment, better maintenance, and improved service quality.

5. The government has in place policy and legal frameworks to reduce energy intensity levels and cut losses, and has plans for significant clean technology investments and institutional reforms. In the short to medium term (2009–2014), power generation capacity will need to increase considerably to match electricity demand growth of 3.1%–5.4% a year. The construction of new and more efficient combined cycle gas turbine (CCGT) plants fit the strategy. Other actions include expanding renewable energy, energy efficiency programs, the replacement or rehabilitation of old and obsolete thermal power plants, and energy trade.

6. Investment in CCGT technology leads to high energy savings and environmental benefits. It is the cleanest fossil fuel-based method of power generation available, and CCGT power plants burning natural gas produce significantly less carbon emissions than do coal- and oil-fired thermal power plants.

7. Uzbekistan is rich in hydrocarbon resources.<sup>3</sup> Another strategic priority is the processing (or value-added production) of these resources for both domestic and foreign markets. This strategy requires substantial investment and investors, with transactions most likely structured around a range of public and private initiatives, several of which are under consideration.

---

<sup>1</sup> International Energy Agency. 2009. *World Energy Outlook*. Paris.

<sup>2</sup> ADB. 2009. *Energy Policy*. Manila.

<sup>3</sup> Uzbekistan is estimated to have 1.8 trillion cubic meters of proven natural gas reserves, 590 million barrels of proven oil reserves, and 3 billion tons of recoverable coal reserves.

8. Increased energy production in Uzbekistan directly benefits several countries in the region. Afghanistan already gets most of its electricity from Uzbekistan. Other beneficiaries are Tajikistan and the Kyrgyz Republic, both of which are rich in hydro resources but prone to winter shortages. The Uzbek power transmission system also facilitates transfer of power supplies between these two countries and Turkmenistan. Uzbekistan is a natural gas exporter, including to the People's Republic of China. In the medium term, Uzbekistan will also pursue power exports to new energy-deficit markets such as Pakistan.

9. Uzbekistan is an active participant in the Central Asia Regional Economic Cooperation Program (CAREC), which includes Afghanistan, Azerbaijan, People's Republic of China, Kazakhstan, Kyrgyz Republic, Mongolia, and Tajikistan. In 2008, the CAREC countries agreed on a long-term strategy for developing the region's energy sector, which focuses on energy security and trade.<sup>4</sup> In October 2009, the countries agreed on a framework action plan to expand the regional power network as a means to increase trade in power.<sup>5</sup> ADB and other multilateral institutions participating in CAREC are cofinancing studies, capacity development, and investments. It was under this framework that Uzbekistan started exporting power to Afghanistan (up to 150 megawatts [MW]) in early 2009; these exports will soon rise to 300 MW.

10. **Power generation.** In 2008, Uzbekistan generated 50,254 gigawatt-hours (GWh) of electric power, imported 925 GWh from its neighbors, and exported about 630 GWh. The total installed capacity for power generation is 12,400 MW, but less than 10,000 MW are available. Thermal power plants (TPPs) represent 86% and hydropower plants 14% of the capacity. Natural gas is used for 94% of thermal power generation. All TPPs run on steam cycle technology with an efficiency rate of 31%, compared to 57% under advanced CCGT technology. Total losses (net generation output less invoiced energy) are 20% of generated energy. The heavy reliance on and inefficient use of fossil fuels in power generation creates negative environmental impacts, while CCGT power plants reduce greenhouse gas emissions.

11. Most assets are 40–50 years old, and require replacement and/or rehabilitation. Since 1991, only two power generation capacity expansion projects have been completed. By 2015, the government wants to replace 570 MW of inefficient (25% efficiency), outdated generation capacity and install three CCGT power plants totaling 1,600 MW. Construction of two such projects in Tashkent and Navoi began in 2009. The third project is the one proposed here.

12. **Power transmission.** The transmission system consists of 1,850 kilometers (km) of 500 kilovolt (kV) lines, 6,200 km of 220 kV lines, and 15,300 km of 110 kV lines. The high voltage system is connected to Kazakhstan, Kyrgyz Republic, Tajikistan, and Turkmenistan. It also has a 220 kV connection with Afghanistan. The transmission system is ageing and needs upgrading. Transmission bottlenecks are becoming a serious obstacle to the delivery of power to domestic and regional customers.

13. The southern region of Uzbekistan receives electricity from the northern region, where 70% of power generation is located. However, over 90% of gas production is located in the south. This means gas is transported to the north for conversion to electricity, which is then sent back to customers in the south. In 2009, the electricity peak demand in the southern region surpassed 2,000 MW, but the north–south transmission capacity is limited to about 1,600 MW, resulting in shortages during peak hours. This energy flow problem is compounded by growing industrialization in the south. The CCGT power plants to be constructed in Talimarjan and Navoi

---

<sup>4</sup> CAREC Seventh Ministerial Conference. 2008. *Strategy for Regional Cooperation in the Energy Sector*. Baku.

<sup>5</sup> CAREC Eight Ministerial Conference. 2009. *Energy Action Plan Framework*. Ulaanbaatar.

are located in the south, close to gas production fields. These investments will reduce gas and power transmission losses. They will also free up transmission capacity to supply neighboring countries.

14. The state joint stock company, Uzbekenergo, the sole power sector utility in the country, is a vertically integrated and publicly owned monopoly. It owns and operates 10 TPPs (including three cogeneration plants), and 28 hydropower plants. It owns and operates the power transmission network. It also distributes power to all categories of customers from its 14 regional distribution centers, which have 256 distribution units. A restructuring of Uzbekenergo is planned. The key objective is to commercialize its utility operations and introduce competition in various business lines.

15. To realize the power system modernization and rehabilitation program, Uzbekenergo will continue to seek investment from international lenders and the private sector. To secure finance, it plans to (i) modernize its accounting system with a financial management information system, (ii) improve financial transparency in line with international auditing standards and reporting practices, and (iii) review the internal financial management structure by establishing internal auditing.

16. Uzbekenergo wants to transform its management and operations to become a model power utility company in the region. This requires new skills, new business practices, and new technology. The management of Uzbekenergo is committed to change. Uzbekenergo also needs expert technical capacity to operate CCGTs.

## **B. Project Impact and Outcome**

17. The project involves a new power plant to improve energy security and facilitate regional energy trade. It also aims to increase energy efficiency and save energy through clean power generation. Supporting investments will increase regional connectivity, and improve power sector performance and management, and customer service.

## **C. Outputs**

18. Outputs are physical and nonphysical in nature. Power supply will be increased by 4,700 GWh per year, and power generation efficiency will increase from 31% to 50%. The power system will operate more reliably, and Uzbekenergo's corporate management and performance will be improved.

### **1. Physical**

19. Two CCGT units (370–450 MW each) will be constructed at the Talimarjan TPP. Each unit will include (i) a gas turbine with electrical generator; (ii) heat recovery steam generator (HRSG); (iii) steam turbine with electrical generator; (iv) deaerator unit; (v) steam condenser; and (vi) ancillary equipment including generator transformer, systems for control, electrical switching, oil, water and gas treatment, cooling water, and all other plant auxiliaries. Construction will be done by an engineering, procurement, and construction (EPC) contractor. The EPC contract scope covers detailed design, selection of equipment, installation, testing and commissioning. The first unit will be commissioned in March 2014, and the second unit in December 2014. An implementation consultant will supervise the construction and report on progress.

20. A community service center will also be built for the power plant employees and their families. Uzbekenergo will use this center for (i) vocational training for female family members; (ii) finance for microenterprises such as a laundry service, salon, bakery, cafe and a handicrafts workshop; (iii) training on various social issues (such as hygiene, preventive medical, family planning, and child rearing); (iv) cultural activities; and (v) sports and recreational activities.

## 2. Nonphysical

21. A special capacity development component will support the improvement of Uzbekenergo's management, financial, and operational performance. Key areas are: (i) corporate management, (ii) financial management systems and audit capabilities, (iii) operation and maintenance of CCGT power plants, and (iv) social and gender development aspects. The program will start with a comprehensive needs assessment. Experts will be engaged to help Uzbekenergo with the work. The necessary equipment, software, training, and consulting services will be financed under the project.

## D. Investment and Financing Plans

22. The project is estimated to cost \$1,280 million. The investment plan is summarized in Table 1.

**Table 1: Project Investment Plan**  
(\$ million)

Item	Amount
<b>A. Base Cost</b>	
1. EPC contract for two CCGT units	891.55
2. Community service	1.50
3. Implementation consulting services	8.61
4. Capacity development (equipment and consulting services)	8.96
5. Taxes and duties <sup>a</sup>	230.00
<b>Subtotal (A)</b>	<b>1,140.62</b>
<b>B. Contingencies <sup>b</sup></b>	<b>96.44</b>
<b>C. Financing Charges During Implementation <sup>c</sup></b>	<b>42.94</b>
<b>Total (A+B+C)</b>	<b>1,280.00</b>

CCGT = combined cycle gas turbine, EPC = engineering, procurement and construction

<sup>a</sup> Includes value added tax of 20%, and customs payments of 20%.

<sup>b</sup> Physical contingencies computed at 5% for total material costs. Price contingencies computed at 0.8% on foreign exchange costs and 12.6% on local currency costs.

<sup>c</sup> Includes interest and commitment charges.

Source: Asian Development Bank estimates.

23. The financing plan for the project is shown in Table 2.



**Table 2: Financing Plan**

<b>Source</b>	<b>Amount (\$ million)</b>	<b>Share of Total (%)</b>
Asian Development Bank (OCR)	340.0	27
Asian Development Bank (ADF)	10.0	1
Japan International Cooperation Agency Fund for Reconstruction and Development of the Republic of Uzbekistan	300.0	23
Uzbekenergo	250.0	20
Government of Uzbekistan	150.0	11
	230.0	18
<b>Total</b>	<b>1,280.0</b>	<b>100</b>

ADF = Asian Development Fund, OCR = ordinary capital resources.

Source: Asian Development Bank estimates.

24. The government has requested two loans from ADB: (i) \$340 million from ADB's ordinary capital resources (OCR) to finance the EPC contract and implementation consulting services, and (ii) \$10 million equivalent from its Special Funds resources to finance the capacity development program. The OCR loan will have a 25-year term, including a grace period of 5 years, an interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility, and a commitment charge of 0.15% per year. The government has provided ADB with (i) the reasons for its decision to borrow under ADB's LIBOR-based lending facility based on these terms and conditions, and (ii) an undertaking that these choices were its own independent decision and not made in reliance on any communication or advice from ADB. The Special Funds resources loan will have a 32-year term including a grace period of 8 years and an interest charge of 1.0% per annum during the grace period and 1.5% per annum thereafter. The ADB loans will be relented to Uzbekenergo on terms and conditions acceptable to ADB. Foreign exchange risk will be assumed by Uzbekenergo.

25. The government has requested JICA to provide joint cofinancing for the project in an amount up to \$300 million. Terms and conditions will be agreed by the government and JICA. ADB will administer JICA's cofinancing in accordance with the Accelerated Cofinancing Scheme with ADB.<sup>6</sup>

26. The rest of the financing for the project will be met by the government through its budget, the Fund for Reconstruction and Development of the Republic of Uzbekistan (UFRD) and Uzbekenergo's internal resources. UFRD funding will be extended in the form of a loan.

## **E. Implementation Arrangements**

27. The implementation arrangements are summarized in Table 3 and described in detail in the Project Administration Manual (PAM).

<sup>6</sup> *Framework Agreement between Asian Development Bank and Japan Bank for International Cooperation for the implementation of the Accelerated Cofinancing Scheme with ADB (ACFA)*. 2007. Manila.

**Table 3: Implementation Arrangements**

Concept	Arrangements		
Implementation period	April 2010–December 2014		
Estimated project completion date	December 2014		
Project management			
(i) Executing agency	Uzbekenergo		
(ii) Project management unit	Uzbekenergo (minimum 12 full-time staff)		
Procurement	Method	Contracts	Amount
(i) EPC contract	ICB	1	\$900 million
(ii) Community service center	Government financed and procured	1	\$1.5 million
(iii) Capacity development (equipment)	ICB	TBD in needs assessment	\$3 million
Consulting services	Method	Contracts	Amount
(i) Project implementation consultant	QCBS	472 person-months	\$9 million
(ii) Capacity development			
(a) Firms	QCBS	TBD in needs assessment	\$4 million
(b) Individuals		TBD in needs assessment	\$2 million
Disbursement	Type	Minimum	Ceiling
(i) EPC contract	Direct payment	No	No
(ii) Capacity development (equipment)	Direct payment	No	No
(iii) Consulting services	Direct payment/commitment/reimbursement	No	No

EPC = engineering, procurement, and construction; ICB = international competitive bidding; QCBS = quality- and cost-based selection; TBD = to be determined.

Source: Asian Development Bank estimates.

### III. DUE DILIGENCE<sup>7</sup>

#### A. Technical

28. Talimarjan TPP is located 500 km southwest of Tashkent in Kashkadarya province. The 800 MW gas-fired steam-cycle unit (unit 1) was commissioned in 2004. The original design envisaged four such units (total capacity of 3,200 MW), and the power plant infrastructure—including power evacuation, gas supply, and cooling water systems, and a dedicated rail access from the main railroad network—has been constructed for that capacity. Power is evacuated through the 220 kV network. The project's proposed power transmission facility will improve evacuation reliability by connecting the CCGT units to the 500 kV network. Natural gas is supplied from the Shuritan gas field and processing facilities located about 30 km from the Talimarjan TPP. Supply comes through the main pipeline system through a dedicated gate station (2 km from the plant). Gas reserves and supply capacity of 953 million cubic meters (m<sup>3</sup>) per year is assured for the life of the CCGT plant. Water is supplied from the Amu Darya River through the Karshi Main Canal (KMC), a multipurpose water supply system that runs adjacent to the plant. The KMC is also connected to the Talimarjan Reservoir located 8 km south of the plant (1.5 billion m<sup>3</sup> capacity), which can serve as a water supply source in times of shortage.

<sup>7</sup> Detailed due diligence reports are referenced in the list of linked documents (Appendix 2).

29. The CCGT technology is the most efficient and cleanest power generation option currently available. A CCGT plant can achieve efficiency levels of up to 60%. It uses (i) a gas turbine (similar to an aircraft jet engine) burning natural gas, with air to drive a generator and produce electric power; (ii) a HRSG, which recovers more of the energy released by the combustion process that occurs in the gas turbine; and (iii) a steam turbine, which uses the steam produced in the HRSG to generate more power. CCGT systems are a well-established technology and are typically supplied as package items. The design of the CCGT plant is intended to ensure safe and efficient operation in different operating modes including start-up, full-load, load-change, shut-down, and emergency shut-down. This is achieved through the options of closed- and open-cycle operation, the selection of thermal plant operating pressures and temperatures, steam turbine configurations, and the control systems. The efficiency of the two CCGT units for the project is 57.4% (this compares to 34%–37% for steam-cycle unit 1).

30. There will be an associated power transmission facility comprising a 500 kV single-circuit transmission line (218 km) from Talimarjan TPP to Sogdiana substation, and a 500 kV substation adjacent to Talimarjan TPP. This will increase power evacuation and transmission capacity, and strengthen the transmission system reliability. The facility will be commissioned by 2013, and will be financed by the World Bank and Uzbekenergo. The safeguards due diligence and actions plans for this investment will follow World Bank guidelines.

## **B. Economic and Financial**

31. The project is economically and financially viable. The economic internal rate of return is 20.3%. The economic benefits are calculated by weighting the project's contribution to incremental (increased electricity consumption) and non-incremental (energy savings and carbon emission reduction) aspects. The sensitivity tests indicate robustness under all tested assumptions. The financial internal rate of return is 6.3% and exceeds a weighted average cost of capital of 0.3%. Nonquantifiable financial benefits, such as the quality of power supply, were not included in the financial analysis. The estimated cost-recovery tariff level is \$0.037/kilowatt-hour (kWh). The project is viable under all sensitivity tests (capital cost, fuel cost, and revenue).

32. The financial performance of Uzbekenergo has been strong, especially over the last 5 years. The company has achieved high profitability, has a low debt ratio, and an accelerated depreciation of fixed assets. Most of the fixed assets are inherited as equity, not as debt, and their residual value has been depreciated. The liquidity level is high, due to a good policy and performance on receivables and account payables.

33. The financial projections for 2010–2015 incorporate Uzbekenergo's investment plan for new power facilities, with total investment, including for this project, of some \$4 billion. Operating costs are contained and the income projections point towards a strong financial base and high creditworthiness, but the tariff will need to be adjusted to reflect the cost of services and inflation.

34. The government is committed to maintaining cost-of-service tariffs. Since 2004, the nominal electricity tariff has increased by 18%–20% per year. As the result, the per kWh retail tariff has risen by factor of three (from SUM20/kWh to SUM62/kWh, or from \$0.018/kWh to \$0.043/kWh) since 2004. The continued tariff increase above the rate of inflation of around 10% has resulted in sustainable financial performance without recourse to direct subsidies.

35. The project may be eligible for carbon financing under the Clean Development Mechanism (CDM). Estimates of carbon emission reduction potential based on available CDM

methodology indicate an annual reduction of about 1.2 million tons of carbon dioxide equivalent (mtCO<sub>2</sub>e). ADB is supporting Uzbekenergo with CDM processing through its Technical Support Facility under the Carbon Market Initiative. ADB's Future Carbon Fund may purchase up to 50% of the emission reductions after the appropriate project registration and validation.

### **C. Governance**

36. The government has undertaken a series of far-reaching measures on governance and anticorruption. These include (i) legal reforms to improve the fairness and effectiveness of judiciary and court systems; (ii) reform of public sector management, especially public financial management and tax reforms; (iii) de-monopolization to open opportunities for the private sector; and (iv) more efficient and transparent procurement procedures. The government is also active in international anticorruption activities. In 2008, it approved a bill to enter the United Nations Anti-Corruption Convention. A comprehensive governance assessment will be conducted under ADB's new country partnership strategy, which will start in 2010.

37. A financial management assessment of Uzbekenergo, the executing agency, found it has sound financial and accounting systems, procedures and policies, and has adopted accrual accounting, double entry bookkeeping and other generally accepted accounting principles and conventions in compliance with current national standards. Capacity development under the project will strengthen Uzbekenergo's financial management capability, as well as overall accounting and auditing practices.

38. Uzbekenergo's procurement capacity was also assessed. It has experience in working with other multilateral and bilateral financiers. It is implementing two similar CCGT power plant projects. Procurement lessons from these projects will be applied to this project. Procurement in any case will follow ADB's guidelines, including the use of standard bidding documents. Uzbekenergo is not yet familiar with all ADB requirements and needs hands-on support, which will be provided through an international consultant engaged under technical assistance.<sup>8</sup> An early warning system will be established to ensure timely procurement and project implementation.

39. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government and Uzbekenergo. The specific policy requirements and supplementary measures are described in the PAM.

### **D. Poverty, Social, and Gender**

40. The household electrification rate is almost 100%. However, power supply gaps are affecting households' socioeconomic activities. Gender stereotypes are reinforced through the electricity shortage, because women must spend more time on household tasks and cannot engage in income generating and educational activities. The project will increase the supply of reliable power to all customers, which will benefit the population, and improve living conditions and job opportunities.

41. Uzbekenergo will implement a community and gender action plan focusing on Talimarjan TPP employees and surrounding communities. A social and gender specialist in the project management unit will provide support. Several social support programs will be implemented, including building of a community service center.

---

<sup>8</sup> ADB. 2009. *Technical Assistance to the Republic of Uzbekistan for Preparing the Talimarjan Power Generation and Transmission Project*. Manila.

42. The influx of foreign and local workers during the construction period might increase the risk of HIV/AIDS or other communicable diseases in the affected communities. Gender sensitive HIV/AIDS awareness campaigns will be initiated by Uzbekenergo for all construction workers, in collaboration with the town administration at the local community.

## E. Safeguards

43. The project's safeguards classifications and requirements are as follows: (i) environment—category A (environmental impact assessment), (ii) involuntary resettlement—category C (no action), and (iii) indigenous peoples—category C (no action).

44. An environmental impact assessment has been prepared and was disclosed on 15 December 2009. Two rounds of public consultations were held prior to project appraisal. The environmental sensitivity of the project site and its surroundings is low. The town of Nuristan (home to employees of the Talimarjan TPP) is the only community close to the plant; the nearest other settlements are over 5 km away. Large parts of the surrounding area have been developed for irrigated agriculture; undeveloped areas consist of Karshi steppe, which is made up of semi-desert scrublands. The project's key environmental issues are air quality and emissions, noise impacts on the Nuristan settlement, and water management. The project will contribute to the process of closing older inefficient plants, which will reduce the amount of carbon dioxide (CO<sub>2</sub>) produced from power generation. CCGTs fueled by natural gas produce significantly lower amounts of CO<sub>2</sub> and nitrogen oxide (NO<sub>x</sub>) than do oil- or coal-fired plants, and negligible amounts of sulfur dioxide (SO<sub>2</sub>). They typically have 35% lower fuel consumption than conventional TPPs and require less water. Dispersion modeling has done to assess the possible impacts of NO<sub>x</sub>. ADB has agreed with the State Committee for Nature Protection on the acceptable discharge limits for CCGTs.

45. Water is taken from the KMC in summer and a single pass cooling process is used. Water is then discharged back into the canal. The thermal plume is cooled to within 5°C of the intake temperature within 500 meters. A closed system is used in winter whereby water is sprayed into lagoons for cooling before being returned to the plant. The method for cooling the new plant will be designed during the engineering stage. There is sufficient water supply in the canal to meet the additional demand without impacting downstream water users.

## F. Risks and Mitigating Measures

46. Major risks and mitigating measures are summarized in Table 4.

**Table 4: Summary Risks and Mitigating Measures**

<b>Risks</b>	<b>Mitigating Measures</b>
Procurement delays	An international consultant under the project preparatory technical assistance is supporting Uzbekenergo in the preparation of bidding documents and evaluation of bids.
Project management	A PMU is staffed with qualified personnel. An implementation consultant will help with construction supervision, contract management, financial management, safeguards monitoring, and reporting. ADB will train Uzbekenergo in PPMS and disbursement.
Safeguards	Uzbekenergo staff will be trained. Sufficient funds have been allocated for environmental management. The EPC contractor's performance will be monitored by Uzbekenergo, the implementation consultant, the State Committee for Nature Protection of Uzbekistan, and ADB.

<b>Risks</b>	<b>Mitigating Measures</b>
Delay in associated power transmission facility	The PMU will manage the project and the associated power transmission facility. ADB is coordinating with the World Bank.
Operations and maintenance	Uzbekenergo staff will undergo specialized training to operate and maintain a CCGT power plant.

ADB = Asian Development Bank; CCGT = combined cycle gas turbine; EPC = engineering, procurement, and construction; PMU = project management unit; PPMS = project performance monitoring system.

Source: Asian Development Bank.

#### **IV. ASSURANCES AND CONDITIONS**

47. The government and Uzbekenergo have assured ADB that implementation of the project shall conform to all applicable ADB policies, including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, and disbursement as described in detail in the PAM and loan documents. The government and Uzbekenergo have agreed with ADB on certain covenants for the project, which are set forth in the draft loan and project agreements.

48. ADB loans will not become effective until after a loan agreement between the government and JICA becomes effective. Loans proceeds will not be disbursed until after the following loan agreements (which must be satisfactory in form and substance to ADB) have become effective in accordance with their terms: (i) loan agreement between the UFRD and a designated commercial bank and a related subsidiary loan agreement between such bank and Uzbekenergo; and (ii) subsidiary loan agreements between the government and Uzbekenergo for the relending of the loans from ADB and JICA.

#### **V. RECOMMENDATION**

49. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve

- (i) the loan of \$340,000,000 from ADB's ordinary capital resources, with interest to be determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility; for a term of 25 years, including a grace period of 5 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft loan and project agreements presented to the Board;
- (ii) the loan in various currencies equivalent to SDR6,542,000 from ADB's Special Funds resources with an interest charge at the rate of 1.0% per annum during the grace period and 1.5% per annum thereafter; a term of 32 years, including a grace period of 8 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft loan and project agreements presented to the Board; and
- (iii) the administration by ADB of a loan not exceeding the equivalent of \$300,000,000 to be provided by the Japan International Cooperation Agency

to the Republic of Uzbekistan for the Talimarjan Power Project.

Haruhiko Kuroda  
President

29 March 2010

### DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and Indicators with Baseline	Data Sources and Reporting Mechanisms	Assumptions and Risks
<p><b>Impact</b> Improved energy security and increased regional energy trade</p>	<p>Thermal power generation efficiency improved from 31% (2009) to 50% by 2015</p> <p>GHG emissions reduced by 1.2 mtCO<sub>2</sub>e by 2014 from 3.5 mtCO<sub>2</sub>e (baseline)</p> <p>Power transmission capacity between north and south increased from 1,600 MW (2009) to 2,200 MW (2014)</p> <p>Power exports to Afghanistan and neighboring countries increased from about 1 TWh (2009) to 3 TWh (2014)</p>	<p>Government economic statistics and reports</p> <p>National statistics on power supply</p> <p>Government integrated energy sector statistics</p>	<p><b>Assumptions</b> Government continues to support power sector development and reform plans</p> <p>Stable economic growth in the region</p> <p>A sustainable power trade framework is realized between Uzbekistan and its neighbors</p>
<p><b>Outcome</b> Energy efficiency improved, regional connectivity enhanced, and customers receive reliable and quality power supply</p>	<p>Base load generating capacity expanded by 800 MW by 2014 from 10,000 MW (2009)</p> <p>4.7 TWh of clean power supplied to customers annually starting in 2015</p> <p>570 MW of inefficient thermal generating capacity retired by 2016</p> <p>Uzbekenergo adopts international standards in corporate and financial management by 2013</p> <p>Uzbekenergo sales increase from 40 TWh (2009) to 45 TWh (2015)</p>	<p>Uzbekenergo annual report</p> <p>CDC reports</p>	<p><b>Assumptions</b> Electricity tariffs regularly adjusted to cover costs</p> <p>Uzbekenergo improves its billing and collection</p> <p>Public entities pay for their power consumption on time</p> <p>Power demand grows 2%–3% per annum</p> <p>Reliable and sufficient gas supply to Talimarjan TPP</p> <p>Planned generation expansion projects commissioned by 2015</p> <p><b>Risks</b> Delays in the commissioning of the 500 kV substation in Talimarjan and 500 kV power transmission line connecting Talimarjan with Sogdiana</p>

Design Summary	Performance Targets and Indicators with Baseline	Data Sources and Reporting Mechanisms	Assumptions and Risks																		
<p><b>Outputs</b></p> <p>Two CCGT units in Talimarjan TPP commissioned</p> <p>Uzbekenergo corporate management and performance improved</p> <p>Community service center is operational</p>	<p>Both CCGT units (370-450 MW each) are operational by 2014</p> <p>Uzbekenergo adopts an enhanced financial management system by 2012</p> <p>Uzbekenergo practices international auditing standards and accounting practices by 2012</p> <p>Talimarjan TPP management and operational staff undergo CCGT operations and maintenance training program by 2013</p> <p>Community and gender action plan implemented by 2013</p> <p>Service center is built by 2012, with full operational structure (staff, budget and workplan)</p>	<p>EPC contractor's commissioning certificates</p> <p>Uzbekenergo's progress reports</p> <p>Trainer's program reports</p> <p>Uzbekenergo's progress reports</p>	<p><b>Assumptions</b></p> <p>Government complies with ADB safeguard policies during construction</p> <p>Effective cooperation between EPC contractor and government entities</p> <p>Counterpart funds made available</p> <p><b>Risks</b></p> <p>Delays in procurement of the EPC contractor</p> <p>Cost overruns due to unforeseen circumstances in the international market</p>																		
<p><b>Activities with Milestones</b></p> <p>1.1 Uzbekenergo prepares environmental impact assessment by December 2009</p> <p>1.2 Uzbekenergo prepares community and gender action plan by January 2010</p> <p>1.3 ADB recruits consultants to prepare bidding documents and evaluate bids by April 2010</p> <p>1.4 Uzbekenergo recruits implementation consultant by April 2011</p> <p>1.5 Uzbekenergo awards EPC contract by June 2011</p> <p>1.6 EPC contractor commissions the first CCGT unit by March 2014</p> <p>1.7 EPC contractor commissions the second CCGT unit by December 2014</p> <p>2.1 A consultant completes capacity needs assessment of Uzbekenergo by September 2010</p> <p>2.2 Key training program starts by March 2011</p>		<p><b>Inputs</b></p> <p>ADB: \$350,000,000</p> <table border="1" data-bbox="862 1247 1412 1388"> <thead> <tr> <th>Item</th> <th>Amount (\$ million)</th> </tr> </thead> <tbody> <tr> <td>CCGT power plant</td> <td>331</td> </tr> <tr> <td>Implementation Consultant</td> <td>9</td> </tr> <tr> <td>Capacity Development</td> <td>10</td> </tr> </tbody> </table> <p>Government: \$230,000,000</p> <table border="1" data-bbox="862 1444 1412 1507"> <thead> <tr> <th>Item</th> <th>Amount (\$ million)</th> </tr> </thead> <tbody> <tr> <td>Taxes and Duties</td> <td>230</td> </tr> </tbody> </table> <p>Cofinanciers:</p> <p>JICA: \$300,000,000</p> <p>UFRD: \$250,000,000</p> <p>Uzbekenergo: \$150,000,000</p> <table border="1" data-bbox="862 1661 1412 1747"> <thead> <tr> <th>Item</th> <th>Amount (\$ million)</th> </tr> </thead> <tbody> <tr> <td>CCGT power plant</td> <td>698.5</td> </tr> <tr> <td>Community service center</td> <td>1.5</td> </tr> </tbody> </table>		Item	Amount (\$ million)	CCGT power plant	331	Implementation Consultant	9	Capacity Development	10	Item	Amount (\$ million)	Taxes and Duties	230	Item	Amount (\$ million)	CCGT power plant	698.5	Community service center	1.5
Item	Amount (\$ million)																				
CCGT power plant	331																				
Implementation Consultant	9																				
Capacity Development	10																				
Item	Amount (\$ million)																				
Taxes and Duties	230																				
Item	Amount (\$ million)																				
CCGT power plant	698.5																				
Community service center	1.5																				

ADB = Asian Development Bank; CCGT = combined cycle gas turbine; CDC = coordinating dispatch center; EPC = engineering, procurement, and construction; GHG = greenhouse gas; JICA = Japan International Cooperation Agency; kV = kilovolt; mtCO<sub>2</sub>e = million ton of carbon dioxide equivalent; MW = megawatt; TPP = thermal power plant; TWh = terawatt-hour; UFRD = Fund for Reconstruction and Development of the Republic of Uzbekistan.

Source: Asian Development Bank.



**LIST OF LINKED DOCUMENTS**

<http://www.adb.org/Documents/RRPs/?id=43151-02-3>

1. Loan and Project Agreements
2. Sector Analysis
3. Project Administration Manual
4. Project Classification Summary
5. Contribution to the ADB Results Framework
6. Development Coordination
7. Financial Analysis
8. Economic Analysis
9. Country Economic Indicators
10. Summary Poverty Reduction and Social Strategy
11. Community and Gender Strategy Action Plan
12. Risk Assessment and Risk Management Plan