



Draft Design and Monitoring Framework

Project Number: 37399
October 2008

BHU: Green Power Development Project

A design and monitoring framework is an active document, progressively updated and revised as necessary, particularly following any changes in project design and implementation. In accordance with ADB's public communications policy (2005), it is disclosed before appraisal of the project or program. This draft framework may change during processing of the project or program, and the revised version will be disclosed as an appendix to the report and recommendation of the President.

Asian Development Bank

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/ Reporting Mechanisms	Assumptions and Risks
<p>Impact Sustained inclusive economic growth through promoting cross-border power trade and electricity access.</p>	<p>Increase in the energy sector share of GDP from 25% to 40% (2017) with annual GDP growth increased at least 2%–3% from 2012 to 2017</p> <p>Increase in the energy sector share of the government revenue from 45% to 75% (2020), through clean energy export to India with an additional 10,000 MW electricity (2020)</p> <p>Increase in use of electric lighting (to replace kerosene lamps or firewood), from 40% to 100% (2013) of rural households¹</p>	<p>Government statistical and census reports</p> <p>UNDP human development report</p> <p>Economic reports of Government, ADB, IMF, and World Bank</p>	<p>Assumptions</p> <ul style="list-style-type: none"> • Political stability • Government's high policy priority to rural development and hydropower export • Stable economic growth in South Asia • Bilateral and multilateral assistance for rural electrification expansion <p>Risks</p> <ul style="list-style-type: none"> • Exogenous economic and political shocks
<p>Outcome Expanded coverage of clean power development</p>	<p>Increase in access to electricity by rural and urban households, achieving a cumulative national electrification ratio from 60% to 84% (2012)</p> <p>Increase in hydropower export revenue of the total national account from 40% to 45% (2013)</p> <p>Increase in investment size from the public and private sectors to hydropower development projects with minimum additional 1,314 MW (2014)</p> <p>Annual reduction of</p>	<p>Quarterly project progress reports and completion report</p> <p>Audit financial accounts and reports</p> <p>National statistics</p> <p>Government's fiscal statements</p> <p>Economic reports of Government, ADB, IMF, and World Bank</p>	<p>Assumptions</p> <ul style="list-style-type: none"> • Government's commitment to promote development for hydropower and rural electrification • Continuation of the existing investment program and regulatory framework • Promotion of a new policy for private participation • Strong demand and supply shortage in the Indian power market • Government's sustainable public debt management • Bilateral assistance from the Government of India for hydropower developments • Bilateral assistance from

¹ The Government has revised the target year to achieve 100% electrification from 2020 to 2013.

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	<p>emission gas equivalent CO₂ by 250,000 tons by 2012 and by 500,000 tons in a cross-country basis after 2012 on onward</p> <p>Continued overall power system loss below 10% and power sector's financial health including sufficient debt service coverage (minimum 1.2) and net profit generation</p>		<p>JBIC for rural electrification</p> <p>Risks</p> <ul style="list-style-type: none"> • Off-taker's serious default • Prolonged significant hydrological shortage because of natural disaster and climate change
<p>Outputs</p> <p>1. Dagachhu Hydropower Development</p> <p>2. Rural Electrification</p> <p>3. Attached CDTA: Promotion of Clean Power Export Development</p> <ul style="list-style-type: none"> - Capacity Building for hydropower - Financial structuring study for medium-size hydropower projects - Preparation of documents for carbon 	<p>Construction of a 114 MW run-of-river Dagachhu hydropower plant by 2012</p> <p>Construction of a 19 km transmission line to evacuate to the grid system by 2012</p> <p>Clean and renewable energy export of additional 250 GWh to India by 2012 and 500 GWh after 2012</p> <p>Provision of reliable power supply and service to 8,767 rural households and 119 off-grid public institutions (schools, health clinics, and other community facilities) in seven subprojects by 2012</p> <p>Full operation of the Druk Green Power Corporation, through the corporate accounting policy (2009) and integrated management information system (2011)</p> <p>Implementation of the Hydropower</p>	<p>ADB review missions' aide memoires</p> <p>Quarterly project progress reports</p> <p>Project completion report</p> <p>Withdrawal applications, and disbursement and contract award records</p> <p>Audit of financial accounts and reports</p> <p>Government's fiscal statement</p> <p>CDM monitoring report</p>	<p>Assumptions</p> <ul style="list-style-type: none"> • Government's commitment to carry out the Green Power Development Project • Timely mobilization of counterpart funds, equities, and cofinancing • Firm commercial agreement (i.e., power purchase agreement, emission reduction underwriting contract) • High quality of construction contractors and equipment • Accessibility to the development sites <p>Risks</p> <ul style="list-style-type: none"> • Unexpected cost increases in commodities and raw materials beyond contingencies • Construction delays due to slow procurement, natural disaster, or design changes • Lack of sufficient and appropriate human resources and expertise

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finance	<p>Development Policy, through two sample projects with public and/or private investments</p> <p>Financial structuring proposals of Nikachhu (210 MW) and Khomachhu (326 MW) development before 2011</p>		
<p>Activities with Milestones</p> <p>1. Dagachhu Hydropower Component</p> <p>1.1 Endorsement and disclosure of the resettlement plan to affected people by June 2008</p> <p>1.2 Advance procurement by July 2008</p> <p>1.3 Endorsement and disclosure of the summary initial environmental examination by September 2008</p> <p>1.4 Completion of physical land acquisition and compensation with revised rates by the fourth quarter 2008</p> <p>1.5 Contract award by the first quarter 2009</p> <p>1.6 Physical construction by 2012</p> <p>1.7 Operation by the second quarter 2012</p> <p>2. Rural Electrification Component</p> <p>2.1 Advance procurement by the fourth quarter 2008</p> <p>2.2 Contract award by the first quarter 2009</p> <p>2.3 Physical construction by 2012</p> <p>3. Promotion of Clean Power Export Development (CDTA)</p> <p>3.1 Consultant selection process by the fourth quarter 2008</p> <p>3.2 Contract award by the first quarter 2009</p> <p>3.3 Consultant fielding by the first quarter 2009</p> <p>3.4 Completion of CDTA by the fourth quarter of 2010</p>			<p>Inputs</p> <p>Dagachhu Hydropower Financing (\$ million)</p> <ul style="list-style-type: none"> • ADB 80.0 • Bhutan Public Sector 45.0 • Cofinancing 55.5 • Private sector 21.0 <p>Rural Electrification Financing (\$ million)</p> <ul style="list-style-type: none"> • ADB 25.28 • Government 6.70 • ACEF 1.00 <p>Attached CDTA (\$ '000)</p> <ul style="list-style-type: none"> • ADB 1,488 • Government 24

ACEF = Asian Clean Energy Fund, ADB = Asian Development Bank, CDM = Clean Development Mechanism, CDTA = capacity development technical assistance, GDP = gross domestic product, GWh = gigawatt-hour, IMF = International Monetary Fund, JBIC = Japan Bank for International Cooperation, MW = megawatt, TA = technical assistance, UNDP = United Nations Development Programme.