



PROJECT ADMINISTRATION MEMORANDUM (PAM)

Project Number: 37139

Loan 2309-IND: Uttarakhand Power Sector Investment Program – Project 1

The Project Administration Memorandum is an active document, progressively updated and revised as necessary, particularly following changes in project or program costs, scope, or implementation arrangements. This document, however, may not reflect the latest project changes.

Executing Agency:
Asian Development Bank **Uttarakhand Energy Dept.**

Implementing Agency:
Uttarakhand Jal Vidyut Nigam Ltd.

CURRENCY EQUIVALENTS

(as of 6 March 2006)

Currency Unit	–	Indian rupee/s (Re/Rs)
Rs1.00	=	\$0.0226
\$1.00	=	Rs44.3387

ABBREVIATIONS

ADB	–	Asian Development Bank
CDM	–	Clean Development Mechanism
EIRR	–	economic internal rate of return
EMP	–	environmental management plan
FIRR	–	financial internal rate of return
FY	–	fiscal year
GDP	–	gross domestic product
GOU	–	government of Uttaranchal
HPP	–	hydropower plant
IEE	–	initial environmental examination
IPDF	–	indigenous peoples development framework
IPP	–	independent power producer
LAA	–	Land Acquisition Act
LIBOR	–	London interbank offered rate
NGO	–	nongovernment organization
O&M	–	operation and maintenance
PIU	–	project implementation unit
PMO	–	project management office
PTCUL	–	Power Transmission Corporation of Uttaranchal, Limited
RMU	–	renovation, modernization, and upgrade
SEB	–	State Electricity Board
SEIA	–	summary environmental impact assessment
SHPP	–	small hydropower plant
T&D	–	transmission and distribution
TA	–	technical assistance
UED	–	Uttaranchal Energy Department
UERC	–	Uttaranchal Electricity Regulatory Commission
UJVNL	–	Uttaranchal Jal Vidyut Nigam, Limited
UPCL	–	Uttaranchal Power Corporation, Limited
WACC	–	weighted average cost of capital

WEIGHTS AND MEASURES

GWh	–	gigawatt-hour (1,000 megawatt-hours)
ha (hectare)	–	unit of area
km (kilometer)	–	1,000 meters
kV	–	kilovolt (1,000 volts)
kW	–	kilowatt (1,000 watts)
kWh	–	kilowatt-hour
MVA	–	megavolt (1,000,000 volt-amperes)
MW	–	megawatt (1,000 kilowatts)
MWh	–	megawatt-hour
VA	–	volt-ampere

NOTES

- (i) The fiscal year (FY) of the Government and its agencies ends on 31 March. The Government convention for designation of FY is followed in this document, i.e., FY2000 begins on 1 April 2000 and ends on 31 March 2001.
- (ii) In this report, "\$" refers to US dollars.

CONTENTS

LOAN PROCESSING HISTORY	i
DESIGN AND MONITORING FRAMEWORK	ii
I. PROJECT DESCRIPTION	1
A. Project Area and Location	1
B. Impact and Outcome	1
C. Outputs	2
D. Technical Justification and Selection Criteria	3
E. Special Features	4
II. COST ESTIMATES AND FINANCING PLAN	5
A. Detailed Cost Estimates	5
B. Financing Plan	6
C. Allocation of Loan Proceeds	7
III. IMPLEMENTATION ARRANGEMENTS	7
A. Executing and Implementing Agencies	7
B. Project Management Organization	7
IV. IMPLEMENTATION SCHEDULE	8
V. PROCUREMENT AND CONSULTING SERVICES	8
VI. DISBURSEMENT ARRANGEMENTS	9
VII. ANTICORRUPTION POLICY	9
VIII. ACCOUNTING, AUDITING AND REPORTING REQUIREMENTS	9
IX. PROJECT MONITORING AND EVALUATION	9
X. MAJOR LOAN COVENANTS	10
XI. KEY PERSONS INVOLVED IN THE PROJECT	11
XII. CONCURRENCE	12
APPENDIXES	
1. Facility and Investment Program	13
2. Terms of Reference for Capacity Building	
a. Project Implementation	22
b. Preparation of DPR for Hydrological Information System	32
3. Flow Chart for Consulting Services Selection Using QCBS	48
4. Detailed Cost Estimate by Expenditure Category	49
5. Organization Chart for Implementation	50
6. Indicative Implementation Schedule	51
7. Indicative Procurement Packages (Tranche 1)	52
8. Indicative Flowchart of Procurement under International Competitive Bidding (ICB)	53
9. Indicative Flowchart of Procurement under National Competitive Bidding (NCB)	54
10. Financial Performance and Projections	55
11. Disbursement Modalities	58
12. Suggested Outline for Progress Report	64
13. Framework and Guidelines in Calculating Project Progress	66
14. Percentage of Project Implementation Progress	68
15. Suggested Format of Project Completion Report	69
16. Financial Reporting and Auditing Requirements	71
17. Major Loan Covenants	74

LOAN PROCESSING HISTORY (MFF)

Item	Date
a. Approval of project preparatory technical assistance	23 Aug 2004
b. Feasibility study	Not required
c. Fact-finding mission	21 Jun 2004
d. Staff review committee	27 Jul 2005
e. Appraisal mission	20-27 Jun 2005
f. Second Management review	03 Nov 2005
g. Loan negotiations	29 Nov - 05 Dec 2005
h. Board circulation	9 Mar 2006
i. Board approval	30 Mar 2006

LOAN PROCESSING HISTORY (Sub-Project 1)

Item	Date
a. Loan negotiations	11-12 Dec 2006
b. Board approval	02 Jan 2007
c. Loan agreement signing	22 Feb 2007
d. Loan effectiveness	29 Mar 2007
e. Physical Completion Date	31 Dec 2011
f. Loan Closing Date	30 Jun 2012

DESIGN AND MONITORING FRAMEWORK

1. Investment Program

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p>Impact Contribute to economic development in Uttaranchal and the northern region of India through expanded power supply at competitive prices.</p>	<p>Relative to a 2004 baseline, increase in gross energy output of 10% per year, sufficient to serve 600,000 people at current consumption rates</p> <p>Increase in in-state service connections and power sales</p> <p>Year-round, daily exportable surplus by 2012 sufficient to serve 12.0 million people at current consumption rates</p> <p>State-level gross domestic product growth in Uttaranchal and customer states</p> <p>Poverty reduction facilitated through village and rural electrification programs</p>	<p>Policy dialogue, project progress reports, reports from state utility companies and the regulatory commission, and loan review missions</p> <p>Electricity sales data from utilities; gross domestic product data broken down by residential, commercial, and industrial categories</p>	
<p>Outcome Clean Energy Development: (i) expansion of the electric power service area and improvements in the reliability and quality of supply; and (ii) promotion of energy efficiency by renovating, modernizing, and upgrading existing hydropower plants</p> <p>Transmission Expansion: New associated hydropower plants connected to the state's grid and the northern region grid within 6 months of commissioning</p>	<p>Provision of sufficient power supplies to serve the majority of the consumers living below the poverty line in the districts of Uttarkashi and Rudraprayag</p> <p>Provision of incremental power supplies to serve 151,000 consumers in the Haridwar service area</p> <p>Evacuation of 21,900 gigawatt-hours per year of generating capacity to the state grid (5,000 MW running at 50% load factor) by 201.</p> <p>Meet in-state demand and create an exportable</p>	<p>Project progress reports, reports from state utility companies and regulatory commission</p>	<p>Assumptions</p> <ul style="list-style-type: none"> • Stable economic growth • Continued evolution of an enabling policy framework and regulations to facilitate the commercialization of utility company operations • Level playing field between state-level utilities, central public sector utilities, and independent power producers <p>Risks</p> <ul style="list-style-type: none"> • Delays in power sector reforms • Tariffs set below cost-recovery levels • Generating capacity, including associated facilities not financed by ADB, not commissioned in a timely manner • Delays in transmission system construction

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p>Capacity Building: Sector sustainability resulting from continued reforms and improvements in operational efficiency</p>	<p>surplus by 2010. Total system generation capacity increase of 2,000 MW by 2011 and an additional 2,000 MW by 2013. Increase in the quality and reliability of supply (45% decrease in load shedding from 2005 to 2010).</p> <p>Compliance with tariff orders, including reduction in aggregate technical and commercial losses to international benchmarks (10–15%)</p> <p>Improvements in metering, billing, collection, revenue management, and collection of arrears</p> <p>Utilities to maintain debt-service coverage ratio of not less than 1.2, accounts receivable of no more than 2 months of billings</p> <p>Adoption and strengthening of financial management via independent audit departments, computerized accounting and management information systems, and development of online billing and collection systems where appropriate and practical</p>	<p>New tariff orders and resolution of challenges to existing tariff orders</p>	<p>Assumption</p> <ul style="list-style-type: none"> Government continues to support sector reforms and utility restructuring
<p>Outputs</p> <p>Clean Energy Development: New small hydropower plants.</p> <p>Energy efficiency improvements by renovating, modernizing, and upgrading existing hydropower plants</p> <p>Development of hydrometeorological monitoring network</p>	<p>29 MW of new generating capacity at 60% load factor by 2010.</p> <p>10 MW of incremental output at minimum 60% load factor by 2010</p> <p>Improved efficiency of generation system, reduced flood damage to</p>	<p>Policy dialogue, project progress reports, reports from state utility companies and the regulatory commission, loan review missions</p> <p>Implementation progress report and loan review missions</p> <p>Review of tender documents</p> <p>Payment certificates for contracts</p>	<p>Assumption</p> <ul style="list-style-type: none"> Counterpart funds for operation and maintenance of project components made available <p>Risks</p> <ul style="list-style-type: none"> Regulatory approval for rights-of-way in forest areas is not obtained in a timely manner Increase in prices of raw materials and fuel for construction operations exceeds contingency and

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p>Transmission Expansion: Construction of eight high-voltage transmission lines and associated substations</p> <p>Capacity Building: Training of the Uttaranchal Energy Department and implementing agencies' staff for project management and implementation; development of human resource management program; upgrading of information technology systems</p> <p>Design of state-level power trading company</p>	<p>hydropower facilities, reduced operation and maintenance costs by 2010</p> <p>Additional wheeling capacity (target: 420 kilometers of new lines, 2 new substations by 2010)</p> <p>Fully staffed project management office and project implementation units by January 2007</p> <p>Consultant services mobilized by mid-2006</p> <p>Number of workshops held and number of people trained</p> <p>Corporate human resource programs in place by the first quarter of 2007</p> <p>Initial information technology system improvements by the end of 2006, with long-term system upgrades defined by the first quarter of 2007</p> <p>Incorporation and operation of an independent power trading company by 2010.</p>	<p>Review of project accounts</p> <p>Summary appraisal reports, including summary environmental impact assessment, resettlement plans, and indigenous peoples development frameworks, if needed, for each subproject</p> <p>Review of tender documents and contract awards</p> <p>Payment certificates for contracts</p> <p>Quarterly and semiannual progress reports</p> <p>Contracts with consulting services and staff recruitment and payroll records</p>	<p>inflation forecasts</p>
<p>Activities with Milestones</p> <p>1.1 Field surveys for all subprojects completed by June 2007</p> <p>1.2 Acquisition of right-of-way completed within 6 months of confirmation of right-of-way</p> <p>1.3 Procurement of consulting services for design, tendering, and implementation of subprojects services by June 2006</p> <p>1.4 Design and engineering procurement and construction: starts first quarter of 2007 and construction completed by December 2011</p> <p>1.5 Procurement of consulting services for institutional strengthening: consultants appointed by June 2006, with services completed by the end of 2008</p> <p>1.6 Human resource development activities to ensure sustainability of all project components: ADB-supported orientation began in March 2005, key training activities to continue through the end of 2006</p>			<p>Inputs</p> <ul style="list-style-type: none"> • Consultancy services for project management, design, implementation of safeguards, and construction oversight • ADB: \$300.0 million • Government: \$3,060.0 million • Private sector: \$750.0 million • Other financial institutions: \$1045.0 million

ADB = Asian Development Bank, kV = kilovolt, MVA = megavolt ampere, MW = megawatt.

2. Sector Road Map and Capacity Building

Objectives	Impact	Performance Target	Measurement
Sector Road Map			
1. Reforms			
Transmission Bill 1998 and Policy 2000, Electricity Act 2003, and National Electric Policy 2005	Allows private participation in transmission projects. Unbundling of State Electricity boards and open access Elucidation of "Power for All by 2012" objective Allows power trading between generating units and distribution companies	New transmission projects with competitive bidding or joint ventures from 2006 onwards. Incorporation of separate generation, transmission, and distribution utilities from 2001 through 2004 Universal and affordable electric power service by 2012	Contract awards and utility company reports Utility company articles of incorporation
2. Restructuring			
Regulatory Framework	Creation of state-level independent regulator in 2002	Transition from monopsony to competitive market by 2011	Uttaranchal Energy Department (UED) and utility company reports
Commercialization of operations:	Tariffs currently set on cost-recovery principals with 14% return on equity, with lifeline tariffs for poor consumers. Retail tariffs reduced across all consumer categories; tariffs restructured to enhance revenue for distribution operations	Competitive tendering of IPP generation projects in effect from 2004 Full dispatch of available power from all generation units; generating plant load factors maintained at 60% or higher	Uttaranchal Electricity Regulatory Commission (UERC) and utility company reports UERC, UED, and utility company reports
<ul style="list-style-type: none"> • Generation • Transmission • Distribution 	Over 50 generation projects are under development by independent power producers (IPP) Improving financial management at distribution company operations including improvements in metering, billing, and collection, to reduce non-technical losses. System-wide infrastructure upgrades to reduce technical losses.	Full compliance with tariff orders issued by Uttaranchal Electricity Regulatory Commission (UERC) Eliminate financial losses at distribution company by 2008 Universal metering at 11 kV distribution feeders achieved in 2005 Maintain and improve financial health of generation and transmission utilities Meet international benchmarks for technical and non-technical losses by 2012	

Objectives	Impact	Performance Target	Measurement
<p>Capacity Building</p> <p>1. Adaptive management to sustain reforms and restructuring, covering:</p> <ul style="list-style-type: none"> • Policy – define and implement state-level policy consistent with national objectives and mandates • Planning – develop and update least-cost sector expansion plans • Investment climate – increase private investment in power sector • Financial management – upgrade and maintain accounting and management systems consistent with international standards and benchmarks <p>2. Implementation of ADB-funded investments</p> <ul style="list-style-type: none"> • Project management office and project implementation units • Procurement, contract management, and subproject management • Training and human resource development • Environmental and social safeguards implementation 	<p>Contribute to economic growth through expansion of power supply at affordable prices.</p> <p>Continue seasonal power trading and expand trading when year-round surplus is created.</p> <p>Plan, design, and implement least-cost generation and transmission system expansion program.</p> <p>Increase investment and competition in generation, transmission and distribution.</p> <p>Elimination of arrears and aggressive collection of accounts payable</p> <p>Reduction of non-technical losses</p> <p>First use of international competitive bidding for turnkey contracts in Uttaranchal power sector beginning in 2006–2007</p> <p>Financial management systems to meet international benchmarks by 2008</p> <p>Increase of clean energy for electric power</p>	<p>Maintain targeted GDP growth</p> <p>Financially viable and competitive utilities</p> <p>Continued increase of private investment in generating plants, and expansion of private investment in transmission and distribution subsectors</p> <p>Tariffs acceptable to customers and utilities</p> <p>Compliance with UERC tariff orders with respect to metering, billing, collection, and other cost control measures</p> <p>In-time and on-budget subproject implementation</p> <p>Restructuring of utilities to asset-management type companies and creation of state-level power trading company by 2011</p> <p>Open recruitment of professional management and staff initiated in 2004</p> <p>Register and trade carbon credits under Clean Development Mechanism</p>	<p>Government of Uttaranchal reports</p> <p>Annual reports of UERC, Uttaranchal Energy Department, and utility companies</p> <p>Utility company and project monitoring reports</p> <p>Utility company and project monitoring reports</p> <p>Incremental revenue from sale of carbon credits</p>

I. PROJECT DESCRIPTION

A. Project Area and Location

1. The Small Hydropower Plants (SHPPs) namely, Madhyamaheswar, Kaldigad, Kaliganga I and Kaliganga II proposed to be constructed under the Periodic Financing Request 1 (PFR 1) are located in various locations across the State of Uttarakhand.

B. Impact and Outcome

2. ADB will finance part of the Investment Program from 2006 through 2012, resulting in sufficient power capacity to meet all in-state demand and achieve a year-round exportable surplus by 2010.¹ New SHPP capacity will provide additional power to local grids in rural areas and is expected to meet about one third of the projected in-state, nonindustrial power demand at the time of commissioning. Additional power output from the RMU of existing HPPs will be sufficient to meet small- and medium-scale industrial demand at the time of commissioning. The expansion of PTCUL's state-level transmission grid will (i) improve system reliability; (ii) facilitate in-state and interregional power transfers; (iii) facilitate a reduction in overall system losses; (iv) improve the utilization of existing and planned power plants; and (v) promote further development of a national electricity market by connecting to the northern region grid. The total power delivery attributable to the Investment Program will serve more than 12.0 million people in Uttaranchal and the northern region grid service area. Parallel efforts by UPCL in relation to rural electrification and local grid improvements will complement ADB's intervention.

3. The 2003 Electricity Act has created an enabling environment to improve efficiency, support commercialization, and promote private sector participation. The proposed executing agency and implementing agencies have developed a rational sector expansion plan formulated on a least-cost basis. PTCUL and UJVNL, both relatively new companies, have some capacity constraints with respect to donor-funded project implementation therefore the proposed interventions include financial support for sector capacity building activities including GOU, UED, the state utilities, and other agencies. Related advisory TA² will provide project management support and build capacity in the project management office (PMO) and the project implementation units (PIUs) during the first year of implementation.

4. The proposed SHPP and RMU investments can be implemented independently of the proposed transmission subprojects, which depend on associated HPPs not financed by ADB. The transmission lines, which require about 3 years to construct, must be ready for initial operation 6 months prior to the commissioning of the associated large HPPs, which require about 5 years to construct. Based on the projected HPP commissioning schedule, the critical transmission system investments will require phased construction of three groups of subprojects and associated HPPs. The first group of subprojects is expected to be completed within 5 years, the second group is expected to be completed within 7 years, and the third group is currently being defined and also is expected to be completed with 7 years. Based on due diligence conducted to date, the capacity of UED and the implementing agencies to use external financing is estimated to be on the order of \$40.0 million to \$60.0 million per year. This capacity,

¹ Interstate power sales will use the lines of the Power Grid Corporation of India, Limited, with actual trading managed by UPCL. Some augmentation of Northern Grid systems may be required to prevent bottlenecks.

² The TA for capacity building of the Project Management Office (ADB, 2005. *Technical Assistance to India for the Uttaranchal Power Sector Capacity Building Project*. Manila), originally proposed as a TA attached to the loan, has been processed separately to accelerate project readiness. The TA was approved on 17 August 2005.

combined with the associated HPP commissioning schedule, indicates that the proposed Investment Program to be supported by ADB will require 5 to 7 years for full implementation and will require flexibility in subproject selection to achieve the Program's objectives and mitigate the overall investment risk. The MFF modality is ideally suited to this type of investment program.

C. Outputs

5. The ADB-supported subset of the Investment Program will cover the following three areas:

- (i) **Clean Energy Development.** Generating capacity will be expanded by the construction of new SHPPs and by energy efficiency improvements at existing grid-connected HPPs. Funding will also be provided for design, construction, and commissioning of a hydrometeorological monitoring system to support statewide hydropower system operations and the planning and design of future hydropower expansion.
- (ii) **Transmission System Expansion.** Time-critical transmission lines, substations, and auxiliary equipment will be constructed to evacuate power from new associated HPPs.
- (iii) **Capacity Building.** This activity will support capacity building and strengthening of the institutional framework within GOU, UED, and the implementing agencies to undertake power system expansion activities in a cost-effective manner. It will focus initially on implementation through the PMO and will include (a) training of UED and implementing agency staff to transfer and implement international best practices in transmission, generation, maintenance, and rehabilitation design and operations; (b) consulting services for design and construction management; (c) acquisition of computer hardware and software for the PMO and the PIUs; (d) field supervision, including compliance with safeguards and external monitoring; and (e) corporate development, including advisory services for restructuring, initial design of an independent power trading company, and other activities to be defined in consultation between GOU, UED, and ADB.

6. The Project covered under the Periodic Financing Request (Tranche 1) consists of the following parts:

(i) Part A –Subprojects

- (a) Madhyamaheswar Hydropower Plant –includes designing, construction, and commissioning of a 10 megawatt (MW) hydropower plant
- (b) Kaldigad Hydropower Plant – includes designing, construction and commissioning of a 9 MW hydropower plant
- (c) Kaliganga I-Hydropower Plant – includes designing, construction and commissioning of a 4 MW hydropower plant
- (d) Kaliganga II-Hydropower Plant – includes designing, construction and commissioning of a 6 MW hydropower plant; and

- (e) Hydrological Information System – includes designing of a hydro-meteorological monitoring system to support state-wide hydropower system operations and planning and design of future hydropower expansion.

(ii) **Part B – Capacity Building (Consulting Services)**

- (a) Provision of consulting services in the areas of designing and construction management; and
- (b) Acquisition of hardware and software to support transmission system planning, design, construction management, and systems operation.

D. Technical Justification and Selection Criteria

7. The long-term generation and transmission expansion program for Uttaranchal has been designed based on national, regional, and state-level least-cost expansion planning led by the Ministry of Power, the Central Electric Authority, UED, UJVNL, PTCUL, and UPCL. The overall expansion program is technically, financially, and economically viable and can be implemented in an environmentally friendly and socially acceptable manner. State-of-the-art technologies and international best practices will be applied to all investments, for example, upgrading from analog to digital control systems, including the System Control and Automated Data Acquisition system for operations; applying global positioning and geographic information systems in route surveys, planning, and design; using tunnels instead of open channel for SHPPs; and upgrading technology during RMU activities. The following are the criteria for selecting each subproject:

- (i) Subprojects will be consistent with the overall least-cost expansion plan and will be formulated on a least-cost basis. Subprojects will be technically feasible and will use advanced but proven technologies, with performance-based design consistent with international benchmarks for system efficiency and operational risks. All subprojects will be economically viable and financially sustainable.
- (ii) Hydropower subprojects will be part of UJVNL's expansion plans, and scheduling for connection to the transmission system will be coordinated with PTCUL. Transmission subprojects will be part of PTCUL's expansion plans, and scheduling will be consistent with the commissioning of new generating capacity.
- (iii) Subproject designs will be consistent with the Environmental Management Plan (EMP), the resettlement framework, and the indigenous peoples development framework (IPDF). Land acquisition and resettlement plans and indigenous peoples development plans based on the agreed IPDF and the resettlement framework will be prepared as necessary for additional subprojects prior to ADB approval for funding.
- (iv) All subprojects require environmental assessments in accordance with ADB's *Environment Policy 2002*.³ Category A and B subprojects will require a summary environmental impact assessment (SEIA) and a summary initial environmental examination (IEE), respectively, to be prepared and made available to the general public 120 days before approval. EMPs with budgets will be prepared for each subproject.

³ ADB. 2002. *Environment Policy*. Manila.

E. Special Features

A. Carbon Emissions Trading

8. The clean energy investments may qualify for greenhouse gas emission reductions, or carbon credit, trading under the Kyoto Protocol's Clean Development Mechanism (CDM). The CDM is one of three flexible mechanisms⁴ established by the Kyoto Protocol aimed at cost-effectively reducing global emissions of greenhouse gases. The CDM is a market-based financial instrument with the dual purpose of assisting developing nations to achieve sustainable development and industrial countries to meet their emission reduction targets. The CDM allows industrial countries to invest in “clean” projects in developing countries, for example, renewable energy such as hydropower, energy efficiency, and waste management, and to acquire certified emission reductions⁵—generically referred to as “carbon credits”—that can be used to comply with the Kyoto Protocol. ADB has provided base financing for three CDM projects⁶ with pending carbon credit transactions, and is currently developing several more projects with CDM potential. ADB's CDM facility provides parallel assistance to projects that can qualify for CDM and to facilitate agreements between sellers, or project owners, and buyers of carbon credits.⁷

9. ADB has been providing active assistance with further definition and qualification of the potential CDM opportunities since early 2005.⁸ Based on experience in neighboring Himachal Pradesh, the SHPP subprojects are highly likely to qualify for the CDM. Based on previous projects supported by ADB, the CDM-related revenue is expected to generate undiscounted financial returns of at least 10 to 15% of project costs. The CDM facility recently solicited carbon credit bids for a subcomponent of the Liaoning Environment Improvement Project of more than \$10 per ton of carbon dioxide equivalent, compared with typical offers of around \$5 per ton of carbon dioxide equivalent being offered by the World Bank's CDM funds. Given the potential financial upside, ADB is continuing to explore other opportunities for carbon credit revenue in the investment program.

B. Renewable Energy Services

10. The Uttaranchal Renewal Energy Development Agency has requested ADB support for a broad range of renewable energy development activities, including commercialization of biofuel production, after-market solar energy services, and mini- and micro-hydropower expansion for rural and off-grid applications. The Global Environment Facility has responded

⁴ The other two mechanisms are Emissions Trading and Joint Implementation.

⁵ Certified emission reductions are the official commodity generated by CDM projects. One certified emission reduction equals 1 ton of carbon dioxide equivalent.

⁶ ADB. 2003. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Gansu Clean Energy Development Project*. Manila; ADB. 2004. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Liaoning Environmental Improvement Project*. Manila; ADB. 2004. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of China for the Coal Mine Methane Development Project*. Manila.

⁷ Details can be found at <http://www.adb.org/cdmf>.

⁸ If the SHPP investments are not feasible or do not qualify for the CDM, selling emission reduction credits in the second-tier, or voluntary, markets may be possible. Uttaranchal has been proposed for inclusion as a focus state for which implementation is expected to begin in late 2005 (ADB. 2004. *Technical Assistance to India for the Capacity Building for Clean Development Mechanism in India*. Manila). The executing agency for this TA is the Ministry of Environment and Forests, which is also India's National Designated Authority for Clean Development Mechanism. UJVNL has requested assistance from ADB to evaluate the feasibility of developing advanced technology to convert excess power from run-of-river plants to other usable forms of energy, for example, hydrogen can be produced from water via electrolysis, then used to power fuel cells.

positively to a preliminary concept paper for a parallel project to support these activities. Further development of the concept paper is in progress. A grant to the Uttaranchal Renewal Energy Development Agency for accelerated upgrading of micro-hydropower facilities has been approved from ADB's regional TA for the Poverty and Environment Program.⁹ The grant will partly finance watermill users' associations, with the objective of commercializing locally-owned facilities that produce mechanical and electric power.

II. COST ESTIMATES AND FINANCING PLAN

A. Detailed Cost Estimates and Financing Plan

11. The Investment Program from 2006–2012, including cost estimates and financing sources, is presented in the table hereunder.

Uttaranchal Power Sector Investment Program, 2006–2012	
Investment Program 2006–2012	\$ Million
Generation	
UJVNL Large Hydropower	700
UJVNL Small Hydropower	335
Central Public Sector Utility and/or Independent Power Companies	3,200
Transmission	550
Distribution	370
Total	5,155
Financing Plan	
Domestic	
UJVNL	440
PTCUL	100
UPCL	40
GOU	580
Central Power Sector Utilities	1,600
Private Sector	750
Power Finance Corporation	300
Local Banks, Private Equity, and Capital Markets	245
International	
ADB	300
Bilaterals	300
International Financial Institutions	500
Total	5,155

Sources: ADB, Power Transmission Corporation of Uttaranchal, Limited, UJVNL, Uttaranchal Power Corporation, Limited, and UED.

12. The Government has requested financing up to an equivalent of \$300.0 million from ADB's ordinary capital resources to help finance part of the Investment Program. The financing will be provided under a MFF in accordance with ADB policy.¹⁰ The MFF will extend multiple loans to finance a range of projects under the Investment Program, subject to the submission of a related periodic financing request (PFR) by the Government and execution of the related loan and project agreements. The Government has entered into a FFA with ADB. The FFA satisfies the requirements set forth in Appendix 4 of the Pilot Financing Instruments and Modalities. The Government is required to comply with the FFA requirements. Pursuant to the FFA, the

⁹ ADB. 2003. ADB. *Technical Assistance for the Poverty and Environment Program*. Manila.

¹⁰ ADB. 2005. *Pilot Financing Instruments and Modalities*. Manila.

Government has submitted to ADB the first PFR in the amount of \$41.92 million. The first PFR is presented to the Board, together with the FFA. The loans under the MFF will finance civil works, equipment supply and erection, consulting services, and other capacity building activities. The minimum amount of a loan request will be \$25.0 million. All of the provisions of the ordinary operations loan regulations applicable to London interbank offered rate (LIBOR)-based loans¹¹ will apply to each loan, subject to any modifications that may be included under any loan agreement. The Government has the option to choose between eligible currencies and the interest rate regime for each loan. The specific terms of each loan will be based on the related PFR with interest to be determined in accordance with ADB's LIBOR-based lending facility. The Government has provided ADB with (i) the reasons for its decisions to borrow under ADB's LIBOR-based lending facility, and (ii) an undertaking that these choices were its own independent decision and not made in reliance on any communication or advice from ADB.

13. In case the Government requests any cofinancing arrangements or related assistance for projects under the MFF from ADB, these may be assisted by ADB, subject to related ADB policy and procedures.

14. The Government will provide the proceeds of the loans under the MFF in local currency to the state and through the state to UED and the implementing agencies. The Government will bear the foreign exchange risk on the loans.

B. Tranche 1 -Detailed Cost Estimates and Financing Plan

15. The total cost of the investment project of tranche 1 is estimated at \$59.89 million, Cost estimates and Financing Plan are shown in Table 1.

Table 1. Cost Estimates and Financing Plan

ITEM	Total Cost in \$ million	Bank Financing (70%)	Govt. of India (30%)
Part A			
Kaldigad Hydropower Plant	12.81	8.97	3.84
Kaliganga I Hydropower Plant	6.05	4.23	1.81
Kaliganga II Hydropower Plant	9.50	6.65	2.85
Madhyamaheswar Hydropower Plant	16.92	11.85	5.08
Hydrological Information System (H. I. S.)	9.60	6.72	2.88
Consulting Services for Preparation of DPR for H.I. S.	0.98	0.69	0.29
Sub-Total	55.86	39.11	16.75
Part B			
Consulting Services for Design, Const. Mgt. Safeguards	3.88	2.71	1.17
Information Technology	0.15	0.10	0.05
TOTAL	59.89	41.92	17.97

¹¹ ADB. 2001. *Ordinary Operations Loan Regulations Applicable to LIBOR-Based Loans Made from ADB's Ordinary Capital Resources*. Manila.

C. Tranche 1 -Allocation of Loan Proceeds

16. UED shall apply the proceeds of the loan to the financing of expenditures on the investment project in accordance with the Loan Agreement. The loan proceeds will be withdrawn from the Loan account on the basis of percentages provided in Table 2.

Table 2: Allocation and Withdrawal of Loan Proceeds

Ref. Category No.	Category Description	Allocation in US\$	Percentage of ADB Financing
01	Works	20,920,000	70%
02	Equipment	10,780,000	70%
03	Materials	6,820,000	70%
04	Consulting Services	3,400,000	100% of eligible expenses
Total		41,920,000	

III. IMPLEMENTATION ARRANGEMENTS

A. The Executing and Implementing Agencies

17. UED will be the executing agency. UJVNL will be the implementing agency for the clean energy development subprojects; PTCUL will be the implementing agency for the transmission system expansion subprojects; and UED, through the PMO, will be the implementing agency for capacity building. The PMO staff shall include representatives of UJVNL, PTCUL, and UED and other GOU departments. The implementation organization is shown in Appendix 5, which highlights the functional responsibilities of the PMO and the PIUs.

B. Program Management Organization

18. The investments supported by ADB will follow sector loan implementation procedures. UED and the implementing agencies will appraise additional subprojects following approval of the MFF. The implementing agencies will undertake detailed design, procurement, construction supervision, commissioning, maintenance, and operation of the subprojects. Technical support from consultants and contractors will be employed as necessary with funding from the capacity building budget. UED and the implementing agencies will liaise with ADB on a regular basis.

19. The PMO, through the related implementing agency offices, will be responsible for processing and implementing the subprojects. It will be assisted by technical experts who will evaluate the technical reports, feasibility studies, preliminary design reports, environmental assessment reports (including the EMP with budget), resettlement and indigenous peoples development plans, and detailed design reports to ensure compliance with ADB and Government requirements. Summary appraisal reports will be submitted to ADB subsequent to UED approval and required Government clearances. The PMO will prepare progress reports and submit them to ADB on a quarterly basis and will submit other required performance and monitoring reports twice a year.¹²

¹² In accordance with ADB's policy on public communications (2005), project reports will be made available to the public.

20. Overall progress and compliance with conditions of the FFA and individual loan agreements will be monitored on a regular basis with periodic reports to ADB, consistent with existing project implementation requirements. Reports will include evaluation of issues or problems faced by the executing agencies and recommended remedial actions. Overall investment progress will be considered as new financing requests are submitted. ADB management and staff will report regularly to ADB's Board of Directors on the implementation of the MFF funded activities. Board Information Reports will be submitted on an annual basis or more frequently if necessary.

IV. IMPLEMENTATION SCHEDULE

21. The Investment Program will be implemented over 7 years, inclusive of procurement and construction activities, and will be completed by January 2013. Each loan agreement is expected to have a utilization period of 5 years. The indicative implementation schedule for the appraised subprojects is presented in Appendix 6.

V. PROCUREMENT AND CONSULTING SERVICES

22. Equipment and materials to be financed under the loan will be procured in accordance with ADB's *Guidelines for Procurement*. International competitive bidding will be used for civil works contracts with an estimated value equivalent to or more than \$10.0 million, for turnkey contracts,¹³ and for supply contracts estimated to cost the equivalent of or more than \$1.0 million. International shopping or local competitive bidding will be used for contracts estimated at \$100,000 to \$1.0 million and direct purchase will be used for contracts worth less than \$100,000. Contract packages will be prepared to ensure maximum competition under international competitive bidding. Similar contractual arrangements and specifications will be applied to other subprojects. Indicative procurement packages are presented in Appendix 6. Web-based procurement will be used to the maximum extent possible following procedures acceptable to ADB.¹⁴ Consulting services will be procured in accordance with ADB's *Guidelines on the Use of Consultants by Asian Development Bank and Its Borrowers*. Services will be provided through a firm or firms recruited and engaged under international competitive bidding procedures using the quality- and cost-based selection method and full technical proposals. For specialized tasks with a contract value less than \$100,000, individual experts may be recruited based on biodata submitted in response to specific terms of reference for the assignment. Appendix 3 shows flowchart in consulting services selection by the Executing Agency using QCBS while Appendix 8 and Appendix 9 is the indicative flowchart of procurement under International Competitive Bidding (ICB) and National Competitive Bidding (NCB), respectively.

1. Advanced Procurement and Retroactive Financing

23. Advanced procurement was approved in July 2005. Draft prequalification and bidding documents have been prepared for contract packages covering 2 clean energy subprojects and 5 transmission subprojects. The Government has requested that retroactive financing be made available for time-critical expenditures necessary to expedite subprojects implementation. ADB has advised that retroactive financing of expenditures incurred from 12 months prior to signing the corresponding loan agreement, with a ceiling up to 20% of the loan amount, may be

¹³ Most proposed subprojects will utilize turnkey types of contracts. This will be the first time that PTCUL and UJVNL will use turnkey procurement for SHPP, RMU, and transmission investments.

¹⁴ UJVNL has implemented a web-based procurement system. Project Coordination and Procurement Division of the Central Operations Services Office will be consulted on further e-procurement.

available for individual loans under the proposed MFF. The Government and GOU have been informed that approval of advanced procurement action and retroactive financing does not commit ADB to finance any of the proposed subprojects.

VI. DISBURSEMENT ARRANGEMENTS

24. The loan proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook, 2007* and ADB's *Interim Guidelines for Disbursement Operations, LIBOR-Based Loan Products*, both as amended from time to time. Disbursement Modalities is shown in Appendix 11.

VII. ANTICORRUPTION POLICY

25. ADB's anticorruption policy was explained to and discussed with the Government, GOU, and the implementing agencies. Consistent with its commitment to good governance, accountability, and transparency, ADB reserves the right to investigate, directly or through its agents, any alleged corrupt, fraudulent, collusive, or coercive practices relating to projects under the MFF. To support these efforts, relevant provisions of ADB's anticorruption policy are included in the loan regulations and the bidding documents for the Investment Program. In particular, all contracts financed by ADB in connection with projects under the MFF will include provisions specifying ADB's right to audit and examine the records and accounts of UED and all contractors, suppliers, and consultants and other service providers as they relate to the projects under the MFF.

VIII. ACCOUNTING, AUDITING AND REPORTING REQUIREMENTS

26. Quarterly progress reports will be prepared for the individual loans and subprojects for submittal to ADB. The reports will include a description of physical progress, problems, and difficulties encountered and a summary of financial accounts that will consist of loan expenditures during the period, year to date, and total to date. A project completion report will be submitted within 3 months following completion of each loan. PTCUL and UJVNL will maintain separate accounts for each loan. Within 6 months of the close of the financial year, UED, PTCUL, and UJVNL will submit annual pro forma project accounts and un-audited financial statements for UED and the implementing agencies, and will submit audited accounts and financial statements within 9 months of the close of the financial year. PTCUL and UJVNL will continue the practice of hiring independent auditors to audit their annual financial statements and annual project accounts on a schedule to be agreed by the Government and ADB. The auditors will submit their report together with the respective annual financial statements and annual project accounts reports. Sample format of progress report is in Appendix 12 and the Financial Auditing and Reporting Requirements is in Appendix 16.

IX. PROJECT MONITORING AND EVALUATION

27. The PMO, with inputs from PTCUL, UJVNL, and UED, will prepare quarterly progress reports and submit these to ADB within 45 days of the end of each quarter. These reports will provide (i) a narrative description of progress made during the period, (ii) changes in the implementation schedule, (iii) problems or difficulties encountered, and (iv) work to be carried out in the next period. The progress reports will also include a summary financial account for the project components, including subprojects, consisting of project expenditures during the period, total expenditure to date, and benefit monitoring in accordance with procedures and details acceptable to ADB. Performance will be evaluated on the basis of indicators and

targets stipulated in the design and monitoring framework. The ADB project team will prepare periodic reports to inform the ADB Board of Directors of overall progress. A Board information report will be submitted annually, and supplemental progress reports will be submitted prior to management approval of individual loan agreements.

1. Monitoring/Review

28. ADB will field an inception mission within 3 months of the first loan approval. ADB will review the implementation and operations based on quarterly progress reports and meet with UED and the Government semiannually to discuss implementation progress. A midterm review to be carried out 2 years after loan effectiveness will focus on the engineering, resettlement, and environmental aspects of the ADB-supported investments and review the financial status of PTCUL and UJVNL. Representatives of ADB, UED, and the implementing agencies will take part in the review. The review will allow for any necessary midcourse corrections to ensure successful implementation and achievement of objectives. A project completion report will be submitted within 3 months following completion of the individual loans. A facility completion report will be prepared after the completion of all ADB-supported activities and subprojects.

2. Inception Mission

29. An inception mission was fielded on 1-12 October 2007 to discuss and finalize this PAM, and to ensure that all administrative matters pertaining to the Project are properly in place and working relationships are established between concerned ADB staff and UED, UJVNL and PTCUL. Details relative to accounting, auditing and reporting requirement, compliance with major loan covenants, disbursement procedures and preparation of withdrawal applications were explained during the mission.

3. Review Missions

30. Review missions will be conducted to monitor overall progress of the Project, review expenditures and cost estimates and most importantly discuss problems and issues causing delays in project implementation. The review missions will also monitor the overall performance of UJVNL and PTCUL. The first review mission is tentatively set around March 2008, and succeeding review missions will be fielded by ADB as and when required but at least twice a year.

X. MAJOR LOAN COVENANTS

31. The status of compliance, including actions taken to comply with the covenants, should be indicated in the appropriate column and be appended in the quarterly progress report. The list of major covenants is in Appendix 17.

XI. KEY PERSONS INVOLVED IN THE PROJECT

32. The list of key persons, their position and contact details are below:

A. The Borrower

Name	Position/Office	Contact Nos.
Mr. Arvind Mayaram	Joint Secretary, Department of Economic Affairs	Tel: + Fax: +91-11-2309-2477

B. The Executing Agency (Uttarakhand Energy Department (UED))

Name	Position/Office	Contact Nos.
Mr. Shatrughna Singh	Secretary, Power, Housing & Urban Development	Tel: +91-135-2713553 Fax: +91-135-2713554
Mr. Devinder Walia	Chief Project Manager	Tel: +00-983-736-8493 (Mobile)

C. The Implementing Agency (Uttarakhand Jal Vidyut Nigam Limited (UJVNL))

Name	Position/Office	Contact Nos.
Mr. S. P. Singh	Managing Director	Tel:+91-135-276-1485
Mr. S. K. Rastogi	General Manager (S.H.P.)	Tel:+91-135-276-1747

D. ADB

Name	Position	Contact Nos.
Mr. Thevakumar Kandiah	Director Energy Division, South Asia Regional Department (SARD)	Tel: (63-2) 632 6301 Fax: (63-2) 636 2338 tkandiah@adb.org
Mr. Tomoyuki Kimura	Principal Energy Specialist Energy Division, SARD	Tel: (63-2) 632 5621 Fax: (63-2) 636 2338 tkimura@adb.org
Mr. Hiroki Kobayashi	Energy Specialist ,SARD	Tel: (63-2) 632 5021 Fax: (63-2) 636 2338 hkobayashi@adb.org
Ms. Annie L. Vizcarra	Assistant Project Analyst Energy Division, SARD	Tel: (63-2) 632 6358 Fax: (63-2) 636 2338 avizcarra@adb.org
Mr. Shigehiko Muramoto	Head, Project Administration, INRM	smuramoto@adb.org Tel: 011-2410-72000
Mr. Vallabh Rao Karbar	Project Implementation, Officer (Energy)	vkarbar@adb.org Tel: 011-2410-72000
Mr. J. Srinivasan	Senior Control Officer, INRM	jsrinivasan@adb.org Tel: 011-2410-72000
Mr. Piyush Nagori Mr. Jyothi K.	Asst. Disbursement Analyst, INRM Sr Disbursement Assistant INRM	pnagori@adb.org jyothi@adb.org
Mr. Francis Emmanuel	Senior Financial Control Specialist Loan Administration Division 1 Controller's Department	Tel. (63-2) 632-4774 femmanuel@adb.org

XII. CONCURRENCE

33. We have reviewed this Project Administration Memorandum and concur to implement the Project according to the agreed requirements.

**For the Executing Agency (UED) and
Implementing Agency (UJVNL)**

For ADB:

(Original Signed)

Devinder Walia
Chief Project Manager, PMO, ADB
Uttarakhand Energy Department

(Original Signed)

Hiroki Kobayashi
Energy Specialist
Asian Development Bank

(Original Signed)

S. K. Rastogi
General Manager (S.H.P.)
Uttarakhand Jal Vidyut Nigam Ltd.

Date: 11 October 2007

FACILITY AND INVESTMENT PROGRAM SUMMARY

Borrower	India
Classification	<p>Targeting classification: General intervention Sector: Energy Sub-sectors: Hydropower generation, transmission and distribution Themes: Sustainable economic growth, environmental sustainability Sub-themes: Fostering physical infrastructure development; cleaner production, control of industrial pollution</p>
Environment Assessment	Category A. A summary environmental impact assessment was prepared and circulated to the Board on 20 May 2005.
Sector Investment Program Description	<p>Power and energy are essential for economic and social development in Uttaranchal. The government of Uttaranchal (GOU) has a long-term roadmap to strengthen the power sector. Besides capital investments to increase power generation and improve transmission and distribution, the roadmap also includes institutional change and capacity building for policy reform and improved financial management. Private sector participation in all parts of the power sector is an objective, as well as tariff regime improvements and the establishment of sound regulatory, legal, and governance frameworks. The roadmap is centered on clean energy development and energy efficiency, which are fast becoming priority themes in India, with particular relevance to states with the resources and physical conditions to broaden the generation base. A key feature of the roadmap is that it blends, phases, and sequences a diverse range of investment and non-investment interventions over time. The overall objective is to raise output and efficiency while ensuring fully inclusive power services for all types of consumers: residential, industrial, commercial, and public administrations.</p> <p>The capital investment program (the program) itself will require about \$12 billion over 2006–2018. This includes new assets and the rehabilitation of existing assets in generation, transmission, and distribution. Given the relatively large size of the program, and in view of the state’s limited financial resources and institutional capabilities, the investments will be phased and distributed among public and private sponsors. Planned capital investments from 2006–2012 are estimated at about \$5 billion.</p> <p>The financing plan involves central and state government authorities (through budget allocations), local banks, private sponsors, national utility companies, capital market operators, and international financial institutions including the Asian Development</p>

Bank (ADB). International loan syndications and bond issues are possible, the latter of which may be enhanced through guarantee products available from multilateral financing institutions and the international insurance market. These enhancements can increase maturities and bring down the total cost of funds to the issuer.

The roadmap and the program (investment and non-investment) are fully consistent with the government of India (GOI) "Power For All by 2012" policy objective, and fits well with ADB's existing strategy for the sector.

Generation

At year-end 2005, Uttaranchal had generating capacity of 1,160 megawatts (MW), entirely from hydropower plants. Total theoretical potential is estimated at 20,000 MW. Capacity expansions planned through to 2018 total about 10,000 MW. There are 14 projects under construction, totaling 5,525 MW in new capacity by 2010. An additional 4,791 MW are in the development stage, with commissioning due soon after 2010, and an additional 9,090 MW is planned beyond that. Approximately \$4 billion in new investment is required for new generating capacity to be commissioned by 2012, most of which will be provided by central public sector utilities (CSPUs), Uttaranchal Jal Vidyut Nigam, Limited (UJVNL), the state generating utility, and private sector developers.

The generation expansion program is dominated by clean energy development in the form of low-carbon generation operations, and energy efficiency improvements in the form of renovation and system loss reduction. While most of the new hydropower capacity during the first phase will come from large (more than 100 MW) and medium (25–100 MW) plants, the program includes small run of river hydropower plants (3–25 MW). Numerous candidate sites have been identified, with a cumulative capacity of around 1,000 MW, about 10% of which is now operating. Independent power producers are expected to develop about half of the small hydropower plants (SHPPs). SHPPs provide power directly to local grids (at 33 kilovolts [kV]), and therefore are integral to meeting rural electrification objectives. SHPPs can be constructed much faster than medium- and larger-sized ones, are environmentally friendly, and are expected to generate tradable carbon credits, with substantial financial upside to the project sponsors. ADB is providing assistance to GOU to develop carbon credit opportunities.

Transmission

The state-level transmission network needs to be expanded quickly to accommodate a four fold increase in generation and

energy transfers by 2012. Transmission expansion is integrated with generation expansion activities, and calls for 785 kilometers (km) of 400 kV lines, 180 km of 220 kV lines, 665 km of 132 kV lines, 8 substations, and auxiliary equipment. Power Transmission Corporation of Uttaranchal, Limited (PTCUL) is the lead project sponsor, and will require around \$550 million to support these investments.

Distribution

The sector roadmap targets 100% village electrification by 2008 and 100% household electrification by 2012, which requires extending the 33 kV and 11 kV distribution networks. The state distribution company, Uttaranchal Power Corporation Limited (UPCL), is implementing a comprehensive system overhaul including energy audits, physical upgrades, expansion of service areas, and improvements in metering, billing, and collection. UPCL's business plan calls for about \$370 million in new investment through 2012, which is being met through central Government incentive programs, state budget transfers, and revenue collection from ongoing operations. The company is moving toward fully commercial operations, and further restructuring covering operational, financial, and management matters is being considered by GOU, the Uttaranchal Energy Department (UED), and UPCL management. External financing may be required after the expiration of funds available under the Accelerated Power Development and Reform Program.

Policy Framework and Capacity

Uttaranchal's power sector was unbundled beginning in 2001, and operations have been rapidly evolving from a system run by regulated monopolies to one incorporating several private groups and more competitive market conditions. A number of reforms have been implemented, and others will be phased in between now and 2012. The Uttaranchal Electricity Regulatory Commission (UERC) actively monitors and promotes reforms to sustain commercial operations. Generation is the most open of the three sub-sectors, with central public sector utilities and private companies developing several major projects. The transmission sector has some current limitations to private sector involvement, but the policy framework caters for public and/or private initiatives, including joint ventures and wholly owned private sector operations, some of which may come on stream in the short to medium term. As noted above, the distribution sub-sector is undergoing a system-wide overhaul. Further restructuring will be implemented subject to careful planning and extensive stakeholder consultations. In the meantime, some design, construction, and maintenance operations will be outsourced to the private sector.

Capacity to implement the sector roadmap remains a constraint. At the central government level the capacity to formulate and execute policy reforms is sound, and to a large extent already tested, since this is done mainly by the Ministry of Power and the Central Electricity Authority.

At the state level, GOU, UED, UERC, and the utilities have strong planning capability. Financial management and fiduciary oversight systems are in place, but can benefit from additional assistance and training. Policy formulation, project definition, project management, and project monitoring will be strengthened over the near term, and ADB intervention includes support for capacity building in these areas. The utilities have the capacity to plan and issue tenders for civil works contracts, the purchase of plant and equipment, and the issuance of concessions, joint ventures, and management contracts. ADB is providing ongoing technical assistance to improve capacity to comply with all relevant ADB policies and procedures, including governance, procurement, and safeguards. Additional support for these activities, including long-term human resource is included in the proposed ADB intervention.

Proposed ADB Intervention

The Government of India (GOI) and GOU have requested ADB to provide \$300 million to partly fund a subset of the investment program covering generation, transmission, and capacity building. This represents a relatively small share of the total funding needs and financing plan. Having ADB as a partner (i) brings down the total cost of funds, (ii) sets out standards in various thematic areas, and (iii) helps to entice other long-term financiers to the sector. GOI and GOU have requested ADB to extend this finance in the form of a multitranche financing facility (MFF).

Multitranche Financing Facility

Up to \$300 million to help fund the investment program during its first phase. The Multitranche Financing Facility (MFF) will be converted into individual loans in line with individual project readiness, as well as policy, safeguards, financial management, fiduciary oversight, and capacity building action plans. These loans will be made from ADB's ordinary capital resources. The utilization period of the facility will be 7 years.

Rationale

Uttaranchal is one of India's poorest states. Clean energy and tourism are two important economic growth and poverty reduction drivers. The state has undeveloped hydropower potential estimated at 20,000 MW. Harnessing this hydropower capacity is vital to meet all in-state demand and export power to surrounding states, and support investment in rural and other productive sectors.

Uttaranchal's power sector road map is based on (i) a memorandum of understanding with the Government of India for unbundling the former State Electricity Board; (ii) the subsequent unbundling into three state-owned utilities; (iii) the implementation of the Accelerated Power Development and Reform Program, which supports local grid strengthening and reduction of system losses; (iv) a tripartite agreement between the state, the central Government, and the Reserve Bank of India for settling accounts between the former State Electricity Board and its unbundled successors; (v) the state's new industrial policy for economic growth through the development of clean (no- and low-pollution) enterprises, which includes provisions for private sector participation in the power sector; (vi) the creation of an independent electricity regulator; (vii) the Accelerated Generation and Supply Program, which provides incentives for the renovation, modernization, and upgrade (RMU) of existing power plants; and (viii) a series of tariff orders for generation, transmission, and distribution that support the commercialization of the state-owned utilities.

Impact and Outcome

The program will support poverty reduction in Uttaranchal. It supports investments and enabling conditions conducive to economic growth and prosperity. Power remains a bottleneck to economic growth, affecting resident and industrial consumers alike. The program will generate exports to neighboring states and improve efficiency and cut energy leaks, operating and financial losses in the system.

The program will encourage reform, promote clean energy and energy efficiency improvements, and build capacity to effectively manage the ongoing multi-billion dollar expansion program. Capacity building activities will initially concentrate on implementation of investments funded by ADB, and will be expanded to support the broader sector reform agenda under GOU leadership.

The ADB-supported investments will increase power supplies by a significant amount by 2012, from large and small plants, by adding new assets, and rehabilitating existing ones. Transmission expansion will enable a more efficient transfer of power within the state, and the sale of excess power to the Northern Region grid. By 2012, the exportable surplus will be sufficient to supply 12 million residential customers. Expanded and improved quality in the service will cut costs, reduce the "cost plus" pressure on the tariff structure and benefit consumers. The SHPPs investments are expected to generate carbon credits, with significant financial upside to sponsors and consumers. ADB is providing ongoing assistance to expand expertise in Uttaranchal for carbon credit identification and trading.

Cost Estimates and Financing Plan

Investment Program 2006–2012	\$ Million
Generation	
UJVNL Large Hydropower	700
UJVNL Small Hydropower	335
Central Public Sector Utility and/or Independent Power Companies	3,200
Transmission	550
Distribution	370
Total	5,155
Financing Plan	
Domestic	
UJVNL	440
PTCUL	100
UPCL	40
GOU	580
Central Power Sector Utilities	1,600
Private Sector	750
Power Finance Corporation	300
Local Banks, Private Equity, and Capital Markets	245
International	
ADB	300
Bilaterals	300
International Financial Institutions	500
Total	5,155

Facility Amount and Terms

The facility will provide up to \$300 million, secured from the Ordinary Capital Resources of ADB, with final terms and conditions to be established under individual loan agreements based on prevailing ADB policies. Financing will be made available under ADB's London inter-bank offered rate (LIBOR)-based lending facility. The client has the option to choose between eligible currencies and interest rate regimes, which can change with each individual loan. Currency and interest rate swaps will be made available during the financing period. Repayment schedules can be structured in line with specific needs of individual loans.

Retroactive Financing

Retroactive financing may be available under individual loans for expenditures incurred 12 months prior to the signing of the corresponding loan agreement, with a ceiling of up to 20% of the loan amount (in line with the Board paper on *Cost Sharing and Eligibility of Expenditures for Asian Development Bank Financing: A New Approach*). The central and state governments have been informed that approval of advanced procurement action and retroactive financing does not commit ADB to finance any of the proposed subprojects.

Period of Utilization

Until 31 January 2013

Executing Agency and Implementation Arrangements

The Uttaranchal Energy Department is the program's overall executing agency. UJVNL, the state generating company, will be in charge of investments in generation. PTCUL will be responsible for transmission sector investments. The Uttaranchal Energy Department will be the lead agency for capacity building activities.

Procurement

Equipment and materials to be financed under each loan will be procured in accordance with ADB's *Guidelines for Procurement* – following international and/or local competitive bidding. Procurement packages will be designed to maximize international competitive bidding opportunities. Advanced procurement action will be allowed to facilitate timely implementation of the investments.

Consulting Services

All consultants financed under each ADB loan will be selected and engaged in accordance with ADB's *Guidelines on the Use of Consultants* and other arrangements for the recruitment of domestic consultants acceptable to ADB.

Consulting services will initially focus on implementation and project management activities including subproject design, safeguards evaluations, procurement, financial management, reporting, and staff training. Additional tasks which may be covered are assistance with planning and policy formulation; carbon credit identification, certification and marketing; corporate development, including human resource development, information technology upgrades, and creation of a state-level power trading company.

Investment Program Benefits and Beneficiaries

The program covers investment and non-investment interventions benefiting all consumers in rural and urban areas, including residential, industrial, public administrations, and commercial establishments. It will deliver on both quantitative and qualitative targets envisaged under the Power For All by 2012 policy objective. Besides generating more power supplies for users in the state itself (now in deficit), the program will also provide substantial surplus power for exports, which is expected to be a major source of revenue for the state.

The program is founded on clean energy development, a field where Uttaranchal has a clear comparative advantage vis-à-vis other states. Expanding clean energy capacity will generate local, regional, and global environmental benefits. Local air quality, particularly indoor air quality, will improve with the substitution of electricity for biomass (animal dung and wood) and kerosene. Regional air quality will be preserved by offsetting the expansion of thermal generating capacity. Carbon credit trading is expected to create significant dividends, with projected upside up to 15% of total capital outlays. Energy efficiency will be improved with substantial reductions in transmission and distribution system losses. Transmission investments are necessary to make other

investments in generation and distribution possible. The investment program will obviously create employment, tax revenues, and royalties to the state.

Risks and Assumptions

The program is accompanied by some risks, in particular cost overruns, commissioning delays, and lack of reforms necessary for sector sustainability.

Given the “cost plus” commercial or tariff regime prevalent in the industry in India today, cost overruns can be partially passed on to consumers, with negative financial and economic effects, especially on residential customers. This risk is small. The cost projections are based on conservative assumptions, and many of these investments fall within the jurisdiction of the central power utilities—experienced groups in terms of project preparation and execution. Implementation is being conducted more and more frequently on the basis of tendered engineering, procurement and construction turnkey contracts (EPCs), which are subject to considerable penalties on budget and time overruns, and come with project completion and commissioning guarantees.

Commissioning delays would put at risk not only in-state supplies but also exports to neighboring areas. Such risk is contained and managed through the “concession” contracts awarded to the short-listed sponsors. About 14 projects are already under way and most of the remaining ones are at an advanced stage of development and/or planning.

Capacity building and public policy reform are essential to the long-term growth and sustainability of the sector. The risk of a turnaround (or a material slowdown) in the reform process is possible but unlikely. GOI and GOU are publicly committed to the reform process, because reliable high quality power service is a key driver for growth and poverty reduction. The sector is also crucial for other investments to materialize, which in turn creates employment, better public goods and services and incomes. High-quality and reliable power supply benefits people and industry in rural and urban areas, and many critical public services, ranging from water and wastewater to education to health services. The reform process is well underway, and needs to be further nurtured.

Warranties and Representations

Uttaranchal has a well-defined power sector roadmap, a clear investment and non-investment program, and the people and institutions to deliver on objectives and targets. The provision of ADB finance through a multitranche facility requires an agreement on key warranties and representations which are intended to ensure program success. A framework financing agreement (FFA) has been negotiated, which captures critical provisions for ADB financing including:

- (i) subproject eligibility criteria, selection, and implementation,
- (ii) capacity building,
- (iii) safeguards framework,
- (iv) procurement and disbursement procedures,
- (v) financial management and fiduciary oversight,
- (vi) monitoring, administration, and reporting.

ADB will provide direct support to GOU and the executing and implementing agencies responsible for program implementation, from headquarters and through the India Resident Mission. A program support office has been established, which will coordinate specific implementation tasks, including procurement, subproject management, monitoring, and supervision. It will comprise professional, experienced staff especially in the areas of safeguards, financial management, administration and reporting. An MFF can be a flexible instrument for the authorities, but its viability requires a strong local presence and quality resources allocated to implementation.

ADB management and staff will report regularly to ADB's Board of Directors on the implementation of the program and the MFF. Board Information Reports will be submitted on an annual basis or more frequently if necessary. Each new financing request to be converted into a new loan will require evaluation on the performance of the previous one. ADB will conduct periodic review missions, which will include due diligence on warranties and representations made to ADB. In addition, staff will report on any issues or problems faced by the authorities and the execution agencies under the program, and the remedial actions suggested to overcome them.

TERMS OF REFERENCE FOR PROJECT IMPLEMENTATION

A. Consultancy Contract for Design, Engineering, Project Management and Construction Supervision for various PTCUL's Transmission Lines and Substations and UJVNL's Small Hydro Power Projects

1. Background Information

India has applied for a loan from the Asian Development Bank (ADB) towards the cost of Uttaranchal Power Sector Investment Program. Part-A will be under the Clean Energy Development Component of Uttaranchal Power Sector Investment Program which will fund expansion of small hydropower generating capacity, by construction of new grid-connected plants ranging from 3 MW to 25 MW. Part-B will be the Transmission System which will fund the proposed expansion program of up to 785 km of 400 kV lines, various 220 kV lines and 132 kV lines, plus associated substations and auxiliary equipment. For this undertaking, the following Projects are to be covered by the consultancy services which are to be financed by ADB:

A. For UJVNL Projects

1. Construction of SHPs

- a) Kaliganga I (4 MW)
- b) Kaliganga-II (6 MW)
- c) Madhyamaheshwar (10 MW)
- d) Kaldigad (9 MW)

B. For PTCUL Projects

1. Transmission Lines under nine (9) contract packages of various 400kV and 220kV lines. The tentative Packages are described below:

1. Package 1:

- (i) 400 KV D.C. Loharinagpala-Koteshwar Line & LILO of Loharinagpala-Koteshwar Line at Pala Maneri.

2. Package 2:

- (i) 400 KV D.C. Vishnugad – Kuwari Pass (Pipalkoti) Line.
- (ii) LILO of 400 KV Vishnugad-Kuwari Pass (Pipalkoti) Line at Vishnugad Pipalkoti.
- (iii) 400 KV DC Karanprayag- Srinagar Line
- (iv) 400 KV DC Kuwari Pass (Pipalkoti)-Karanprayag Line
- (v) LILO of 400 KV Vishnu Prayag - Muzzaffarnagar Line at Kuwari Pass (Pipalkoti) Substation.

3. Package 3:

- (i) 400 KV D.C. Srinagar – Kashipur Line.
- (ii) 400 KV D.C. Srinagar 400 KV S/s – Srinagar Power House (HEP).

4. Package 4:

- (i) 220 KV D.C. Baramwari-Srinagar Line
- (ii) 220 KV Ghansali-Chamba Line.
- (iii) 220 KV D.C. Tapovan – Joshimath Line.
- (iv) LILO of 220 KV Tapovan-Joshimath Line at Badrinath.
- (v) 220 KV D.C. Joshimath – Kuwari Pass (Pipalkoti) Line.

5. Package 5:

- (i) 220 KV D.C. Kotlibhel St. II – Roorkee Line
- (ii) 220 KV D.C. Kotlibhel IB – Kotlibhel St. II Line & LILO of this line at Kotlibhel IA.
- (iii) 220 KV D.C. Line from 400 KV Substation, Roorkee (PGCIL) – 220 KV Substation, Roorkee.

6. Package 6:

- (i) 220 KV D.C. Mori -Nogaon- Khodri Line
- (ii) 220 KV D.C. Arakot Tuni - Mori Line
- (iii) LILO of 220 KV Arakot Tuni - Mori Line at Tuni Plasu
- (iv) LILO of 220 KV Arakot Tuni - Mori Line at Hanol Tuni
- (v) LILO of 220 KV Arakot Tuni - Mori Line at Mori Hanol
- (vi) 220 KV D.C. Devsari-Karanprayag Line
- (vii) 220 KV D.C. Nandprayag-Karanprayag Line
- (viii) LILO of 220 KV Nandprayag-Karanprayag Line at Langrasu

7. Package 7:

- (i) 400 KV S/s Srinagar
- (ii) 400 KV Srinagar Bay at 400 KV S/s Kashipur

8. Package 8:

- (i) 220 KV AIS Ghansali Substation
- (ii) 220 KV Bay at Chamba
- (iii) 220 KV GIS Mori Substation
- (iv) 220 KV GIS Substation Baramwari

9. Package 9:

- (i) 400 KV GIS Substation, Kuwaripass (Pipalkoti)

Uttaranchal Energy Department (UEID) will be the Executing Agency (EA) and Uttaranchal Jal Vidyut Nigam Ltd (UJVNL) and Power Transmission Corporation of Uttaranchal Ltd., (PTCUL), will be the Implementing Agencies (IA's) for the abovementioned projects.

Introduction

The above projects are proposed to be undertaken primarily through EPC (Turnkey) mode. The scope of the work of the Consultant is described in the scope of work. However, Consultant should bear in mind that list of tasks and activities can by no means be construed as the complete and comprehensive description of the consultant duties and responsibilities. Hence, the consultant is expected to further undertake activities and responsibilities that are essential and necessary under the circumstances to attain the very purpose and objective of the projects.

A. Brief Scope of Services for UJVNL

- 1) Provide international expertise on geotechnical engineering (foundations and tunneling), hydrology, and hydraulics engineering (including modeling) as necessary on an intermittent basis, continuing through implementation phase.
- 2) Check and review the construction drawings for Civil and Electromechanical works, in consultation with the UJVNL Engineers. The projects are being constructed through EPC so the contractor shall prepare the drawings.
- 3) Periodically monitor the projects progress during implementation.
- 4) Ensure environmental and social safeguards are implemented as per Environmental Management Plans (EMP) and Resettlement Framework (RF) and Resettlement Plan (RP) documents.
- 5) Assist in supervision and management of the project during the implementation.

A.1 Civil Works Scope-

The Civil and Electromechanical works are defined but not limited to as described below: Earthwork, dewatering, geotechnical measures like jet grouting etc. and construction of:

- A trench weir across the stream
- An intake chamber provided with a shingle excluder and a power duct (open channel)
- A desilting tank (hopper type)
- A power channel and free flow un-pressurised tunnel 'D' – shaped,
- A forebay providing for two (02) minute storage
- One no. spiral welded steel penstock bifurcating into two steel
- A surface type over ground power house Tail race channel
- Hydro-mechanical equipments such as gates etc.
- Civil Works for switchyard, roads, buildings for -offices, workshops, stores and housing for personnel.

A.2 Electromechanical Works Scope

- Horizontal Francis/Pelton turbines along with all accessories and auxiliaries including governors.
- Horizontal Synchronous Generators along with accessories and auxiliaries including brushless excitation system and automatic voltage regulators.
- > 3.3 / 33 kV, 6300 kVA oil filled out door power transformers.

- 33 kV switchyard equipments for 3 Nos. 33 kV bays including main and auxiliary structures
- Installation of cranes
- Metering, control and protection equipments for the entire project.
- 33/0.433 kv, 250 kVA auxiliary transformer
- LT Switchgear
- 33 kV line for power evacuation.

A.3 Environmental and Social Safeguards Implementation

- Adherence to Environmental Management Plan
- Adherence to the Resettlement Framework, Resettlement Plan, and indigenous peoples framework.
- Update and develop environmental and social baselines, as necessary, and reporting of compliance as per ADB/GoU/GOI guidelines.

B. Brief Description of Scope of Services for PTCUL

- (i) Provide international expertise on foundation, tower, and gas-insulated substation (GIS) design as necessary on an intermittent basis, continuing through implementation phase.
- (ii) Review of Bidding Documents, Bid drawings and Technical Specifications for the 400KV and 220 KV transmission lines and substation projects.
- (iii) Work as Technical Consultant during the pre-bid conference and evaluate/respond to clarifications made by bidders.
- (iv) Assist in detailed Evaluation of Bid Proposals including review and evaluation of technical issues and the recommendations for contract awards.
- (v) Review and checking of Construction and Manufacturer's drawings and necessary and related documents.
- (vi) Assist in Project Implementation Management and Supervision, sustained project monitoring, including evaluation of proposed change orders and extra work orders based on ADB Guidelines, quality evaluation and control, and submission of periodic project performance evaluation and accomplishments reports.
- (vii) Assist in the supervision and provide the necessary expertise (if required), for the successful pre-commissioning and commissioning of the transmission lines and substations.
- (vii) Environmental and Social Safeguards Implementation
 - Conduct of route survey and prepare subproject environmental assessments (IEE and EIA), and RPs as necessary.
 - Adherence to Environmental Management Plan
 - Adherence to the Resettlement Framework, Resettlement Plan, and indigenous peoples framework.
 - Update and develop environmental and social baselines, as necessary, and reporting of compliance as per ADB/GoU/GOI guidelines.

2. TERMS OF REFERENCE

The consultant is expected to supply the services under the consultant's professional responsibility satisfying the Client. To attain the required objective, the consultant shall deploy and assigned only well-qualified, professional and experienced team of consultants. The

consultant cannot change or modify the conceptual design without obtaining the approval of PMO.

(i) Scope of Services

The consultant shall perform the following detailed tasks as described but not limited to:

A. Inception Phase

The Consultant will prepare a work program and work schedules including the complete lists of:

- (i) the transmission line materials and substation equipment for 400 kV and 220 kV, including its associated materials, equipment and accessories of which the respective technical specifications, design data and other relevant and necessary technical data of these line materials and equipment will be prepared ;
- (ii) the field quality plan for both transmission line and substation projects;
- (iii) the provision involving standard safety, environmental and social aspect of the projects;
- (iv) the review of technical specifications pertaining to installation, erection works and all associated civil works required and necessary for the transmission line materials and substation equipment including the scope pertaining to commissioning works to handover;
- (v) the evaluation criteria for technical and price proposals for both transmission line and substation projects; and
- (vi) the factory and witness tests inspection of equipment prior shipment/delivery. In relation to these, undertake review and prepare comments and recommendations on the requisite factory tests program submitted by the manufacturers for consideration of UJVNL/PTCUL.
- (vii) the framework for compliance with the EMP and RP/RF for each sub-project proposed for both PTCUL and UJVNL.

This entire work program and work schedules will be subject to review and approval by PMO/PTCUL.

B. Design and Procurement Phase

(i) For PTCUL, review of Bidding Documents and Technical Specifications, design data and other relevant and necessary technical data and computations, bid drawings and other related documents for all the line materials and substation equipment and associated component equipment of the 400kV and 220kV transmission line and substation projects. The technical specification should be reviewed in line with the new technology prevailing in the power sector industry and conforming to recognized International Standards. This also includes review of contract packaging if necessary, and all Employer's Requirements such as the Bill of Quantities (BOQ), design calculations and related parameters, etc., and as may deemed necessary by Consultant for approval by PTCUL;

(ii) For UJVNL specifically, review and approval or rejection of all the drawings and documentation and supporting documents for structures/equipment prepared and/or submitted by contractor. Approval or rejection of samples, patterns and/or models to be delivered according to contract conditions by the contractors for supply and installation of equipments. Inspection and testing supervision of the equipments of material and

workmanship of all plants to be supplied within the contracts, at all reasonable times and locations and particularly at the contractors site premises.

(iii) Work as Technical Consultant during the pre-bid conference and evaluate/respond to clarifications made by bidders. In case it is necessary to respond in writing, prepare the reply to technical issues and concerns for consideration and approval of PMO/UJVNL/PTCUL;

(iv) Undertake the detailed Evaluation of Bid Proposals including review and evaluation of technical issues and prepare the necessary clarifications to bidders and related procurement issues and the recommendations for contract awards for consideration and appropriate action of PMO/PTCUL.

(v) Environmental and Social safeguards implementation

- Ensure that subproject-specific environmental and social mitigation measures are incorporated into contract documents.
- Update the EMP as necessary, including carrying out supplemental environmental assessments for additional subprojects appraised after loan approval.
- Update the RPs and prepare new RPs and other safeguards related documents where necessary for additional subprojects appraised after loan approval as per the detailed final design.
- Provide necessary guidance and due diligence for endorsement of resettlement plans, obtaining approval from ADB and availing clearances as required from various government agencies.

C. Project Implementation Phase

- (i) Review and checking of Construction and Manufacturer's plans and drawings, design computations and parameters and other necessary and related documents submitted by the contractors and providing appropriate comments (if necessary), and recommendations for appropriate and necessary actions and/or approval by UJVNL/PTCUL.
- (ii) Assist in Project Implementation Management and Supervision, sustained project progress evaluation and monitoring, including the review and evaluation of proposed change orders and extra work orders based on field changed conditions and pursuant to ADB Guidelines. Also, prepare the necessary document and communications for consideration by UJVNL/PTCUL, quality evaluation and projects control at any stage necessary during the project execution, and submission of periodic project performance evaluation and accomplishments reports. The Consultant is also required to periodically assess and report the periodic performance of the contractor and submit periodically these reports in writing to UJVNL/PTCUL.
- (iii) In coordination with the Commissioning Engineer of the Contractor/Manufacturer, undertake the supervision and provide the necessary expertise (if required), for the successful pre-commissioning and commissioning of the SHPs, transmission lines

- and substations up to commercial operations and final handover to end-users/operations.
- (iv) All the above tasks as described and required for the smooth execution of the project up to commissioning and commercial operation and hand-over, shall be done in coordination with UJVNL/PTCUL and concern agencies as appropriate.
 - (v) Environmental and Social safeguards implementation:
 - Provide orientation for PIU/Field Staff on safeguard measures, including implementation of the Environmental Management Plan (EMP), Resettlement Plan.
 - Supervise the implementation of environmental mitigation and monitoring measures as specified in the EMP.
 - Monitor and supervise resettlement and other social impact mitigation activities, as defined in the Resettlement Plan, resettlement framework, and indigenous peoples' development framework.
 - Assuring that all the safeguards related works (resettlement and timely disbursement of compensation, necessary mitigations, etc) are completed before the civil work starts.

D. Post-Project Implementation Phase

- (i) Submission of Project Completion Reports (PCR) of all the completed transmission lines and substation projects as well as Small Hydro Projects.
- (ii) Submission of "Contractors' Performance Evaluation Report" for each project undertaken and completed by the main contractor.
- (iii) Check and Review the "as-built drawings" submitted by the Contractor for all the projects and provide comments as it may deemed necessary and discuss and finalize with the contractor for approval by UJVNL/PTCUL.
- (iv) Environmental and Social safeguards implementation:
 - Evaluate the overall implementation of safeguards and to suggest the PMO/PIU whether the objectives of safeguards planning and implementation have been achieved.
 - Provide safeguards related completion input for the over all project completion report with suggestive recommendations for the future.

E. Submission of Reports

Apart from the Post-Implementation Report to be submitted as described above, the Consultant will prepare and submit the following reports at every phase of the undertaking described as follows:

1. Inception Report

The consultant shall submit the Inception Report to UJVNL/PTCUL within 6 weeks from mobilization. The report includes a detailed work program as described in the scope of services, plus any observed major inconsistencies in the TOR (if any), and any substantial staffing problems or deficiencies as described in the TOR if warranted.

2. Design and Procurement Phase- Progress Report

To keep the Employer of the consultant's progress, a monthly progress report is to be submitted by the consultant to PMO/UJVNL/PTCUL through its project officer which should be short and concise (e.g., 2 pages of text) in two copies and signed. This should be supported by a Bar Chart showing planned and actual progress, real and anticipated problems and the work plan for the coming month.

3. Project Implementation Phase- Progress report

To keep the Employer of the consultant's progress, a monthly progress report is to be submitted by the consultant to PMO/PTCUL/UJVNL through its project officer which should be short and concise (e.g., 2 pages of text) in two copies and signed. This should be supported by a Bar Chart showing planned and actual progress, real and anticipated problems and the work plan for the coming month. Any real or anticipated problems should be discussed with PTCUL through its project officer and provide appropriate advice and recommendation for review, evaluation and consideration of the project officer of UJVNL/PTCUL.

4. The Consultant is not allowed to change or make any substitution of any of its assigned consultant without prior written approval from PTCUL or UJVNL as the case may be. Any unauthorized replacements will be considered breach of contract and will be dealt with accordingly and as appropriate. PTCUL and UJVNL reserve the right to exercise their rights to institute any action under the contracts and any legal remedies available under the circumstances.

5. Staffing

International Consultants:

- A. PTCUL: Tower Design Foundation Design and Gas Insulated Substation Design
The specialists must have international experience in designing special type towers/tower foundation suitable for hilly terrain and environmental safeguards for environment and social. The specialists must have completed at least four GIS substations out of which two are in hilly terrain.
- B. UJVNL: Geo-technical Engineering, Tunneling, Hydrology, Hydraulics and Modeling
The specialists must have international exposure to carry out similar works for at least three projects in hilly terrain.

National Consultants:

- A. Design and Procurement and Bid Evaluation:
The specialist should have an engineering degree in Electrical/Civil and having experience in reviewing and evaluating bid documents of three similar projects.
- B. Project Implementation Specialist: Review/Checking of Construction and Manufacturer's Drawing and Technical Data)
The Specialist should have Engineering Degree in Electrical/Mechanical/Civil and must have experience in project implementation of three similar projects.

- C. Project Construction Management:
Project Manager: The specialists must have engineering degree in Civil/Electrical/Mechanical and should have five years experience in hilly region for carrying out similar projects.
- D. Post Project Implementation: (Project Completion Report and Evaluation of Performance of Construction)
The specialists should have engineering degree in Civil/Mechanical/Electrical and must have completed at least three similar projects.
- E. Safeguards Specialist
Environment Specialist: The Specialist must have experience in developing environmental baseline and monitoring of environmental aspects, EMP management for similar projects.
- Social Specialist: The Specialist must have experience in preparing/monitoring/evaluating Social and Resettlement plans for similar project in hilly regions.

6. Expertise Required and Workload Assessment – 60 person months of International Consultants and 440 person months of National Consultants, and 180 person months of administrative support are required.

The following expertise has to be provided:

International Consultants (60 person-months)

(i)	Team Leader/Tower Design Engineer	- 12 person-months
(ii)	Foundation Designing Engineer	- 8 person-months
(iii)	GIS Substation Designer	- 16 person-months
(iv)	Geo-Technical Designer	- 4 person-months
(v)	Tunneling Engineer	- 8 person-months
(vi)	Hydrology Engineer	- 5 person-months
(vii)	Hydraulics Engineer	- 3 person-months
(viii)	Modeling Expert	- 4 person-months

National Consultants (440 person-months)

- A. Design and Procurement and Bid Evaluation (PTCUL)
- | | | |
|----|--|-----------------|
| a. | Review of Bidding Document, Bid Drawings and Technical Specifications- | |
| i | Design Engineer (Electrical) | 3 person-months |
| ii | Design Engineer (Civil) | 3 person-months |
| b. | Evaluation of Bids to Award | |
| i | Design Engineer (Electrical) | 8 person-months |
| ii | Design Engineer (Civil) | 4 person-months |

B. Project Implementation Specialist: Review/Checking of Construction and Manufacturer's Drawing and Technical Data)

PTCUL	Design Engineer (Electrical)	12 person-months
Both	Design Engineer (Civil)	6 person-months
UJVNL	Design Engineer (Electro-Mech)	6 person-months

C. Project Construction Management:

PTCUL	Project Manager	1 person	24 person-months
	Project Engineers (Transmission Lines)	4 persons	192 person-months
	Project Engineers (Substations)	3 persons	48 person-months
UJVNL	Project Engineers (SHP)	2 persons	72 person-months

D. Post Project Implementation: (Project Completion Report and Evaluation of Performance of Construction)

Project Engineer (Civil)	1 person-month
Project Engineer (Electrical)	1 person-month

E. Project Safeguards Implementation, Monitoring and Reporting for both PTCUL and UJVNL

Environment Specialist	30 person-months
Social Specialist	30 person-months

F. Administrative Support Staff (180 person-months) for both PTCUL and UJVNL.

Administrative Assistant	60 person-months
Clerk/Encoder	60 person-months
Clerk/Encoder	60 person-months

B. Consultancy Services for Preparation of DPR for Hydrological Information System for the Uttarakhand State

TERMS OF REFERENCE

1. NAME OF THE IMPLEMENTING AGENCY: Uttarakhand Jal Vidyut Nigam Ltd. (A Govt. of Uttarakhand Enterprise)
2. TITLE OF THE PROJECT : Hydrological Information System for the State of Uttarakhand
3. BACKGROUND INFORMATION

Water and food are the basic necessities for the survival of living beings. Energy is another basic requirement, which is crucial for the overall development of any state/ country. Sharp growth of population and the contamination of water bodies have reduced the availability of suitable water. Further, inefficient irrigation practices compound the problem in many parts of the developing countries. Thus, sustainable and eco-friendly development of water resources is the key for satisfying the basic requirements of water, food, and energy. A necessary pre-requisite to wise water management is accurate, comprehensive and timely hydrological data along with information about the economic, social and environmental dimensions. The prime objective of this project is to develop a comprehensive, reliable, easily accessible, user-friendly, and sustainable Hydrological Information System (HIS) for the state of Uttarakhand. An HIS comprises of physical infrastructure and human resources to collect, process, store and disseminate water resources data. The overall objective of this HIS is to assist in implementing the Govt. of Uttarakhand's policies and strategies in the water sector. Article 2 of India's National Water Policy, Govt. of India (2002) stipulates: *"A well developed information system, for water related data in its entirety, at the national/state level, is a prime requisite for resource planning. A standardised national information system should be established with a network of data banks and data bases, integrating and strengthening the existing Central and State level agencies and improving the quality of data and the processing capabilities"*.

The primary role and scope of HIS is to provide reliable data for planning, design, and management of water resources and for research purposes. A good HIS should:

- be demand driven, i.e., output is tuned to the user needs,
- use standardised equipment and procedures for data collection,
- employ computerized, processed and validated databases for efficient dissemination, and
- have proper institutional support to ensure sustainability.

Unfortunately, the systems for collecting and managing water-related information in Uttarakhand are inadequate and lack reliability. Difficulties arise due to lack of funds, non-standard procedures for data collection and quality assurance, and outdated procedures of data

management and dissemination. Poor availability of comprehensive and good quality data leads to unsound design and operation of water resources projects. A comprehensive computerized hydrological-geographic database is key to efficient water management.

To bring about a qualitative and quantitative improvement upon the existing system based on manual observation and transmission in Uttaranchal, it has been proposed to setup a state-of-the-art Hydrological Information System (HIS). This will assist in gathering reliable and spatially intensive data on water quantity and transmit the information to the central control facility at Rishikesh/ Dakpathar through territorial transmission mode and storage of this data in computerized database. Special attention is to be paid to standardization of procedures for data observation and validation so that data is of acceptable quality and compatible across agencies. Infrastructure and human resources development aspects are to be attended for sustainability of the system, which should grow with developments in hydrology and allied technologies.

3. EXISTING HYDROLOGICAL INFORMATION SYSTEM IN UTTARNCHAL

Hydrological information in Uttaranchal is presently gathered by various Central and State Government's meteorological, surface water (SW), and ground water (GW) agencies. Meteorological information is provided by the India Meteorological Department (IMD) and by various state departments under the guidance and supervision of the IMD. The Central Water Commission (CWC) and the state water resources/irrigation departments provide information on SW. The Central Ground Water Board (CGWB) and the respective state GW agencies provide information on GW. The responsibility to gather water quality data lies with the Central/State Pollution Control Boards, State Public Health Engineering Departments, CWC and CGWB.

Uttaranchal Jal Vidyut Nigam Limited (UJVNL) has no system for measurement of snowfall and rainfall but depend upon the data available if required from Indian Metrological Department (IMD) and from Central Water Commission (CWC). Some of the discharge measurement sites on the rivers are managed by CWC and some are managed by irrigation department. These discharge measurement sites are maintained manually. Planning of all hydro projects depends upon the data available from C.W.C., I.M.D. or department of water resources, under ministry of water resources.

4.1 Observation networks

In order to determine the runoff from a watershed and the resulting stream runoff, precipitation is one of the primary inputs. Rainfall varies in space and time as a result of the general pattern of atmospheric circulation and local factors. Therefore, rainfall stations are one of the important entities in a HIS. Rainfall stations constitute the bulk of the hydro-meteorological network and

are mainly owned by the state departments. Unfortunately, most of the rainfall and climate stations are quite old (ranging from 20 to 100 years) and many of these have not been adequately maintained in the recent past. This had often resulted in poor quality data and gaps in series.

River gauging stations have primarily been setup to collect water level and discharge data at river and reservoir stations. At some of these stations, sediment and water quality parameters are also observed. Stations belonging

to the CWC are located on the major rivers. CWC mainly gathers data for assessing overall water resources of the country, to resolve interstate water sharing, and for flood forecasting. However, coverage of smaller rivers or tributaries of major rivers is the responsibility of states, for planning & designing water resources projects. Unfortunately, the measuring sites on these smaller rivers (tributaries) are grossly inadequate presently.

Availability of observers at the river gauging and hydro-meteorological stations had gradually declined. This, coupled with ever reducing financial support had rendered many river gauging and meteorological stations (except CWC and a few states) non-operational. The observation processes on most stations are manual though a few automatic equipments have been installed recently. The velocity measurement is mainly done by current meters at CWC stations; the use of floats has been in vogue in many places especially in smaller rivers and streams.

The assessment of GW resources in India is based on annual recharge and discharge using water balance equation. Inputs like water levels, aquifer parameters, rainfall, and evaporation are observed directly while others are estimated indirectly. Most GW observations have been at open dug wells tapping the upper unconfined aquifers. The measured water levels represent the piezometric head/water table elevation of the semi-confined/ unconfined aquifers. However, the necessary well-aquifer hydraulic connection is not always confirmed. Usually, observations are taken four times in a year: pre-monsoon, monsoon, post-monsoon, and winter season. Presumably, these represent the troughs and peaks of the water table hydrograph, but these are too sparse to yield reliable conclusions. Limited monitoring of the piezometric head of the deeper confined/leaky confined aquifers has been carried out by some agencies.

Awareness of water quality data has grown only in the last couple of decades, primarily due to deterioration of already dwindling water resources. Whereas the river gauging authorities take samples at the gauging stations, the pollution control boards take observations for surveillance near industrial or urban centers. In past, water quality labs were inadequate in numbers and capabilities. Insufficient finances have also marred operations.

4.2 Data processing and dissemination

Computers are being used for hydrological data handling for quite some time with different levels of sophistication ranging from simple ASCII based files to more user-friendly spreadsheet files and dBase databases. However, there is lack of uniformity in the formats and software in different agencies and even at different offices of same agency. There have been sporadic efforts in past to improve the data processing systems but these are not streamlined to yield objective solutions. Consequently, there have been difficulties in locating the source and getting data, all of which may not be on computer media. This unsatisfactory scenario led to the need and formulation of a plan to upgrade the existing setup.

Through the current system has been in operation for the past many years, yet, it has many limitations such as:

1. The data is communicated manually or by telephones and its performance deteriorates during bad weather conditions in monsoon when data is crucially needed.
2. The systems of gauging sites are very old.
3. The conventional system of manual data collection and communication is prone to mistakes/ errors.
4. Information from manually collected data is difficult to derive.
5. All gauges/ stations are not located scientifically as these have been generally located near population areas so as to have easy accessibility.

4.3 Catchments Description

4.3.1 Yamuna River Catchment

River Yamuna emerges from Himalaya glacier in northern part of Uttarkashi district of Uttaranchal. The Barkot barrage is situated on Yamuna river near Barkot town, which is about 100 km from Dehradun via Naugaon and Mussorrie. The total catchment area of Yamuna river at Barkot is 765 sq.km out of which 130 sq.km is snow bound.

Sl.No.	Particular	At Naugaon (sq.km)	At Barkot (sq.km.)
1.	Total catchment area	815	765
2.	Snow bound area	130	130
3.	Net catchment area	685	635

4.3.2 Ganga River Catchment

The catchment area of river Ganga at Raiwala is 22936 sq.km. out of which an area of 5968 sq.km is above the level of 4780 m i.e. snow bound area.

4.3.3 Alaknanda Catchment

River Alaknanda, which along with Bhagirathi and other tributaries constitutes river Ganga, originates in glacial regions of Himalayas in the extreme northern parts of district Chamoli of Uttaranchal. The catchment area of river Alaknanda at Bowala is 5590 sq.km. out of which 2890 sq.km. is snow bound.

4.3.4 Bhagirathi Catchment

River Bhagirathi meets Alaknanda, another major tributary, at Dev Prayag to form river Ganga. River Bhagirathi originates in glacial region of Himalayas in the extreme northern part of district Uttarkashi of Uttaranchal. The catchment area of river Bhagirathi at Maneri and Pala are given below:

Sl.No	Particular	At Naugaon (sq.km)	At Barkot (sq.km.)
1.	Total catchment area	4071	3667
2.	Snow bound area (above EL 4900 m)	1891	1865
3.	Net catchment area (below EL 4900 m)	2180	1802

4.3.5 Tons Catchment

The Tons river which emerges from Bandar Poonch glacier is the largest sub tributary of river Yamuna. A barrage is proposed near village Hanol on tons river about 15 km U/S of village Tuini, which is about 185 km from Dehradun. The total catchment area of river Tons at Hanol is 1840 sq.km out of which 172 sq.km is snow bound. The catchment area at Tuini and Hanol is tabulated as below:

Sl.No.	Particulars	At Tuini (sq.km)	At Hanol (sq.km.)
1.	Total catchment area	3320	1840
2.	Snow bound area	962	172
3.	Net catchment area	2358	1668

List of Discharge measuring stations of CWC in Uttaranchal State are:

Sl.No.	River	Discharge measurement stations
1.	Alaknanda	Badrinath, Joshimath, Karanprayag, Rudraprayag, Sri Nagar
2.	Pinder	Nand Keshari, Karanprayag
3.	Mandakini	Chandrapuri, Rudraprayag

4.	Nayar	Maror / Satpuli
5.	Song	Satyanarayan
6.	Ganga	Devprayag, Rishikesh, Haridwar
7.	Bhilangana	Ghuttu
8.	Bhagirathi	Uttar Kashi, Tehri, Devprayag
9.	Dauliganga/Kaliganga	Tawa Ghat,Dharchula,Ghat
10.	Gauri Ganga	Jauljibi
11.	Ramganga	Thal
12.	Sarju	Bagheswar
13.	Sharda	Pancheswar, Banbasa, Paryakalan,Rameshwar,Purangiri,Rupaligarh

There are twenty nine Gauge and Discharge (G&D) sites are available in Uttaranchal state, out which 25 G&D sites are maintained by Central Water Commission (CWC) and 4 G&D sites are maintained by State government.

The most striking hydrological features of the above catchments is that inflows in all the rivers are due to snow melt as well as rainfall. As such the knowledge of snow accumulation and snow melt as well as the quantum of rainfall in the catchments area is very essential for predicting run-off in the rivers. The optimum water uses of all the rivers can best be achieved by forecasting the supplies likely to be available from the snow-melt and rainfall.

A key parameter in flood forecasting activity is the travel time required for the rain generated water to travel from one part of the area where the rainfall has occurred to the other area lying on the same major river. In addition the flow contributed through rains over the catchments area lying between the site of interest and the remote catchment area is to be estimated and accounted for the river channels in a basin form a network which collects and increase flow in the main river as the flow progress towards the down stream. A flood forecasting network is to make the data of observation at key hydro-metrological sites located over as a wide geographic area available to the central station with a minimum delay so that flood forecast would be formulated. With the advance warning, the operation of the major / minor reservoirs is controlled and also the local authorities take up a chain of activity towards protection of property and relief and rehabilitation if any required.

5. SCOPE OF HYDROLOGICAL INFORMATION SYSTEM

Scope of the project is envisaged as:

- Installation of telemetry system in the catchments of Yamuna, Bhagirathi, Alknanda, Tons and other tributaries of these rivers for improvement of water management through effective early flood warning system.
- The real time observation of data is proposed to be made through automatic sensors and communicated through satellite based data communication system. The main features of the scheme would be to have the following inputs on real time basis.

- Discharge in river Yamuna, Bhagirathi, Alkananda, Tons and other tributaries of these rivers such as Mandakini, Nandakani, Pinds, Vishnu Ganga etc.
 - Rainfall and corresponding runoff in the catchments of these rivers.
 - Snowfall and corresponding run-off.
 - Atmospheric temperature in the catchments.
 - Relative Humidity.
 - Wind Velocity (speed and direction).
- Estimation and forecasting of rainfall and snowfall and corresponding run-off.
 - Installation of state of the art automatic electronics gauge recorders at various gauge discharge sites on rivers / channels along with real time data communication system.
 - Setting up a Central Control room at Rishikesh/ Dakpather for real time LCD display of observed data of catchments, dams and various rivers / channels.
 - Consultant may advise for setting up of Laboratory facility for conducting petrographic analysis at different places e,g, Yamuna Valley, Ganga Valley, Bhagirathi, Dhauliganga, Sarda, Ramganga etc.

The new HIS is conceptualized through the following steps:

5.1 Review of observational networks

Existing observational network is to be thoroughly reviewed from three view points:

- (a) to open new stations in the areas that have been inadequately covered earlier or to replace non-representative stations with dedicated sites,
- (b) to avoid duplication of stations across agencies, and
- (c) to improve frequency and accuracy of observations through automated equipment and standard procedures.

The old and defunct equipments have to be replaced with the state-of-the-art ones. Comprehensive list of equipments to be employed for data observation and detailed specifications for each of these is to be drawn so as to reduce variability in observations at different locations and by different agencies.

5.2 Hydro-meteorological and surface water monitoring network

An effective hydro-meteorological network is to be established. New full climatic stations are to be established, their locations are to be identified and scheme of interconnectivity is to be proposed. The river gauging stations have to be identified and the equipments along with specifications and their manufacturers are to be suggested. In those rivers where dams are there the water passing over spillway as well as through tunnel/penstock to the hydro turbine should be monitored automatically and summed up for arriving at river discharge at those

locations. In small streams where normal flood discharge is less there shall be at least one measuring site on the diversion weir- of one of the hydropower stations even if there are more than one small hydropower stations installed in cascade. For such small streams, the location for measurement of discharge passing over the diversion weir shall be decided by the consultant. Most reservoir locations are to be provided with automatic water level recording. At few locations, sophisticated techniques of discharge measurements like Acoustic Doppler Current Profilers (ADCPs) can be suggested where gauging with conventional means is extremely difficult. Modern technology for reservoir sedimentation surveying is to be suggested.

5.3 Ground water monitoring network

The objective of GW network is to provide improved understanding of quantity and quality of GW systems. Under the project, the network is to be strengthened by adding piezometers. These are purpose-built, non-pumping observation wells that facilitate measurement of vertically averaged piezometric head of a selected single layer. These can also be used to take samples for water quality monitoring. The network is to be optimized by integrating piezometers of different agencies. The improved network is to be designed to get a good spatial and vertical coverage, representation of all the hydro-geological setups, considering the present and projected status of GW development and water quality variations.

5.4 Water quality monitoring and analysis network

Extensive network for monitoring of SW quality as per guidelines of the World Health Organization is to be established. Frequency of sampling and water quality parameters to be analyzed for each category of stations have to be defined and documented. A comprehensive water quality laboratory development programme is to be suggested for establishing or upgrading existing laboratories under three categories: Level I, Level II, and Level II+. Level I labs to cover 6 parameters (colour, temperature, pH, dissolved oxygen, conductivity and turbidity) at the sampling site. Other parameters can be analyzed at Level II or Level II+ labs. There should be sufficient Level II labs for analysis of physico-chemical and microbiological parameters and Level II+ labs for an additional analysis of heavy metals and pesticides. List of instruments for these labs are to be suggested.

5.5 Data processing, analysis and reporting

The existing system of manual or limited computerised data processing is to be replaced by fully computerised data processing using dedicated and user-friendly software. The raw data is in a variety of formats such as hand-written records, charts and digital records and contained gaps and inconsistencies. These are passed through a series of operations, typically: data entry, validation, filling-in gaps, processing to estimate derived variables, compilation in different

forms, and commonly required statistics etc. Of particular importance is assuring the quality and reliability of the data through a variety of validation procedures. Reports are to be prepared to bring out the salient characteristics of the hydrological regime of the region. Keeping this in mind, uniform hydrological data processing software may be needed for all hydro-meteorological, SW quantity and quality data processing and a comprehensive GW data processing and resource estimation purposes.

Another important activity of this project is digitization of various themes (e.g. river drainage system, contours, geological setup, administrative units, etc.) on 1:50,000 scale for the whole state. A detailed report is to be prepared in this regard.

5.6 Management of historical data

A huge volume of historical data, mostly in manuscript or chart forms, was available with many agencies. Some of this was even being lost due to gradual decay of manuscripts. Often data are of variable or “unknown” quality since in many cases the recorded data was seldom scrutinised. For each agency having such data, a comprehensive program of historical data entry and processing is to be formulated.

5.7 Data storage and dissemination

All historical and current data is to be stored in well-defined computerised databases using industry standard SQL databases. An efficient query system aided with graphical visualisation on the maps for identifying the required data is to be provided.

5.8 Development of Decision Support System

In order to promote merital use of data generated under this project and to support decision making in water resources planning and operational policies, DSS consisting of information system linked to appropriate models is desired to be developed. The DSS to be developed under this project should fall into 2 types. i.e.

- (i) DSS for water resource planning.
- (ii) DSS for real time forecasting, planning of new projects, and management (including special purposes like that of maximizing power generation from existing projects).

The DSS activities are to be supported through the provision of appropriate consultant(s), equipments, associated civil works, software & data development, training and incremental operating costs. Real time DSS for flood management and advanced operations is to be used to support operational decisions required for daily or shorter time interval. Such decisions relate to the scheduling of reserve release to hydropower turbines, the operation of spillway gates, and the issue of flood warning, etc. Real time DSS require sophisticated data acquisition system and modeling technologies as well as technical support staff with advanced and specialized training.

The propose of real time DSS is to accumulate the necessary experience for a more targeted, sustainable and cost effective DSS implementation in Uttaranchal Jal Vidyut Nigam.

5.9 Control Monitoring Station / Central Control Room

All the data of catchments and river / channel down stream of dams is proposed to be displayed in a Central Control Room to be located at Rishikesh / Dakpathar. This will require communication network from all observation points for real time transmission and display in the control room.

5.10 Proposed Telemetry System

The key components of the proposed telemetry system are proposed as below:

(i) Sensors

The Sensors (Transducers) for measuring rainfall, snowfall temperature and humidity will be installed at different sites. Water level sensors will be installed in the reservoirs and channels. The most striking hydrological feature is inflow at Yamuna, Bhagirathi, Alaknanda Tons and other major rivers. As such the key parameter is the measurement of discharges in rivers, sensors for which form a most important components.

(ii) Data Collection Platforms (DCP)

Each of the sites shall be provided with a computerized data logger (Remote Terminal Unit (RTU) which shall collect the data from individual sensors at a user selected frequency and hold the data into its hardware till such time that the same is not downloaded by Central Monitoring Station through the Telemetry. The data logger shall also receive the data through manual input from its key pad. The data logger shall have a least 10-digital / Analogue input / output, built in transmitter and shall be compatible with the sensors. In the event of transmitter break down, the data shall remain stored in the logger's memory till the equipment is restored. In case the data logger does not have a built in transmitter, then the external transmitter compatible with the system shall have to be provided. The frequency of data collection throughout the year (monsoon and non-monsoon period) shall be 1 hour.

(iii) Central Monitoring Station (CMS)

The Central Monitoring Station at Rishikesh / Dakpathar shall form the Central and most important node in the hierarchy. The Direct Digital Readout Ground Station (DDRGS) will be used to receive data from DCP and transmit to it the CMS. The CMS shall collect the Data from each of DCP through the

telemetry system. The data shall be further checked with regards to correlation and other Statistical checks on inter DCP data sets. The real time data shall be checked for completeness and accuracy especially the data which is entered manually.

(iv) Regional Control Centre (RCC)

The Regional Control Centers at Rishikesh / Dakpathar shall receive partial data from CMS for those sites which fall under its jurisdiction for validation and Management. The data exchange shall take place through VSAT link between CMS and RCC. The RCC shall have the capability to perform remote log in on the CMS Server through VSAT link. Through the voice link over VSAT, RCC can be instructed by CMS to carry any urgent running and maintenance work at any of the DCP for ensuring proper functioning of DCP. In addition, the RCC shall also act as a dissemination node mainly for the forecast received from CMS and communicate the same to concerned state Government authorities. Subsequently, remote station will be established in other catchment areas / upper reaches. However, the central Monitoring station shall be capable transmitting the relevant partial data and perform all functions for these stations.

(v) Computer Hardware and Peripherals

A local area network of computers (LAN) will be established at a central monitoring station at Rishikesh / Dakpathar. The LAN will be used for data processing, storage, archiving, retrieval and report generation. A similar LAN will be provided at regional control centre at Rishikesh / Dakpathar. The LAN at RCC will be used for dissemination of hydro metrological information received from CMS to various offices concerned.

(vi) System Software

The LANs as described above will have windows NT operating system / any suitable system. In addition, other general purpose software such as package for word processing and spread sheet, E-mail and anti-virus etc. will also be provided.

(vii) Auxiliary Equipment

Each of the computer centers will have power conditioning equipment such as isolation transformer, servo stabilizer, uninterrupt power supply etc. for the smooth and efficient functioning of the computers.

(viii) VSAT Equipment

VSAT terminal equipment comprising antenna, outdoor units, inter facility link, indoor unit etc. will be provided at CMS and RCCs. The VSAT communication will be used for the dedicated data and voice / fax link between the centers.

(ix) EPAX

For voice / fax communication between CMS and RCCs, electronic private automatic exchange with adequate capacity will be installed at Rishikesh / Dakpathar.

Note : The above guidelines are general in nature, and the art, technology and methodology may change at later stage to serve the intended purposes more effectively.

5.11 Sustainability of Hydrological Information System (HIS)

The proposed HIS should be sustainable.

6. DESCRIPTION OF THE ASSIGNMENT

The consultancy assignment under this project shall broadly cover the following aspects :

1. Preparation of detailed project report including the design for a hydro-meteorological monitoring and telemetry system, which will support overall hydropower generation operation and management for the Uttaranchal Jal Vidyut Nigam.
 The monitoring system is proposed to be installed in the catchments of Yamuna, Bhagirathi, Alaknanda, Tons, and other tributaries of these rivers for improvement of water management through effective early flood warning system. The real time observation of data is proposed to be made through automatic sensors and communicated through satellite based communication system. The main features of the scheme would be to have the following inputs on real time basis :
 - (i) Discharge in river Yamuna, Bhagirathi, Alaknanda, Tons, and other tributaries of these rivers such as Mandakini, Nandakini, Pinds, Vishnu Ganga, etc.
 - (ii) Rainfall and corresponding runoff in the catchments of these rivers.
 - (iii) Snowfall and corresponding run-off.
 - (iv) Atmospheric temperature in the catchments.
 - (v) Relative humidity.
 - (vi) Wind velocity (speed and direction).
 - (vii) Estimation and forecasting of rainfall and snowfall and corresponding run-off.
 - (viii) Installation of state of art automatic electronic gauge recorders and various gauge discharge sites on river/ channels along with real time data communication system.
 - (ix) Measurement of silt concentration at automated discharge gauging sites.
 - (x) Setting up a Central Control room at Rishikesh/ Dakpathar for real time LCD display of observed data of catchments, dams and various rivers/ channels.
2. Preparation of technical specifications and bid documents for a turnkey contract package to design, manufacture, supply at the place of installation, erection and commissioning of the above system.
3. Assisting Uttaranchal Jal Vidyut Nigam in Techno-Commercial Evaluation of the Tenders received against serial no. 2.
4. Providing consultancy to Uttaranchal Jal Vidyut Nigam during the execution of the project by the Contractor to be hired later on as regards adequacy, technical

suitability and conformity with the specification envisaged in the tender specifications and general technical particulars submitted by

the successful bidders. Financial proposal against this item of work may be indicated by the consultant as

an optional item.

5. Providing services for capacity building in Uttaranchal Jal Vidyut Nigam by organizing short term training workshops.
6. On job training to executives of UJVNL for all the activities through continuous involvement of their experts for effective transfer of know- how.
7. Development and Implementation of a training program for minimum 120 working days to transfer knowledge on design, installation, operation and maintenance of hydrometeorological system for which consultancy services are being provided.

7. INSTITUTIONAL ARRANGEMENTS

The consultant shall provide the following in his proposal:

- (i) The Executing Agency (Uttaranchal Jal Vidyut Nigam Ltd.) shall provide necessary help in obtaining permissions for acquisition of topographical sheets and remote sensing satellite imagery if required. However, the consultant shall provide necessary undertaking that these data made available to them shall not be disclosed to any third party under any circumstances.
- (ii) The consultant will suggest in his proposal the organizational set-up in the Uttaranchal Jal Vidyut Nigam for effective execution and management of this project.

8. TIMING, DURATION AND PHASING

- (i) Project duration is 12 months. The time for preparation of the DPR shall be six months time from the date of award of contract. Another 6 months will be given for finalisation of tender documents.
- (ii) The consultant shall submit the inception report in four weeks from the date of award of contract.
- (iii) The consultant shall submit the draft of the DPR in four months from the date of award of the contract.
- (iv) The UJVNL (EA) shall hold a workshop after 15 days of the receipt of Draft DPR inviting the consultant and such other experts that they considered fit to discuss the provisions in the draft DPR.

The consultant shall revise the draft DPR on the basis of the recommendations of the workshop and submit the final DPR within one month thereafter.

Details of Terms of reference for individuals consultants to be engaged for Hydrology Project

9.1 Domestic Experts:

(i) Hydrologist: The Consultant should have Masters in Engineering/ Equivalent of having at least 10 years of experience in hydrology related projects and development of two projects preferable in hilly areas.

(ii) Civil Engineer: The consultant should have at least Master's Degree/Equivalent in Structure related to Dams and Trench Weirs having minimum 10 years of experience and installation of 3 projects preferable in hilly areas.

(iii) Instrumentation Engineer: Must have five years of experience in instrumentation and control for hydropower including experience in SCADA systems. Installation of similar systems in two projects in hilly areas will be preferred.

(iv) Communication Engineer: The Consultant should have at least five years of experience in implementation of communication system in hydropower and other similar projects.

(i) Computer and Network Engineer : He/ She should have a Master's Degree in Computer Science and must have at least five years of networking for hydrology related projects.

(ii) Meteorologist: The consultant must have advanced degree in Meteorology with experience of at least five years of establishing any hydrology system.

(iii) Project Management specialist (Team leader): The consultant must have Engineering Degree in Civil/Electrical/Mechanical and have prior experience of projects for establishing hydrology in river basins.

9.2 International Experts:

i. **Hydrologist:** The consultant must have international experience on working for four similar projects.

ii. **Communications, Computer and Networking Specialist:** The specialist should have experience of setting up four similar projects.

10. STAFFING REQUIREMENT

10.1 Technical Consultants :

10.1.1 National

S No.	Description of Specialist	No. and expected duration	Total person-months
1.	Hydrologists	2 No. @ 6 person-months	12

2.	Civil Engineers	2 No. @ 6 person-months	12
3.	Instrumentation Engineers	2 No. @ 6 person-months	12
4.	Communication Engineer	2 No. @ 6 person-months	12
5.	Computer & Network Engineer	2 No. @ 6 person-months	12
6.	Meteorologists	1 No. @ 6 person-months	6
7.	Project Management specialist (Team leader)	1 No. @ 12 person-months	12
Total			78 person-months

10.1.2 International

S No.	Description of Specialist	No. and expected duration	Total person-months
1.	Hydrologists	2 No. @ 1 person-months	2
2.	Computer & Network	2 No. @ 1 person-months	2
Total			4 person-months

11. REPORTS

The consultant shall submit the following reports:

- i. Inception report
- ii. Monthly progress report
- iii. Draft DPR
- iv. Final DPR and tender specification and bid documents.
- v.

11.1 The specification for each of these reports shall be as under:

- (i) The language of the report shall be English.
- (ii) The report shall be typed on A-4 size with appropriate headers and footers to indicate the title of the report, the name of the Executing Agency and the Consultant.
- (iii) The inception report shall be submitted in six copies.
- (iv) The monthly progress report shall be submitted in six copies.
- (v) The draft DPR shall be submitted in 12 copies alongwith a Soft Copy.
- (vi) The final DPR and the tender documents shall be submitted in 20 copies alongwith a Soft Copy. The DPR and tender documents shall be bound separately.
- (vii) All the above reports shall be printed on one side only.
- (viii) The copy right of all the reports shall vest in the Executing Agency i.e. UJVNL.

The inception report shall include the detailed work programme and any major inconsistencies in the TOR, staffing problems or deficiencies in EA's assistance.

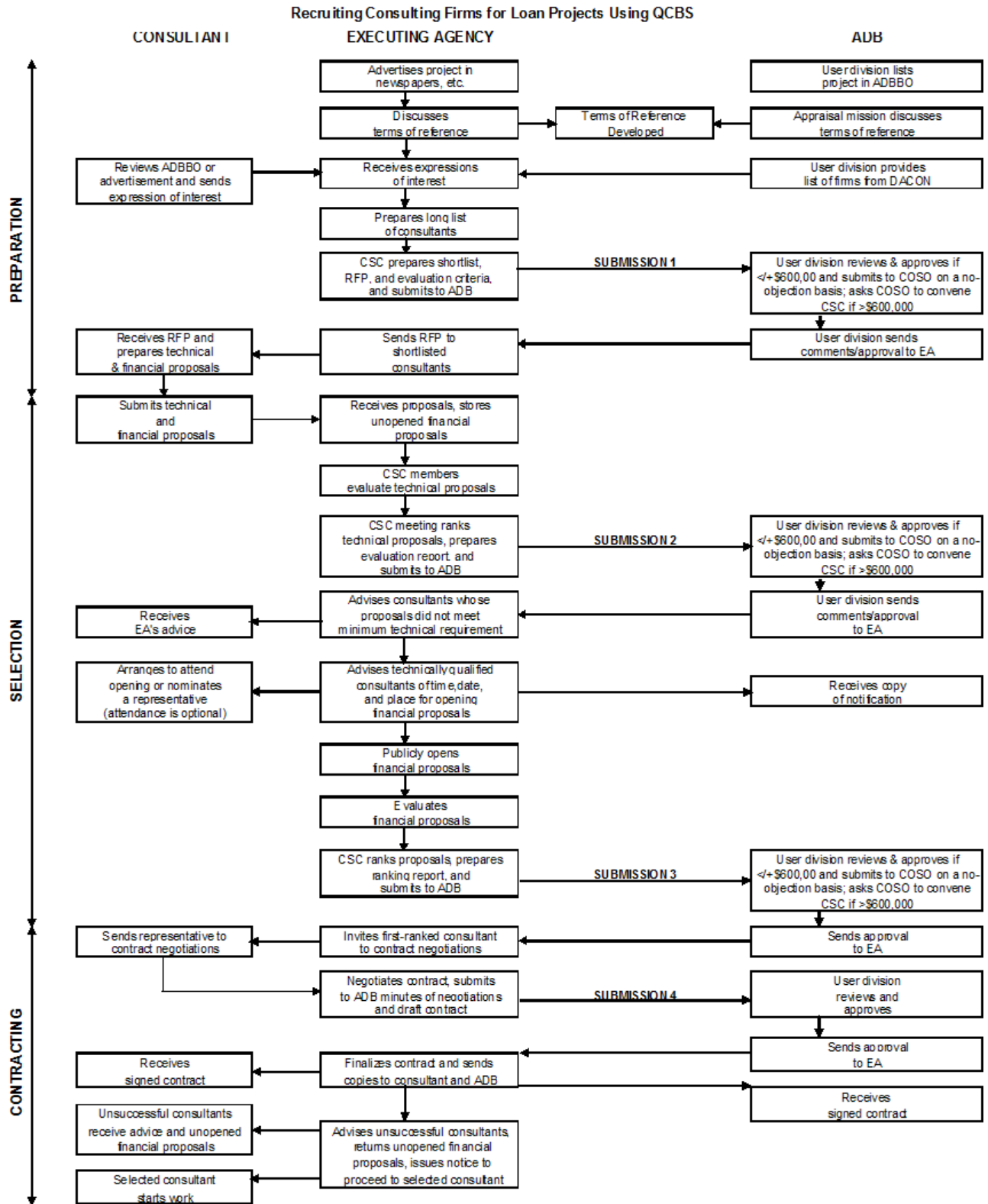
12. COMPLIANCE WITH NORMS OF THE FUNDING AGENCY

The consultants have to fulfill the norms of the Asian Development Bank so far as it relates to engagement of consultants. The following ADB guidelines are enclosed for ready reference (Annexure – I):

- Section 1 - Letter of Invitation
- Section 2 - Instructions to Consultants
 - Including Data Sheet and
 - Evaluation Criteria
- Section 3 - Technical Proposal Standard Forms
- Section 4 - Financial Proposal Standard Forms
- Section 5 - Terms of Reference
- Section 6 - Standard Form of Contract
- Section 7 - List of ADB Member Countries

Appendix 3

Consulting Services Selection by EA using QCBS



Appendix 4

DETAILED COST ESTIMATE BY EXPENDITURE CATEGORY

(\$ million)

	Total Cost	Base Cost (%)
A. Investment Costs		
Clean Energy Development		
Component A: New Small Hydropower Plants^a		
1. Kaldigad (9MW, Kaldigad River, Uttarkashi District)	9.62	2.81
2. Kaliganga-I (4MW, Kaliganga River, Rudraprayag District)	4.40	1.28
3. Kaliganga-II (6MW, Kaliganga River, Rudraprayag District)	6.83	1.99
4. Madhyamaheswar (10MW, Kaliganga River, Rudraprayag District)	13.00	3.79
	35.00	10.20
Component B: Renovation, Modernization, and Upgrade		
1. Pathri (20.4MW, commissioned in 1955)	12.90	3.76
2. Mohammadpur (9.3MW, commissioned in 1951)	6.10	1.78
	19.00	5.54
Component C: Hydrological Improvement		
1. Hydrological Information Systems	6.90	2.01
2. Consulting Services	0.90	0.26
	7.80	2.27
Component D: Environment Management Plan	0.20	0.06
Subtotal	62.00	18.07
Taxes and Duties	7.00	2.04
Base Costs excluding Taxes and Duties	55.00	16.03
Transmission Expansion		
Component A: Transmission Lines^b		
1. 400kV Lohari Nagpala – Koteshwar	37.15	10.83
2. LILO of 400kV Lohari Nagpala – Koteshwar at Pala Maneri	3.60	1.05
3. 400kV Srinagar PH – Srinagar s/s	2.60	0.76
4. 400kV Lata Tapovan – Kuwaripass	4.30	1.25
5. 400kV Srinagar – Kuwaripass	41.40	12.07
6. 400kV Srinagar – Kashipur	38.00	11.08
7. 220kV Roorkee – Roorkee	3.16	0.92
8. 132kV Lata Tapovan – Kuwaripass	3.69	1.08
	133.90	39.04
Component B: Substations^c		
1. Kuwari Pass 400/132 kV S/S	33.50	9.77
2. Srinagar 400/132kV S/S	15.50	4.52
3. Kashipur 400kV S/S	1.10	0.32
	50.10	14.61
Component C: Environment Management Plan Candidate Subprojects	3.00	0.87
Subtotal	87.00	25.36
Taxes and Duties	26.00	7.58
Base Costs excluding Taxes and Duties	248.00	72.30
Capacity Building		
1. Training/Human Resource Development	1.85	0.54
2. Information Technology (Hardware and software)	0.15	0.04
3. Consulting Services for Design and Planning	2.60	0.76
3. Field Supervision (including safeguards monitoring)	1.10	0.32
3. Corporate Development	1.30	0.38
Subtotal	7.00	2.04
Total Base Cost	343.00	100.00
B. Contingencies		
1. Physical ^d	30.00	8.75
2. Price ^e	25.00	7.29
Subtotal (B)	55.00	16.04
C. Financial Charges During Implementation^f		
1. Interest During Construction (not financed by ADB loan funds)	39.00	11.37
Subtotal (C)	39.00	11.37
Total Project Cost Including Candidate Projects	437.00	127.41

^a These costs include land acquisition and resettlement compensation costs of \$0.19 million in local currency.

^b These costs include local currency cost of \$0.82 million for land and resettlement compensation.

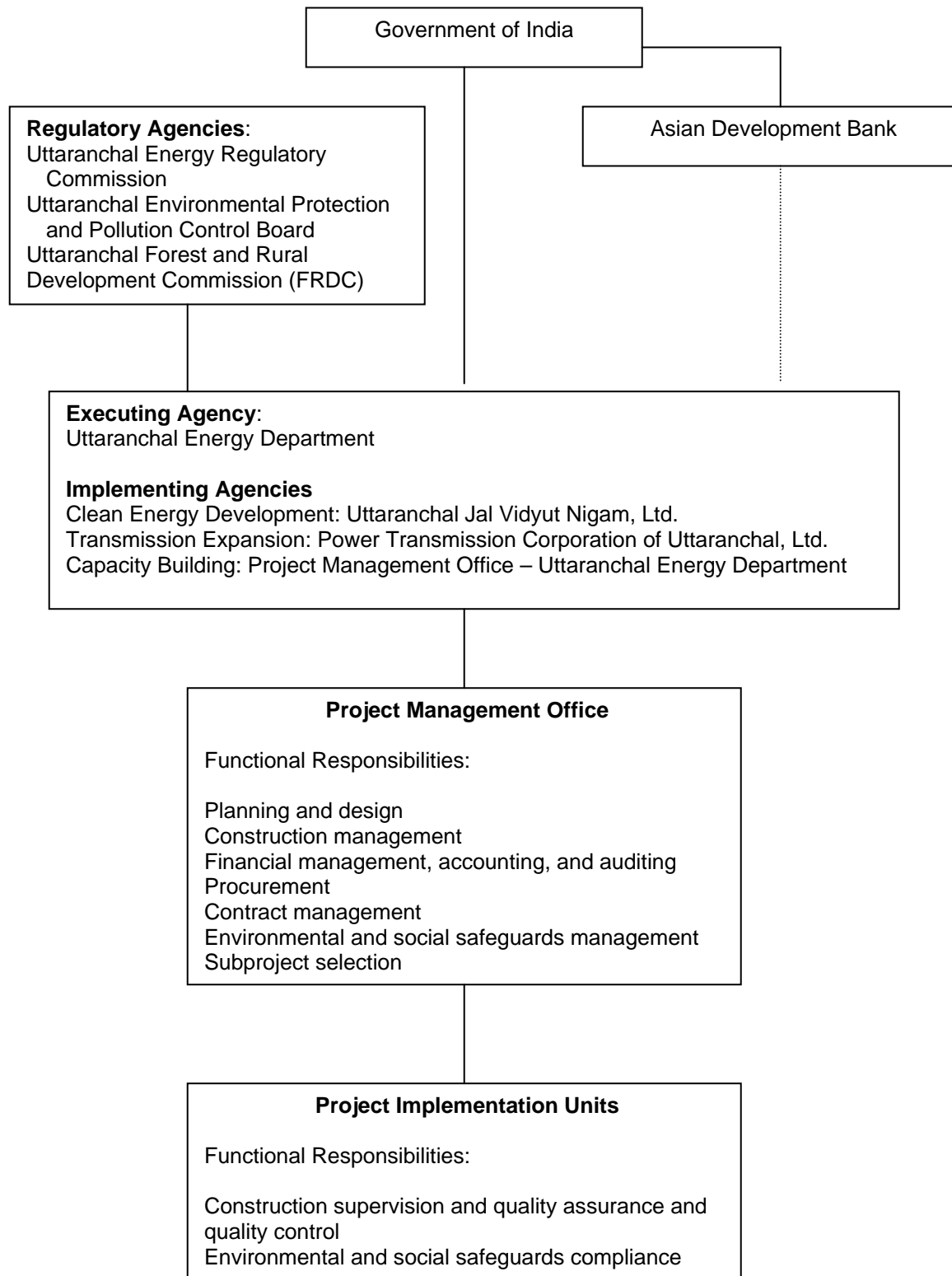
^c Local currency cost of \$3.6 million for land acquisition and resettlement costs is included in the base costs.

^d Physical contingencies include 10% provision on base costs.

^e International cost escalation factors and domestic escalation factors for 2005-2009 are used to estimate price contingencies. Foreign inflation of 2% and domestic inflation of 4.8% are applied for years beyond 2009.

^f ADB loans will finance up to 70% of total project costs, exclusive of interest during construction:

ORGANIZATION CHART FOR IMPLEMENTATION



Appendix 6

IMPLEMENTATION SCHEDULE

Subproject name	2006												2007												2008												2009												2010																																																											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12																																																
Clean Energy Development																																																																																																												
1. New Plants																																																																																																												
- Kaliganga-I SHP	PQ												TF												CA												C																																																																							
- Kaliganga-II SHP	PQ												TF												CA												C																																																																							
-Madhyamaheswar SHP	PQ												TF												CA												C																																																																							
- Kaldigad SHP	PQ												TF												CA												C																																																																							
2. Modernization and Upgrading																																																																																																												
- Mohammadpur Power Station	PQ												TF												CA												C																																																																							
- Pathri Power Station	PQ												TF												CA												C																																																																							
3. Hydrological Information System																																																																																																												
- Consulting Services	TF												CA												C																																																																																			
- System installation																									TF												CA												C																																																											
Transmission System																																																																																																												
Core Subprojects																																																																																																												
1. Bhagirathi Basin																																																																																																												
- 400 kV D. C. Loharinagpala-Koteshwar Transmission line & LILO at Pala Maneri													TF												CA												DA												CS												CE												C																																			
- 220 kV D.C. line Roorkee 400 kV-Roorkee 220 kV line																																																																																																												
2. Alaknanda Basin																																																																																																												
- 400 kV D.C. Kuwari Pass - Srinagar line													TF												CA												DA												CS												CE												C																																			
- 400 kV D.C. Tapovan-Vishnugad-Kuwari Pass line																																																																																																												
- 132 kV D.C. Lata Tapovan- Kuwari Pass line																																																																																																												
- 400 kV D.C. Srinagar 400 kV S/s-Srinagar Power House (HEP)																																																																																																												
3. 400 kV S.C. Srinagar-Kashipur line													TF												CA												DA												CS												CE												C																																			
4. 400 kV S/s Kuwari Pass																									TF												CA												DA												CS												CE												C																							
5. 400 kV S/s Srinagar																									TF												CA												DA												CS												CE												C																							
- 400 kV Srinagar bay at 400 kV S/s Kashipur																																																																																																												
Capacity Building																																																																																																												
1. Project Management Office / Project Implementation Unit - Consulting Services	TF												CA												C																																																																																			

C = commissioning; CA = contract award; CE = commencement of erection; CS = commencement of supply; DA = drawing approval; kV = kilovolt; LILO = Line in/line out; PQ = Invitation for Prequalification; P/S = power station; SHP = small hydropower plant; S/S = substation; TF = tender float

INDICATIVE PROCUREMENT PACKAGES (Tranche 1)

Package No.	Contract Type	Procurement Mode	Estimated Value (\$ million)
A. New Small Hydropower Plants			
1. Madhyamaheshwar Hydropower Plant			
Power plant equipment and associated civil works, 33 kV transmission system	Turnkey	International competitive bidding	7.87
2. Kaliganga-I Small Hydropower Plant			
Power plant equipment and associated civil works, 33 kV transmission system	Turnkey	International competitive bidding	3.35
3. Kaliganga-II Small Hydropower Plant			
Diversion weir, power channel, tunnel, power house building, etc.	Civil works	Local competitive bidding	3.39
Power plant and 33 kV transmission system	S + E + C	International competitive bidding	1.72
4. Kaldigad Small Hydropower Plant			
Diversion weir, power channel, tunnel, power house building, etc.	Civil works	Local competitive bidding	4.01
Power plant and 33 kV transmission system	S + E + C	International competitive bidding	2.49
B. Modernization and Upgrading			
1. Modernization and Upgrading of Pathri Power Station			
Power plant equipment and associated civil works	Turnkey	International competitive bidding	11.78
2. Modernization and Upgrading of Mohammadpur Power Station			
Power plant equipment and associated civil works	Turnkey	International competitive bidding	5.49
C. Hydrological Information System			
Consulting services		Quality- and cost-based selection	0.98
Hardware and software	Turnkey	International competitive bidding	7.16

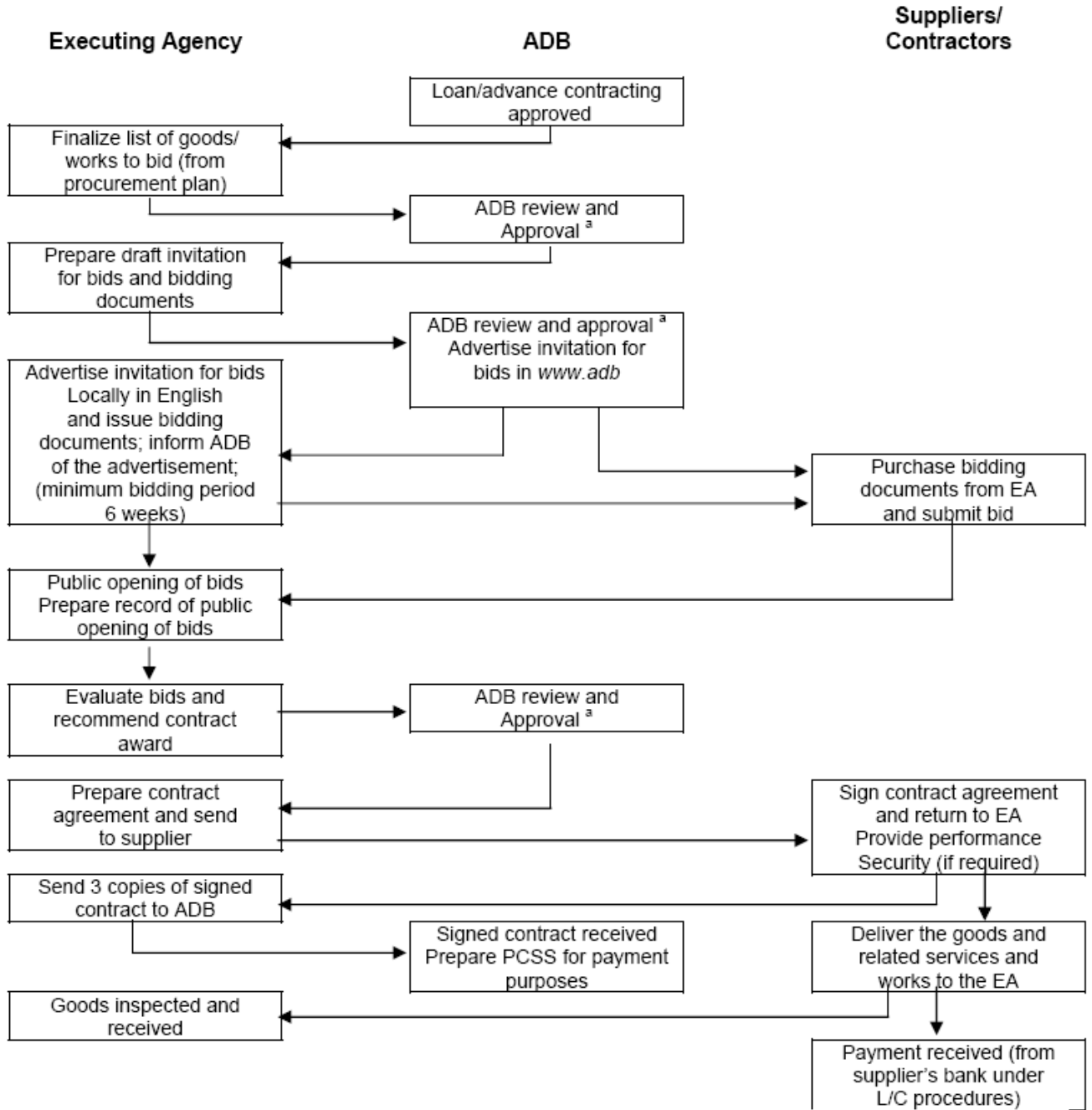
kV = kilovolt; S+E+C = Supply, Erection, and Commissioning.

Note: \$1 = Rs43.

Source: Uttaranchal Jal Vidyut Nigam Limited

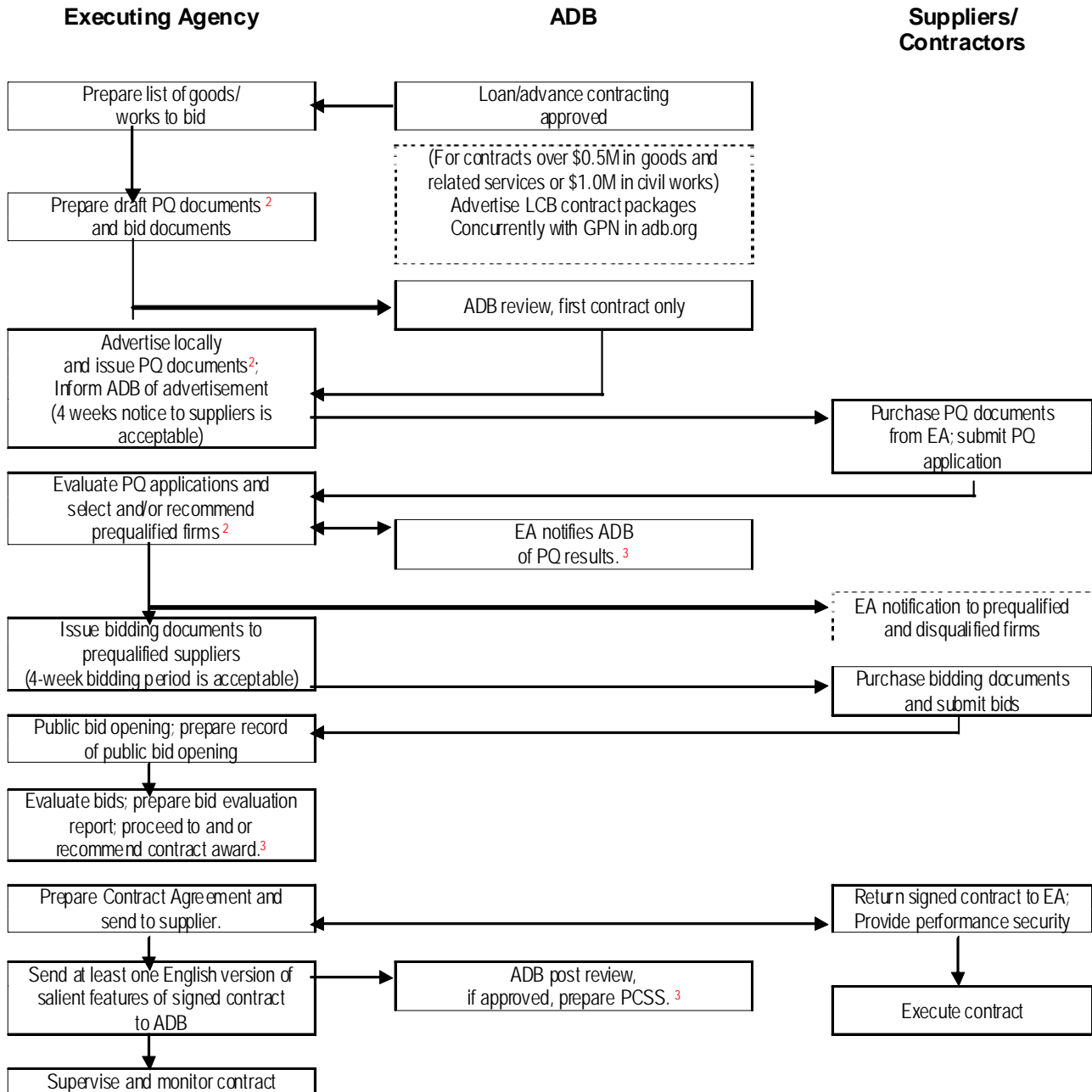
Indicative Flowchart of Procurement under International Competitive Bidding

Procurement under International Competitive Bidding
(with no prequalification)



Indicative Flowchart of Procurement under National Competitive Bidding¹

Procurement under National Competitive Bidding¹



¹ While NCB procedures are not required to be identical with ADB's ICB procedures, they must reflect the underlying principles and not contravene ADB's *Procurement Guidelines*.

² Prequalification is discouraged for NCB. DMCs may have a register of suppliers. The processing mission should ensure that the registration system is acceptable to ADB (e.g., it reflects the underlying principles of ADB's *Procurement Guidelines*); and where acceptable, a PQ may not be required.

³ If the prequalification or procurement requires prior consideration of the procurement committee, in accordance with PAI 3.11, the EA must be advised not to notify prequalified firms or award contract prior to the committee's deliberations and subsequent ADB approval.

FINANCIAL PERFORMANCE AND PROJECTIONS

A. Financial Management Issues

1. The financial management of Uttaranchal Jal Vidyut Nigam, Limited (UJVNL) and the Power Transmission Corporation of Uttaranchal, Limited (PTCUL) was reviewed and found to be adequate. Progress on strengthening corporate governance and financial management is under way: an independent audit committee, external directors, and open recruitment of managers and other staff and other human resources policies are being actively undertaken. As the newer organization, PTCUL is still in the early stages of establishing its human resource processes and management systems. Both companies are excessively reliant on deputed¹⁵ staff and need to strengthen their human resource programs and finalize their long-term staffing plans. Another issue common to both entities is the need to identify and value the assets that were allocated to the companies during the unbundling process. PTCUL in particular was allocated a large inventory of spare parts and materials and accounts receivable of indeterminate value. The companies' sponsors need to accept some write-off of obsolete stock and uncollectible receivables so that financial reports can be finalized.

2. The 1956 Companies Act, the Income Tax Act, and the 2003 Electricity Act govern accounting and reporting requirements for both companies. Financial reporting is conducted on an accrual basis, with financial statements prepared in accordance with accounting standards issued each year by the Institute of Chartered Accountant of India. Proper accounting policies and procedures are in place for UJVNL and PTCUL, but reporting is slow and needs to be improved, for example, UJVNL's latest audited financial statements are for FY2002. Both companies have failed to meet deadlines for regulatory submissions. The adoption of computerized accounting and management information systems under the MFF would help overcome the current slow and inefficient flow of information.

3. Internal auditors for both UJVNL and PTCUL report to their respective directors of finance, which reduces the internal auditors' independence and threatens the integrity and creditability of their functions. A more independent and autonomous internal audit department is recommended, with auditors reporting directly to their respective boards of directors rather than to the managers of the firms' finances.

4. UJVNL is able to obtain some funding from various state and central government schemes, for example, financing under the Accelerated Generation and Supply Program and equity infusions from the state government. Given its large capital expenditure plan and the current interest in hydropower, UJVNL could conceivably tap private sources of funds to help finance its investment program. However, vigilance is required to ensure that the company's capital investments are technically sound and commercially viable. In some cases, technical and financial evaluations are outsourced to external agencies to ensure high standards of investment evaluation. To strengthen its future corporate strategy and vision, UJVNL is in the process of finalizing the selection of external consultants to help develop a comprehensive business plan and sound financial risk management policies and practices.

¹⁵ Deputed staff are those employees "on loan" from other organizations, but whose salaries are paid by the "borrowing" company.

B. Uttaranchal Jal Vidyut Nigam Limited

1. Financial Performance

5. UJVNL was formed in 2001, shortly after the creation of the state of Uttaranchal. UJVNL was created by separating the assets of Uttar Pradesh Jal Vidyut Nigam, Limited based on location. As a result, UJVNL received 9 large and medium hydropower plants, 9 small hydropower plants, and 23 microhydro stations with total capacity of 1,130.00 megawatts (MW), of which 1,005MW are operated by UJVNL, 5MW by an independent power producer, and the balance of 120MW by the National Hydroelectric Power Corporation, Limited.

6. UJVNL is in the process of initiating a range of new projects that complement the investments of the central public sector utilities by increasing its supply capacity from 1,130 MW to more than 3,000 MW. The new projects will enable UJVNL to meet local demand in the near term and are expected to allow it to sell power outside the state and thereby improve returns, particularly through the sale of peaking power capacity.¹⁶ The largest of the major projects (Pala Maneri) is now in the early stages of implementation and will provide 480 MW from 2011. Maneri Bhali-II (304 MW), which is due to be completed in 2006, will generate significant additional income for the company. The other large hydroelectric power plants in the program are scheduled to start construction over the next 2 to 3 years.

7. Large capital investments will catalyze and sustain long-term economic growth in the state. The financial analysis indicates that the overall program is financially viable provided that UJVNL secures sufficient long-term funds to carry out the slated capital expansion program over a short time span. However, UJVNL will need to carefully manage its expenditures and finances to avoid commitments that unduly stretch its debt-service capacity and/or test the regulator's willingness to raise generation tariffs to a level that covers capital costs. The analysis assumes that the Uttaranchal Electricity Regulatory Commission (UERC) will increase tariffs to cost-covering levels in accordance with UERC and Central Electricity Regulatory Commission guidelines; that the overall investment program will be staggered; and that UJVNL will maintain a minimum capability for projected debt service, that is, a debt-service coverage ratio of 1.2. Figures for FY2001–FY2004 are based on actual figures provided by UJVNL, whereas the projections for FY2005–FY2012 are based on assumptions described in the next subsection.

2. Assumptions

8. Domestic inflation is projected using domestic cost escalation factors for 2005–2009¹⁷ published by the Asian Development Bank and at 4.8% per year from 2010 onward. International inflation forecasts use the international cost escalation factors 2005–2009¹⁸ published by the World Bank, and thereafter are assumed to increase at 2% per year.

9. The growth of electricity sales is positively correlated with the availability of an integrated transmission network connected to hydropower stations and an electricity deficit from unmet demand. The projected sale of power is derived from energy to be generated from UJVNL's planned capital investments. Additional energy to be generated as a result of the proposed Investment Program consists of the outputs of four small hydropower plants (SHPPs) and the output following the renovation, monitoring, and upgrade of two existing SHPPs. Generation tariff calculations were based on current UERC norms. The generation tariff for the projected years for

¹⁶ The Ministry of Power allows 15% of generation capacity to be sold outside long-term power purchase agreements.

¹⁷ India's Consumer Price Index is estimated at 4.2% for 2005, 3.0% for 2006, 3.5% for 2007, 4.7% for 2008, and 6.4% for 2009.

¹⁸ The Manufacturer's Unit Value index is 3.0% for 2005, 2.8% for 2006, 1.9% for 2007, 1.9% for 2008, and 1.9% for 2009.

new projects were adjusted to cover capital costs (depreciation, interest, and return on equity), with an allowable return on equity of 14% according to UERC regulations. UJVNL has three different tariff schemes for existing plants, new large hydropower plants, and new SHPPs. Existing large and small hydropower plants have a flat tariff scheme of Rs0.37 per kilowatt-hour (kWh) and Rs1.7 per kWh, respectively, as stipulated in UERC's FY2004 tariff order, which UJVNL is currently challenging which will be resolved by a high court decision. For the purpose of assessing UJVNL's financial viability, weighted average generation tariffs were calculated based on UERC regulations and were assumed to increase at a measurable rate. Interstate surplus energy is expected to generate export income starting in FY2010 following the commissioning of high-voltage transmission lines.

10. Operating expenses consist of repairs and maintenance, fuel costs, salaries and wages, administrative costs, and depreciation. Starting from current levels of around 4% of gross fixed assets, costs for the repairs and maintenance of generation assets were assumed to decline over time as new plants come into operation. Depreciation was calculated on a straight-line basis at 2%¹⁹ in line with the Companies Act.

¹⁹ In line with UERC regulations, UJVNL uses accelerated depreciation over the repayment period for a loan and spreads the life of capital assets over the remaining years.

DISBURSEMENT MODALITIES

I. PAYMENT PROCEDURES

A. Direct Payment Procedure (page 24 of the Handbook)

1. ADB pays the designated beneficiary, at the request of the Recipient, from the loan funds.

1. Supporting Documents for Direct Payment

- (i) Signed Withdrawal Application (ADB-DRP/RMP, Appendix 5 of Handbook);
- (ii) Summary Sheet (ADB-DRP-SS, Appendix 8 of Handbook);
- (iii) Contract or confirmed purchase order, indicating amount and due date;
- (iv) For payment of goods: supplier's invoice and bill of lading or other similar documents; and
- (v) For payment of services: consultants' claim or invoice

B. Commitment Procedure (page 26 of Handbook)

2. This procedure is used for financing import of goods. A letter of credit is usually opened by a commercial bank. The negotiating bank is authorized to seek payment from ADB under the loan.

3. ADB issues a Commitment Letter against a letter of credit (L/C), and agrees to pay (on behalf of the Recipient and out of loan funds) the negotiating bank for the payments made or to be made to the supplier in accordance with the terms of the L/C.

1. Supporting Documents for Issuing Commitment Letter

- (i) Signed Application for Commitment Letter (ADB-CL, Appendix 6 of Handbook);
- (ii) Summary Sheet (Appendix 9)
- (iii) Contract or confirmed Purchase Order;
- (iv) Two signed copies of L/C.

4. ADB issues a Commitment Letter to the designated commercial bank (usually advising bank) as shown in Appendix 15 of Handbook. A copy of ADB's commitment letter is also sent to the EA for information.

2. ADB's Payment to the Negotiating Bank

5. The Commitment Letter provides for ADB's payment to the negotiating bank upon receipt of the reimbursement claim confirming that negotiation has been done in full compliance with the letter of credit terms. Such reimbursement claim is usually made by tested telex or authenticated SWIFT message.

3. Amendment to the Letter of Credit

6. ADB's approval is required for amendment to the letter of credit (L/C) involving:

- (i) terms of payment including currency and amount of L/C;
- (ii) the description or quantity of goods;
- (iii) beneficiary;
- (iv) country of origin; and
- (v) extension of the expiry date of L/C beyond the loan closing date.

7. Amendments not mentioned above do not require ADB's approval. For example, extension of L/C expiry date within loan closing date does not require ADB's approval, but simply inform ADB of such extension by filling out the form shown as Appendix 17 of Handbook and attaching one copy of the amendment.

C. Reimbursement Procedure (page 30 of Handbook)

8. ADB pays to the project account for eligible expenditures which have been incurred and paid for by the Government out of its budget allocation or its own resources (page 30 of Handbook).

1. Supporting Documents for Reimbursement Procedure

- (i) Signed Withdrawal Application (ADB-DRP/RMP, Appendix 5 of Handbook);
- (ii) Summary Sheet (ADB-RMP-SS, Appendix 8 of Handbook);
- (iii) Contract or confirmed Purchase order, if not yet submitted earlier to ADB; and
- (iv) Evidence or receipt of payment showing the amount paid, the date of receipt and the payee.

D. Statement of Expenditure (SOE) Procedure

9. This is a procedure requiring no submission of supporting documents. Any individual payment to be reimbursed or liquidated under the SOE procedure shall not exceed \$100,000 (including counterpart fund). The procedure derives its name from the Statement of Expenditure (SOE) form, which is submitted with the Withdrawal Application (W/A). The SOE is used in lieu of the usual supporting documents and the Summary Sheet. It may also be used in connection with the liquidation or replenishment of the Imprest Account (page 31 of Handbook).

10. Three types of SOE are available:

- (i) SOE form for contract items, mostly related to civil works (Appendix 22 and 23 of Handbook);
- (ii) SOE form for noncontract items, mostly related to operating expenses and overhead (Appendix 24 of Handbook); and
- (iii) SOE form (free format) for items not provided in the other SOE forms (Appendix 25 of Handbook).

E. Instructions for Withdrawal

11. Before the first W/A is submitted to ADB, the name of the authorized representative(s) must be provided to ADB, through the Authorized Representatives of the Recipients, including the authenticated specimen signatures of the representative(s).

12. The W/A should be signed by the authorized representative(s), sequentially numbered and should not exceed five digits (00001, 00002, etc.)

13. The cover letter of the W/A should include a sentence reconfirming that the contracts were awarded on the basis of tax exemption to ensure expeditious loan disbursement by ADB.

14. The W/A forms and summary sheets to be used vary for the different procedures. A separate W/A for each currency requested should be submitted.

15. The W/A to be submitted to ADB must be the signed original copy. However, supporting documents may be in photocopies.

16. Before a disbursement is made for any contract issued by the Recipient, ADB has to prepare a Procurement Contract Summary Sheet (PCSS). Copies of all signed contracts and supporting documents should be sent to ADB as soon as they are available. This is a basis for ADB to monitor performance of against the projected annual activities made at the start of each

year. A PCSS number will be assigned by ADB for each contract received and these data will be relayed to EA. The PCSS serves as an acknowledgment by ADB that the award of a contract has been checked and has been found to comply with ADB's procurement guidelines. It also serves as a basis for disbursement. The PCSS is also numbered sequentially, not exceeding four digits, i.e. 0001, 0002, etc. The PCSS consists of following basic information:

- (i) ADB Contract No. or the PCSS No.
- (ii) Date of ADB approval of the Award of Contract
- (iii) Date of Contract Approval by the EA
- (iv) Mode of Procurement
- (v) Name of contractor or supplier
- (vi) Terms of payment and currency of contract
- (vii) Component to which the expenditures will be charged

17. Without the PCSS, ADB's Controller's Department could not proceed with the processing of payment for the W/A.

18. When an amendment or a variation of a contract is made, a copy of the variation order should also be sent to ADB, for updating of the PCSS.

19. To avoid delay in the processing of payment, the PCSS No. should be indicated in the W/A to be submitted by the EA. The PCSS No. should be shown in the summary sheet.

II. PROCEDURES FOR ESTABLISHING AND OPERATING THE LOAN IMPREST ACCOUNT

A. Definition

20. Whenever used in this procedure, unless the context otherwise requires, several terms defined in the Loan Agreement between the Recipient and the Asian Development Bank (ADB) have the respective meanings therein set forth.

B. Imprest Account for Loan Proceeds

21. For the purpose of this project, Schedule 3, para. 6 (a), and (b) of the Loan Agreement provides that except as ADB may otherwise agree, (a) the Borrower shall establish immediately after the Effective Date, an imprest account at the Reserve Bank of India. The imprest account shall be established, managed, replenished and liquidated in accordance with ADB's Loan Disbursement Handbook dated January 2007, and the Interim Guidelines for Disbursement Operations for LIBOR-Based Loan Products dated July 2002, both as amended from time to time, and detailed arrangements agreed upon between the Borrower and ADB. The initial amount to be deposited and thereafter to be maintained in the imprest account shall not exceed the equivalent of \$4,192,000 (10% of the Loan) or the estimated expenditures for the next six months, whichever is lower; (b) the Borrower may cause the State to establish immediately after the Effective Date, a Second Generation Imprest Account (SGIA) in a non-interest bearing commercial bank account. The Borrower shall pass on the Rupee equivalent of the ADB's Imprest advance as provided in clause (a) of this paragraph. The SGIA shall also be established, managed, replenished and liquidated in accordance with ADB's "Loan Disbursement Handbook" of January 2007, and the Interim Guidelines for Disbursement Operations for LIBOR-Based Loan Products dated July 2002, both as amended from time to time and detailed arrangement between the Borrower and ADB. The initial amount to be deposited and thereafter to be maintained in the imprest account shall not exceed the equivalent of \$4,192,000 (10% of the Loan) or the estimated expenditures for the next six months, whichever is lower.

C. Eligible Expenditures

22. Payments out of the Imprest Account/SGIAs will be made exclusively to meet eligible expenditures in accordance with the provisions of Schedule 3 of the Loan Agreement.

D. Account Name and Authorization for Withdrawals

23. The Imprest Account will be opened and maintained at a commercial bank acceptable to ADB, in the name of the PMO and the person or persons duly authorized by PMO for making withdrawals from the Loan Account, under relevant provisions of the Loan Agreement will be responsible for operating the Imprest Account and withdrawals and payments therefrom.

E. Initial Advance and Ceiling

24. After the Effective Date, on the basis of a Withdrawal Application-Imprest Fund (Form ADB-IFP) and an Estimate of Expenditure Sheet (Form ADB-IFP-EES) from the PMO setting out the estimated expenditures for the first six months of project implementation, and submission of evidence satisfactory to ADB that the Imprest account has been duly opened, ADB will withdraw from the Loan Account and deposit into the Imprest account an initial amount based on the estimated expenditure for the first 6 months of project implementation or US\$1,000,000. The initial amount to be deposited into each of the SGIAs shall be equivalent to 6 months estimated expenditure, but in any event not exceeding the equivalent of \$50,000.

F. Liquidation and Replenishment

25. The PMO will, on a regular basis, furnish to ADB in respect of all payments out of the Imprest Account, the duly filled-in Withdrawal Application-Imprest Fund (Form ADB-IFP-WA) and Summary Sheet (ADB-IFP-SS), together with such supporting documents and other evidence as ADB will reasonably request, showing that each payment was made for eligible expenditures. ADB agrees to the use of the Statement of Expenditure (SOE) procedure for expenditures incurred not exceeding US100,000.

26. For every liquidation and replenishment request, the PMO will furnish to ADB (a) Statement of Account (Bank Statement) prepared by commercial banks, and (b) the Imprest Account Reconciliation Statement (IARS) reconciling the abovementioned Bank statement against the PMO's records following the format provided in Appendix 30, page 114 of the Loan Disbursement Handbook dated January 2007.

27. ADB may at any stage by notice to the PMO, suspend further replenishments to the Loan Imprest Account if they failed to comply with any of the provisions of this Attachment.

G. Accounts and Records

28. The PMO will ensure that all amounts received for or in connection with the Loan Imprest Account/SGIAs and amounts withdrawn therefrom are recorded in a separate account in accordance with consistently maintained sound accounting principles. The PMO will retain until one year after the closing date for withdrawals from the Loan account all accounts and records including orders, invoices, bills, receipts and other original documents evidencing the expenditures paid out of the Imprest Account, and will enable ADB's representatives to examine such account and records during disbursement and review missions.

H. Audit

29. The PMO will cause an independent auditor or government auditor acceptable to ADB to annually audit the Imprest Account/SGIAs and records referred to in Paragraph 10 above and furnish to ADB certified copies of audit report and audited financial statements not later than 6 months after the end of each fiscal year. An opinion on the examination of the Imprest Account and SGIAs should be separately set out in the said Auditor's Report.

I. Ineligible or Unjustified Payment

30. Where any withdrawal or payment from the Loan Imprest Account/SGIAs is determined by ADB (i) to have been utilized for any purpose not eligible, or (ii) not justified by the evidence furnished pursuant to Paragraph 10 of this Attachment, the PMO will, promptly upon notice from ADB, deposit into the Loan Imprest Account/SGIAs an amount equal to the amount of such payment or the portion thereof not eligible or justified, in the same currency as that in which the amount was withdrawn from the Loan Account. Alternatively, ADB may offset the unjustified payment against new withdrawal applications for replenishment.

J. Closing of the Imprest Account

31. In the event that ADB determines that (i) any amount outstanding in the Loan Imprest Account will not be required to cover further payments for eligible expenditures, or (ii) any amount remains outstanding in the Loan Imprest Account after the closing date, PMO will, promptly upon notice from ADB and unless otherwise agreed by ADB, refund such amount then outstanding in the Loan Imprest Account.

K. Other Issues

32. For matters not covered in the Attachment, the guidelines set forth in ADB's Loan Disbursement Handbook will apply. The ADB mission provided PMO and the IAs, ADB reference materials, which included among others, ADB Loan Disbursement Handbook dated January 2007, standard bidding documents for procurement of plant, design and install, works, goods, user guide for prequalification of bidders, guide on bid evaluation and the guidelines on the use of consultants and procurement guidelines.

III. STATEMENT OF EXPENDITURES (SOE) PROCEDURE

A. Definition

33. Pursuant to Paragraph 4 of Schedule 3 of Loan Agreement, you may use the SOE procedure whereby an application for replenishment or liquidation of the Imprest Account is supported by Statement of Expenditures, in lieu of the normal full documentation. Under the SOE procedure you are required to submit to ADB together with the Withdrawal Application (Form ADB-IFP), a Statement of Expenditures (ADB-SOE-SS), duly certified by persons authorized to sign withdrawal applications. The SOE form would be submitted in place of the usually required supporting documents such as invoices, contractors' bills, bills of lading and or other related documents.

B. SOE Limit

34. SOE procedure will be used in respect of payments out of the Imprest Account for eligible expenditures not exceeding \$100,000 per individual payment.

C. Supporting Documents

35. The SOE, a special reimbursement procedure of ADB has been approved for use of the Project on the condition that all relevant supporting documents will be retained by PMO and will be made available for examination by the ADB's representatives during field missions. In addition, the PMO is required to maintain proper accounting records of SOE expenditures to facilitate verification of these expenditures against supporting documents.

D. Ineligible Expenditures

36. Where ADB subsequently finds any payment made under the SOE procedure to be insufficiently supported or ineligible for ADB financing, ADB may offset the amount of the unjustified or ineligible payment against subsequent withdrawals for reimbursement or request the PMO to refund the same amount to the Loan account.

E. Audit

37. The SOE records must be audited regularly by independent and qualified auditors acceptable to ADB. The audit is carried out as part of the regular annual audit of the Project's accounts. A separate opinion should be included in the annual audit report.

SUGGESTED FORMAT OF PROGRESS REPORT

Pro Forma of the Executing Agency's Project Progress Report

A. Introduction and Basic Data

Provide the following:

- ADB loan number, project title, borrower, executing agency(ies), implementing agency(ies);
- total estimated project cost and financing plan;
- status of project financing including availability of counterpart funds and cofinancing;
- dates of approval, signing, and effectiveness of ADB loan;
- original and revised (if applicable) ADB loan closing date and elapsed loan period based on original and revised (if applicable) loan closing dates; and
- date of last ADB review mission.

B. Utilization of Funds (ADB Loan, Cofinancing, and Counterpart Funds)

Provide the following:

- cumulative contract awards financed by the ADB loan, cofinancing, and counterpart funds (commitment of funds to date), and comparison with time-bound projections (targets);
- cumulative disbursements from the ADB loan, cofinancing, and counterpart funds (expenditure to date), and comparison with time-bound projections (targets); and
- reestimated costs to completion, need for reallocation within ADB loan categories, and whether an overall project cost overrun is likely.

C. Project Purpose

Provide the following:

- status of project scope/implementation arrangements compared with those in the report and recommendation of the President (RRP), and whether major changes have occurred or will need to be made;
- an assessment of the likelihood that the immediate development objectives (project purpose) will be met in part or in full, and whether remedial measures are required based on the current project scope and implementation arrangements;
- an assessment of changes to the key assumptions and risks that affect attainment of the development objectives; and
- other project developments, including monitoring and reporting on environmental and social requirements that might adversely affect the project's viability or accomplishment of immediate objectives.

D. Implementation Progress

Provide the following:

- assessment of project implementation arrangements such as establishment, staffing, and funding of the PMO ;
- information relating to other aspects of the EA's internal operations that may impact on the implementation arrangements or project progress;
- progress or achievements in implementation since the last progress report;

- assessment of the progress of each project component, such as,
 - recruitment of consultants and their performance;
 - procurement of goods and works (from preparation of detailed designs and bidding documents to contract awards); and
 - the performance of suppliers, manufacturers, and contractors for goods and works contracts;
- assessment of progress in implementing the overall project to date in comparison with the original implementation schedule—quantifiable and monitorable target, (include simple charts such as bar or milestone to illustrate progress, a chart showing actual versus planned expenditure, S-curve graph showing the relationship between physical and financial performance, and actual progress in comparison with the original schedules and budgets, the reference framework or guidelines in calculating the project progress including examples are shown in Appendix 13); and
- an assessment of the validity of key assumptions and risks in achieving the quantifiable implementation targets.

E. Compliance with Covenants

Provide the following:

- the borrower's compliance with policy loan covenants such as sector reform initiatives and EA reforms, and the reasons for any noncompliance or delay in compliance;
- the borrower's and EA's compliance with financial loan covenants including the EA's financial management, and the provision of audited project accounts or audited agency financial statements; and
- the borrower's and EA's compliance with project-specific loan covenants associated with implementation, environment, and social dimensions.

F. Major Project Issues and Problems

Summarize the major problems and issues affecting or likely to affect implementation progress, compliance with covenants, and achievement of immediate development objectives. Recommend actions to overcome these problems and issues (e.g., changes in scope, changes in implementation arrangements, and reallocation of loan proceeds).

APPENDIX 13**FRAMEWORK AND GUIDELINES IN CALCULATING PROJECT PROGRESS****A. Introduction**

1. To ensure that all implementation activities are reflected in measuring implementation progress against the project implementation schedule, the term "physical completion" in the PPR has been changed to "project progress."

2. Physical and pre-commencement activities are considered in calculating project implementation progress. These activities, which may include recruitment of consultants, capacity building, detailed design, preparation of bid and prequalification documents, etc., could constitute a significant proportion of overall implementation and therefore should be counted.

3. Each activity in the implementation schedule will be weighted according to its overall contribution (using time as a reference) to progress of project implementation. These weights will then be used to calculate the percentage of project progress along the entire time span of the project. This is to provide a holistic view of the pace of implementation.

B. Framework for Compiling Activity List and Assigning Weights

4. As implementation activities (with corresponding weights) will vary in terms of project, sector, and country, SAEN will be responsible for incorporating them in the project administration memorandum. The actual project implementation progress of these activities should be reported regularly through the EA's quarterly project progress report. To ensure ADB-wide consistency, the following framework has been established. The application of this framework will be monitored through the PPR.

1. Compilation of Activity List

5. SAEN should identify and include major implementation activities in the implementation schedule. The implementation schedule should follow the critical path of the project's major activities in project implementation taking account of various country, sector, and project constraints.

2. Assignment of Weights

6. Corresponding weights for each activity should be assigned to ensure that "project progress" measures the percentage of achievement (non financial except when the project has credit components) for all events during the entire duration of the implementation schedule. To avoid disproportionate assignment of weights, to the extent possible these should be evenly distributed along the implementation schedule. When activities are concurrent, avoid "double counting."

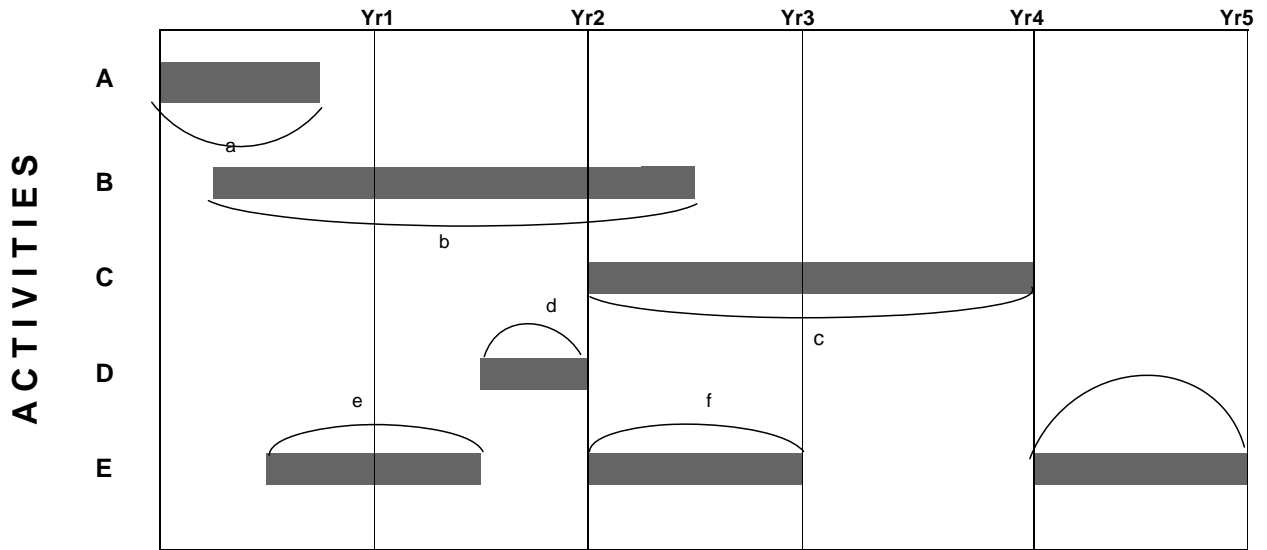
3. Computation of Project Progress

7. Once all activities are identified and corresponding weights assigned, project progress should be calculated using the following steps:

- (i) Determine the actual percentage progress (non-financial) of each activity.
- (ii) Multiply these percentages by the assigned weight of each activity to arrive at the weighted progress.
- (iii) Add up the resulting weighted progress of all activities to determine the project progress.

Below is an illustration of this calculation using a generic sample implementation schedule, and the Appendix 14 shows a specific schedule for this Project.

Implementation Schedule with Activities and Weights



1. Sum of all weights should equal 100 percent ($a+b+c+d+e+f+g = 100\%$)
2. When calculating the percentage of "project progress," all completed activities should be counted as accomplished, regardless of when they were scheduled to be completed. For example, when calculating the percentage of "project progress" after year 3, if activity D is completed in year 3 rather than in year 2, it should still be included in the computation.
3. Total weight of each activity is as follows: Activity A— a ; Activity B— b ; Activity C— c ; Activity D— d ; and Activity E— $e + f + g$
4. Project progress of a project is the summation of the actual percentage of progress for each activity multiplied by the total weight of each activity.

Appendix 14

PERCENTAGE OF PROJECT IMPLEMENTATION PROGRESS

No.	Description	Weight (a)	Progress (b) %	Weighted Progress (a)x(b)/100
I.	Initial Activities [6]			
	a- Establish and Staffing of PMO	3	20	0.60
	b- Loan Negotiations/Signing/Effectiveness	3	100	3.00
	Part A: (\$55.86M) [85]			
II	PFR 1 Madhyamaheswar SHPP (\$16.92M) [26]	26	30*0.9 70*0	7.02
III	PFR 1 Kaliganga I SHPP (\$6.05M) [9]	9	30*0.9 70*0	2.43
IV	PFR 1 Kaliganga II SHPP(\$9.50M) [14] Civil [8] ; E&M [6]	14	8 30*0.25 70*0	0.60
			6 30*0.45 70*0	0.81
V	PFR 1 Kaldigad SHPP (\$12.81M) [19] Civil [11] ; E&M [8]	19	11 30*0.45 70*0	1.49
			8 30*0.45 70*0	1.08
	Hydrological Information System (HIS)			
VI	- Hardware and Software Installation (\$9.6M) [15]	15	30*0+70*0	0
VII	- Consulting Services for HIS (\$0.98M) [2]	2	30*0.25 70*0	0.15
	Part B: (\$4.03M) [9]			
VIII	Consulting Services for Project Implementation (\$3.88M) [8.5]	8.5	30*0.25 70*0	0.64
IX	Information Technology (\$0.15M) [0.5]	0.5	30*0+70*0	0
Total Weight and Progress		100		17.82
A. Establishing and Staffing of PMO [I-a]:				
20%: Initial Set-up, , 100%: Full Staff				
B: Loan Negotiation/ Signing/Effectiveness [I-b]:				
20%: Negotiation; 50%: Signing; Effectiveness: 100%				
C: Turnkey Project [II, III, IV, & V]				
30%: Bidding Process				
(Draft Bid Doc.20%; Issuance:30%; TBER: 60%; FBER: 80%; Sub. Signed Contract: 100%)				
70%: Contract Implementation				
(%: (Disbursement) / (Contract Amount))				
D: Consulting Services [VII & VIII]				
30%: Selection Process				
(SL & Draft RFP:20%; Issuance RFP:30%; TPER: 60%; FBER: 80%; Sign Contract: 100%)				
70%: Contract Implementation				
(%: (Disbursement) / (Contract Amount))				
E: Procurement [VI & IX]				
30%: Bidding Process				
(Draft Bid Doc.20%; Issuance:30%; TBER: 60%; FBER: 80%; Sub. Signed Contract: 100%)				
70%: Contract Implementation				
(%: (Disbursement) / (Contract Amount))				

SUGGESTED FORMAT FOR PROJECT COMPLETION REPORT**Suggested Topics for Project Completion Reports to be Prepared by Borrowers
(project, multiproject, sector, program, sector development program, and
technical assistance loans)****I. PROJECT DESCRIPTION**

- A. Objectives
- B. Components (or subprojects for sector and multi projects)
- C. Implementation methods
- D. Description and justification of changes in components (or subproject appraisal criteria) or implementation methods

II. PROJECT IMPLEMENTATION

- A. Compare original and actual implementation schedules. Indicate delays, length and causes of delays, and remedial action taken.
- B. Compare cost estimates made during appraisal and actual costs (foreign and local). Local currency costs incurred, appropriate exchange rates for their conversion into US dollars, and the foreign exchange costs financed by cofinanciers must be compiled correctly with reference to audited project accounts. Indicate factors that contributed to any significant overruns or underruns.
- C. State problems or difficulties in recruiting consultants, with reference to ADB procedures. Assess the consultant's work and the working relationship between the executing agency (EA) and the consultant. Use of a design and monitoring framework is strongly recommended.
- D. State problems or difficulties encountered in procuring goods and services (including civil works) with reference to ADB procedures. Assess the supplier's or contractor's performance under the contract.
- E. Give the extent of compliance of the borrower and EA with loan covenants, with reasons for noncompliance or delays in compliance and the remedial actions taken.
- F. State reasons for any delays in loan utilization. Evaluate the appropriateness of the disbursement methods used. Justify the reallocation of loan proceeds.
- G. State problems or difficulties with subproject appraisal. Evaluate the EA's performance and capacity to appraise subprojects.

III. INITIAL OPERATIONS

- A. Describe initial operations of the project and transitional problems encountered from project completion to initial operations.
- B. Describe measures taken to ensure continued smooth operation of the project relative to management, staffing, funding, and maintenance of project facilities.
- C. Analyze the prospects of the project benefits being realized.

IV. EVALUATION OF THE ASIAN DEVELOPMENT BANK'S PERFORMANCE

- A. Assess ADB's performance in supervising project implementation. Include comments on the adequacy of the consultants' terms of reference and appropriateness of specifications in tender documents. Evaluate the effectiveness and timeliness of assistance extended by ADB to solve implementation problems.
- B. Comment on problems encountered with ADB's procedures. Note the measures taken to resolve these problems and suggest changes in procedures and requirements.

Appendix 16

FINANCIAL REPORTING AND AUDITING REQUIREMENTS

1. ADB's *Handbook for Borrowers on the Financial Governance and Management of Investment Projects Financed by the ADB* (the Booklet) provides guidelines to ensure timely compliance with the loan covenants and the quality of financial information as required by ADB.
2. ADB, by its Charter, is required to ensure that the proceeds of any loan made, guaranteed, or participated in by ADB are used for the purposes for which the loan was approved. ADB requires accurate and timely financial information from its borrowers/recipients to be assured that expenditure was for the purposes stated in the loan agreement.
3. The following are the main requirements:

- (i) ADB requires the EA to maintain separate project accounts and records exclusively for the Project to ensure that the grant funds were used only for the objectives set out in the Loan Agreement.

The first set of project accounts to be submitted to ADB covers the fiscal year ending 31 March 2008. As stipulated in the Loan or Project Agreement, they are to be submitted as soon as available but not later than 9 months after the end of the fiscal year. For this loan, the deadline is by 31 December 2008. A sample report format with explanatory notes is attached as Annex A.

- (ii) The accounts and records for the project are to be consistently maintained by using sound accounting principles. The external auditor is to express an opinion on whether the financial report has been prepared using international or local generally accepted accounting standards and whether they have been applied consistently.

ADB prefers project accounts to use international accounting standards prescribed by the International Accounting Standards Committee. The name of external auditor is to comment on the impact of any deviations, by the Executing Agency from international accounting standards.

- (iii) The external auditor specifies in the Auditor's Report the appropriate auditing standards they used, and direct them to expand the scope of the paragraph in the Auditor's Report by disclosing the key audit procedures followed. The external auditor is also to state whether the same audit procedures were followed for all supplementary financial statements submitted.

ADB wishes that auditors conform to the international auditing standards issued by the International Federation of Accountants. In cases where other auditing standards are used, the external auditor is requested to indicate in the Auditor's Report the extent of any differences and their impact on the audit.

- (iv) The external auditor's opinion is also required on whether
 - the proceeds of the ADB's loan have been utilized only for the project as stated in the Loan Agreement;
 - the financial information contains data specifically agreed upon between the Recipient or EA and ADB to be included in the financial statements;

- the financial information complies with relevant regulations and statutory requirements; and
 - compliance has been met with all the financial covenants contained in the Loan or Project Agreements.
- (v) The Auditor's Report is to clearly state the reasons for any opinions that are qualified, adverse, or disclaimers.
- (vi) Actions on deficiencies disclosed by the external auditor in its report are to be resolved by the Recipient or Executing Agency within a reasonable time. The external auditor is to comment in the subsequent Auditor's Report on the adequacy of the corrective measures taken by the Recipient or EA.
4. Compliance with these ADB requirements will be monitored by review missions and during normal project supervision, and followed up regularly with all concerned, including the external auditor.

ANNEX A: SAMPLE FORM OF AUDITOR'S OPINION**Imprest Account**

We have examined the Statement of Imprest Account of Loan No. 2309-IND for the period 1 January to 31 December 2007, pursuant to the Agreement signed between the Government and the Asian Development Bank on 22 February 2007.

Our examination was made in accordance with generally accepted auditing standards emphasizing on the adequacy and completeness of the supporting documents of the Imprest Account and other auditing procedures as we considered necessary in the circumstances;

In our opinion, the Statement of Imprest Account and supporting documents and information submitted with them (can/ cannot) be fairly relied on to support the applications for reimbursement/payment in accordance with ADB's requirements as set out in the Loan Agreement.

STATEMENT OF EXPENDITURE

We have also examined the Statements of Expenditure submitted to ADB during the period in support of applications for liquidation of the Imprest, pursuant to the above-mentioned Loan Agreement. Our examination was made in accordance with generally accepted auditing standards, and, accordingly included such tests of the accounting records, verification of assets and other such auditing procedures as we considered necessary in the circumstances.

In our opinion, the Statement of Expenditures submitted, together with the internal control and procedures involved in their preparation, (can/cannot) be relied on to support the applications for liquidations in accordance with the requirements of the above mentioned Loan Agreement.

MAJOR LOAN COVENANTS

	Covenants	Responsible Agency	Compliance Status
	Project Execution and Implementation		
1	<p>Executing Agency (EA). Loan Agreement (LA) Sch. 5, para. 1 The State acting through UED shall be the Project Executing Agency and shall be responsible for the execution of the Project.</p>	Government/UED	Complied
2	<p>LA, Sch. 5, para. 2 Project Implementing Agency (IA). UJVNL shall be the Project Implementing Agency for Part A of the Project</p>	UED/UJVNL	Complied
3	<p>Project Management Office (PMO). LA, Sch. 5, para. 6. UED shall establish PMO on or before 1 January 2007 at Dehradun, Uttarakhand. PMO shall be headed by the head of UED or such other officer as nominated by the State, and shall have representatives of: (i) UED; (ii) UJVNL; (iii) PTCUL and (iv) other State departments, if necessary. PMO shall maintain expertise in planning, design, construction management, financial management, accounting, auditing, procurement, contract management, and environmental and social safeguards management.</p>	Government/UED	Partly Complied
4	<p>Project Coordination. LA, Sch. 5, para. 7. UED through PMO shall have the primary responsibility for the Project coordination. PMO through the related IAs shall be responsible for the processing and implementation of the subprojects. PMO shall be assisted by technical experts who shall evaluate technical reports, feasibility studies, preliminary design reports, environmental assessment reports (including environmental management plans (EMPs) with budget, resettlement and indigenous peoples development plans, and detailed design reports to ensure compliance with the requirements of ADB and the Borrower.</p>	UED	Ongoing

	Covenants	Responsible Agency	Compliance Status
	Project Execution and Implementation		
5	<p>Implementing Agencies. LA, Sch. 5, para. 8 PTCUL and UJVNL each shall establish one PIU or or before 1 January 2007 at their respective offices in Dehradun, Uttarakhand. PIUs shall be responsible for field operations, including without limitation, construction supervision, quality assurance and quality control, and environmental and social safeguards implementation.</p>	UED/PTCUL/UJVNL	Complied.
6	<p>Performance Monitoring and Reporting. LA, Sch. 5, para. 10. The IAs shall undertake periodic performance reviews of each related Subproject and Facility in accordance with the above-mentioned Performance Monitoring System, to evaluate the scope, implementation arrangements, progress and achievement of the objectives of the Project and the Facility.</p>	UED/PTCUL/UJVNL	To be complied
7	<p>Financial Covenants LA, Sch. 5, para. 11 (a). The State through UED shall prepare and provide ADB, within 45 days from close of each quarter, with quarterly progress reports on Subprojects' implementation. Such information shall include information on: (i) overall progress of the facility; (ii) progress made in the implementation of the project during the period of review; (iii) changes, if any in the implementation schedule; (iv) problems or difficulties encountered and remedial actions taken; and (v) work to be undertaken in the coming quarter. The quarterly progress report shall also include: (vi) summary financial account(s) for each Subproject, (vii) expenditures to-date for each Subproject; and (viii) a report on benefit monitoring undertaken.</p>	GOU/UED/UJVNL	Ongoing.
8	<p>LA, Sch. 5, para. 11 (b). The State shall provide ADB with periodic overall progress on the Project, in form and substance, mutually agreed between the Borrower, the State, and ADB.</p>	GOI/GOU/UED	Ongoing.
9	<p>LA, Sch. 5, para. 12. Without limiting the generality of Section 2.08© of the Project Agreement and Section 7.04(d) of the Loan Regulations, the State through the</p>	GOU/UED/UJVNL	Not yet due.

	Covenants	Responsible Agency	Compliance Status
	Project Execution and Implementation		
	Borrower shall submit to ADB: (i) a Project Completion Report with three (3) months of physical completion of the subprojects under the Facility. These reports shall contain a detailed evaluation of the Project and the Facility, covering the design, costs, contractors' and consultants' performance, social and economic impact, economic rate of return, and such other details, as may be requested by ADB.		
10	LA, Sch. 5, para. 13. UJVNL through UED shall submit, on six-monthly basis, reports on implementation of EMP(s).	UJVNL/UED	Ongoing.
11	Review : Sch. 5, para. 14. ADB, the Borrower and the State shall meet regularly as required to discuss the progress of the Project of any changes in the implementation arrangements or remedial measures required to be taken to achieve the objectives of the Project and the Facility.	GOI/GOU/UED/ADB	Ongoing.
12	LA, Sch. 5, para. 15. ADB, the Borrower and the State shall undertake a mid-term review of the Project, which shall include review of issues and any problems and/or weaknesses in implementation arrangements and shall agree on any changes needed to achieve the objectives of the Project.	GOI/GOU/UED/ADB	Ongoing.
13	LA, Sch. 5, para. 16. ADB, the Borrower and the State shall undertake a mid-term review of the Facility in the fourth year from the date of approval of the Facility by ADB.	GOI/GOU/UED/ADB	Not yet due.
14	Sector Reforms. LA, Sch. 5, para. 17. The State acting through UED shall cause PTCUL and UJVNL to: (i) conform to the tariff charges issued from time to time by UERC to ensure reduced transmission and distribution losses, rational power pricing, and graduated rationalization in tariffs as determined by UERC, (ii) file tariff applications with UERC in a timely manner.	GOU/UED/PTCUL/UJVNL	Ongoing.
15	LA, Sch. 5, para. 18. The Borrower and the State shall continue to emphasize the support and the autonomy of PTCUL and	GOI/GOU/UED	Ongoing.

	Covenants	Responsible Agency	Compliance Status
	Project Execution and Implementation		
	UJVNL with respect to commercial, administrative and operational activities.		
16	Financial Governance. LA, Sch. 5, para. 19. In accordance with tariff orders issued by UERC, the State acting through UED shall ensure that PTCUL and UJVNL maintain the following financial management objectives from FY 2006-2007 until FY 2011-2012: (i) debt-service coverage ratio of not less than 1.2, and (ii) accurate accounts receivable of no more than 2 months of billing.	GOU/UED	Ongoing.
17	Financial Management. LA, Sch. 5, para. 20. The State shall ensure that internal controls shall be strengthened to be consistent with international standards by setting up and maintaining independent and autonomous internal audit departments of the IAs.	GOU/UED/PTCUL/UJVNL	Ongoing.
18	LA, Sch. 5, para. 21. The State shall cause IAs to adopt, by end of 2007, computerized accounting and management information systems, including online billing and collection systems, where appropriate and practical.	GOU/UED/PTCUL/IJVNL	Ongoing.
19	Subprojects Selection Criteria. LA, Sch. 5, para. 22. EA and IAs shall be jointly responsible for selection and preparation of the Subprojects and shall follow the criteria set out herein below for selecting each Subproject: (i) Subprojects shall be consistent with over-all least-cost generation and transmission expansion plan of Uttarakhand, and shall be formulated on a least-cost basis (ii) Subprojects shall be technically feasible and shall utilize advanced but proven technologies, with performance-based design consistent with international benchmarks for system efficiency and operational risks (iii) Subprojects shall be economically viable and financially sustainable (iv) Hydropower Subprojects shall be part of UJVNL expansion plans, and their scheduling shall be coordinated with PTCUL for connection to the transmission system (v) Subprojects shall have met all environmental and social	GOI/GOU/UED/PTCUL/UJVNL/ADB	UJVNL complied.

	Covenants	Responsible Agency	Compliance Status
	Project Execution and Implementation		
	safeguard obligations of the Borrower, the State and ADB (vi) All necessary approvals of the Borrower and the State shall have been obtained for the Subprojects.		
20	<p>Resettlement and Social Matters. LA, Sch. 5, para. 23. The State acting through UED shall cause PTCUL and UJVNL to (i) make available all land and rights-of way required for the Subprojects in a timely manner and that the provisions of RF and any necessary RP, including compensation and entitlements for affected households and persons, shall be implemented in conformity with all applicable laws and regulations of the Borrower and the State, including as amended from time to time, the entitlement benefits as listed in the Borrower's National Policy on Resettlement and Rehabilitation, notified in February 2004, and ADB's Involuntary Resettlement Policy, 1995, and the agreed RF and RP (ii) ensure that people affected by each Subproject are consulted and fairly compensated in a timely manner on replacement values in accordance with the related RPs and RF, such as their living standards are not adversely affected (iii) submit progress and completion reports on land acquisition and resettlement under the quarterly progress reports of each subproject (iv) prepare and implement for the Subprojects IPDP in accordance with the IPDF; and (v) engage with 3 months of the Effective Date independent external experts for monitoring and grievance redress mechanisms to address any grievances of affected people on resettlement, environment and other social issues.</p>	GOU/UED/PTCUL/UJVNL	Complied.
21	<p>LA, Sch. 5, para. 24. The State acting through UED shall ensure that contracts under the Project follow all applicable labor laws of the Borrower and the State and that these further include provisions to the effect that contractors: (i) do not use children as labor; and (ii) follow legally mandated provisions of labor (including equal pay for equal work), health, safety, sanitation, welfare and working conditions. Such contracts shall also include clauses for termination in case of any breach of</p>	GOU/UED/PTCUL/UJVNL	Ongoing.

	Covenants	Responsible Agency	Compliance Status
	Project Execution and Implementation		
	these provisions by the contractors.		
22	Environment. LA, Sch. 5, para. 25. The State acting through UED shall cause PTCUL and UJVNL to ensure that (i) each Subproject is undertaken and the Project facilities are operated and maintained, in accordance with all the applicable laws, rules and regulations of the Borrower and the State and ADB's Environment Policy, 2002, as amended from time to time (ii) prepare and implement for each Subproject, the necessary IEE, EIA, and EMP (with budget) in accordance with EARF (iii) for any category A or B sensitive Subprojects, summary EIA or IEE shall be prepared ADB's Environment Policy, 2002, as amended from time to time and made available to the public 120 days in advance of the approval of the Subproject.	GOU/UED/PTCUL/UJVNL	Ongoing.
23	LA, Sch. 5, para. 26. The State acting through UED shall cause PTCUL and UJVNL to monitor, audit, and report to ADB, on six monthly basis, the implementation of EMP for each Subproject.	GOU/UED/PTCUL/UJVNL	Ongoing.
24	Particular Covenants: PA, Art. II, Sec.2.01 (a) The State shall carry out of the Project with due diligence and efficiency, and in conformity with sound, administrative, financial, engineering, environmental and power sector development practices.	GOU/UED	Ongoing. Partly Complied.
25	PA, Art. II, Sec. 2.02 The State shall ensure that UED and the IAs make available, promptly as needed, the funds, facilities, services, equipment, land and other resources which are required, in addition to the proceeds of the Loan, for the carrying out of the Project.	GOU/UED/PTCUL/UJVNL	Ongoing. Partly Complied
26	PA, Art. II, Sec. 2.03 (b) Except as ADB may otherwise agree, all Goods, Works and consulting services to be financed out of the proceeds of the Loan shall be procured in accordance with the provisions of Sch. 4 and Sch. 5 to the Loan Agreement. ADB may refuse to finance a contract where Goods, Works or consulting	GOU/UED/PTCUL/UJVNL	Ongoing. Partly complied

	Covenants	Responsible Agency	Compliance Status
	Project Execution and Implementation		
	services have not been procured under procedures substantially in accordance with those agreed between the Borrower and ADB or where the terms and conditions of the contract are not satisfactory to ADB.		
27	PA, Art. II, Sec. 2.09 (a) The State shall (i) maintain and cause through UED that the IAs maintain separate accounts for the Project (ii) have such accounts and related financial statements (balance sheet, statement of income and expenses, and related statements) audited annually, in accordance with appropriate auditing standards consistently applied, by independent auditors whose, qualifications, experience and terms of reference are acceptable to ADB; and (iii) furnish to ADB, promptly after their preparation but in any event not later than nine (9) months after the close of the fiscal year to which they relate, certified copies of such audited accounts and financial statements and the report of the auditors relating thereto (including the auditor's opinion on the use of the Loan proceeds and compliance with the covenants of the Loan Agreement, all in the English language. The State shall furnish to ADB such further information concerning such accounts and financial statements and the audit thereof as ADB shall from time to time reasonably request.	GOU/UED/PTCUL/UJVNL	Ongoing.