



Extended Annual Review Report

Project Number: 42902
Investment/Loan Numbers: 7277/2417 and 7277/2434
November 2012

Loan Gujarat Paguthan Wind Energy Financing Facility (India)

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Asian Development Bank

CURRENCY EQUIVALENTS

Currency Unit – Indian rupee/s (Re/Rs)

		At Appraisal	At Project Completion		
			Samana (Phase 1)	Samana (Phase 2)	Saundatti
		18 Feb 2008	12 Mar 2009	31 Jan 2011	04 Dec 2010
Re1.00	–	\$0.0252	\$0.0193	\$0.0219	\$0.0222
\$1.00	–	Rs39.67	Rs51.86	Rs45.77	Rs45.11

ABBREVIATIONS

ADB	–	Asian Development Bank
CCPP	–	combined cycle power plant
CER	–	certified emission reduction
CERC	–	Central Electricity Regulatory Commission
CIPL	–	CLP India Private Limited
CLP	–	China Light and Power Group
CWFPL	–	CLP Wind Farms Private Limited
EIL	–	Enercon India Limited
EIRR	–	economic internal rate of return
FIRR	–	financial internal rate of return
GPEC	–	Gujarat Paguthan Energy Corporation
GUVNL	–	Gujarat Urja Vikas Nigam Limited
O&M	–	Operation and maintenance
PPA	–	power purchase agreement
REC	–	renewable energy certificate
RPO	–	renewable purchase obligation
RRP	–	report and recommendation of the President
WACC	–	weighted average cost of capital
WTG	–	wind turbine generator

WEIGHTS AND MEASURES

GWh (gigawatt-hour)	–	1,000,000 kWh
kW (kilowatt)	–	1,000 watts
kWh (kilowatt-hour)	–	1,000 watt-hours
MW (megawatt)	–	1,000,000 watts
MWh (megawatt-hour)	–	1,000 kilowatt-hours

NOTES

- (i) The fiscal year (FY) of the Government of India ends on 31 March. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY2000 ends on 31 March 2000.
- (ii) In this report, "\$" refers to US dollars.

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BASIC DATA
Gujarat Paguthan Wind Energy Financing Facility
(7277/2417 – LN – India) and (7277/2434 – LN – India)

Key Dates		Expected	Actual
Concept Clearance Approval		17 December 2007	17 December 2007
Board Approval		March 2008	17 April 2008
Loan Agreement			
	GPEC		23 October 2008
	CWFPL		2 July 2009
Loan Effectiveness			
	GPEC		1 June 2009
	CWFPL		11 January 2010
First Disbursement			
	GPEC		10 June 2009
	CWFPL		15 January 2010
Commercial Operations Date			
	Samana (Phase 1)	30 June 2008	12 March 2009
	Samana (Phase 2)	31 January 2009	31 January 2011
	Saundatti	30 June 2009	4 December 2010
Loan Closing			
	GPEC	10 June 2009	10 June 2009
	CWFPL	31 December 2010	31 March 2011
Months (effectiveness to commercial operations date)			
	GPEC		(-3 months) ¹
	CWFPL		12 months

CWFPL = CLP Wind Farms Private Limited, GPEC = Gujarat Paguthan Energy Corporation.

Project Administration and Monitoring	No. of Missions	No. of Person-Days
Due Diligence	3	13
Project Administration	4	13
Extended Annual Review Mission	1	2

¹ For the GPEC loan, the commercial operations date was 3 months earlier which is in March 2009 as compared with the effectiveness date of June 2009.

EXECUTIVE SUMMARY

On 17 April 2008, the Board of Directors of the Asian Development Bank (ADB) approved a loan of up to Rs4.45 billion to Gujarat Paguthan Energy Corporation Private Limited (GPEC), now known as CLP India Private Limited (CIPL), a 100% subsidiary of the China Light and Power Group (CLP Group). The financing was for setting up two wind power projects—100.8 megawatts (MW) at Samana, Gujarat and 82.4 MW at Saundatti, Karnataka in India.

The development impact of the project was evaluated using four criteria: (i) private sector development; (ii) business success; (iii) economic sustainability; and (iv) environment, social, health, and safety performance. The project's contribution to private sector development is rated *excellent*. The Samana and Saundatti wind power projects were the first projects undertaken by CIPL in the wind sector in India. In 2012, CIPL has successfully scaled up its wind power operations in India to include seven other wind farms, diversifying its presence across six states. The demonstration effect of these early wind farm projects encouraged the unleashing of nonrecourse financing from local commercial banks. This resulted in the wind power sector's growth (in terms of cumulative installed wind power generation capacity) of 129% in Gujarat and 91% in Karnataka in 2008–2012. Furthermore, the success of the sector as a whole has prompted the government to introduce innovative initiatives such as renewable energy certificates and renewable purchase obligations.

Both the Samana and Saundatti wind power projects have been commissioned and are operating satisfactorily. The projects have demonstrated reliability in operations with an availability ratio in excess of 95%. The consolidated financial internal rate of return is greater than the weighted average cost of capital. Hence the project's business success is rated *satisfactory*.

The economic sustainability of the project is rated *satisfactory* as the consolidated economic internal rate of return is higher than the social discount rate of 12%.

The investment profitability of the project is rated *satisfactory*. CIPL has been making regular interest and principal repayments from the start of commercial operations. In addition CIPL has also voluntarily prepaid one of the outstanding loans.

ADB's work quality is rated *satisfactory* in terms of (i) screening, appraisal, and structuring; (ii) its role and contribution; and (iii) monitoring and supervision. As CIPL underwent internal reorganization, ADB's portfolio monitoring team were proactive in processing waivers, meeting with the borrower and revising the finance agreement to ensure that the legal documents remain aligned with the project objectives as well as the goals of the company.

ADB's additionality is rated *satisfactory*. ADB's lending to initial wind power projects has had a valuable demonstration effect leading to better understanding of risks associated with financing of wind farms.

The overall rating of this project is *successful*. This project is considered successful as it contributed significantly to power generating capacity in a country with a major power deficit, it developed new renewable energy thus helping to reduce greenhouse gasses and other pollutants in a country heavily reliant on thermal power, and it has demonstrated successful implementation of large-scale wind power projects by the private sector.

I. THE PROJECT

A. Project Background

1. In April 2008, the Board of Directors of the Asian Development Bank (ADB) approved a loan of up to Rs4.45 billion, to be denominated in Indian rupees, to Gujarat Paguthan Energy Corporation Private Limited (GPEC), a wholly owned subsidiary of the China Light and Power Group (CLP Group), for the construction of two wind power projects in India—the 100.8 megawatt (MW) Samana Wind Power Project in Gujarat and the 82.4 MW Saundatti Wind Power Project in Karnataka.

2. Subsequent to Board approval, GPEC requested, and ADB consented to, the conversion of the rupee-denominated loan of Rs4.45 billion into an equivalent US dollar denominated loan of up to \$105 million. This was to be borrowed by two entities—up to \$45 million by GPEC, and up to \$60 million by CLP Wind Farms (India) Private Limited (CWFPL), a 100% subsidiary of GPEC. The Samana project was divided into two equal parts, Samana (Phase 1) and Samana (Phase 2). The Samana (Phase 1) project was developed by GPEC and the Samana (Phase 2) and Saundatti projects were developed by CWFPL. Due to delays in land acquisition, the size of the Saundatti project was reduced from 82.4 MW to 72.0 MW. Consequently \$20 million was cancelled from the CWFPL loan. The GPEC loan was fully disbursed.

3. Effective 3 February 2012, the name GPEC was officially changed to CLP India Private Limited (CIPL).¹ The change of the company name is a reflection of its status as the holding company for business across six states in India, covering conventional and renewable power generation.

B. Key Project Features

4. The Samana Wind Power Project is located in Samana, Jamnagar District in Gujarat State. Each phase consists of 63 wind turbine generators (WTGs). The capacity of each WTG is 800 kilowatts (kW). Electricity generated from the project in CIPL is sold to Torrent Power Limited for 62 WTGs while 1 WTG is for captive use; and electricity generated from the project in CWFPL is sold to the state electricity utility company, Gujarat Urja Vikas Nigam Limited (GUVNL).

5. The Saundatti Wind Power Project is located in Saundatti, Belgaum District, Karnataka State. The project consists of 90 WTGs, each with a capacity of 800 kW. Electricity generated from the project is sold to the state electricity utility company, Bangalore Electricity Supply Company Limited under a 20-year PPA.

6. Construction and operation of the Samana Wind Power Project and the Saundatti Wind Power Project are outsourced to Enercon India Limited (EIL). EIL was responsible for design, development, construction, commissioning, land procurement, and regulatory and statutory approvals. EIL is also responsible for operation and maintenance (O&M) of the projects.

¹ For purposes of borrower reference in this XARR, the new name, CIPL has been used.

C. Progress Highlights

7. The Samana (Phase 1) project was commissioned in March 2009, while the Samana (Phase 2) project was commissioned in January 2011. The Saundatti project was commissioned in December 2010. All projects have been operating satisfactorily.

II. EVALUATION

A. Project Rationale and Objectives

8. The developmental impact objectives as set out in the report and recommendation of the President (RRP)² were as follows. The project aimed to:

- (i) promote sustainable growth in India through contributions towards achieving minimum share targets for renewable energy in the generation mix and towards India's "Power for All" goal;
- (ii) catalyze private sector investment in India's renewable energy sector;
- (iii) mitigate a significant amount of greenhouse gas emissions;
- (iv) improve energy security in India by developing indigenous energy sources;
- (v) reduce the current energy and peak power shortages in the India states of Gujarat and Karnataka;
- (vi) demonstrate a unique model for private sector participation in renewable energy envisaging successful collaboration between a private turnkey project developer and a strategic investor.

B. Development Impact

1. Private Sector Development

9. **Company impact.** The Samana (Phase 1), Samana (Phase 2) and Saundatti wind power projects were the first renewable energy projects developed by CIPL in India. With the assistance of ADB, CIPL was able to secure financing, on a corporate basis, for these projects. During 2008–2012, CIPL has undertaken an additional seven wind power projects, diversifying its presence across six states in India. With a total wind power generation capacity of over 700 MW, CIPL has become one of the largest developers of wind power in India. Following the successful negotiation between CIPL and ADB, amending the ADB facilities, CIPL has also managed to secure nonrecourse debt financing for all of the seven new projects. Building a strong portfolio of wind power projects in India is part of the CLP Group's overall commitment to developing 30% of its global generating capacity from non-carbon emitting energy sources by 2020. Table 1 lists the wind power projects of CIPL.

Table 1: Wind Power Projects Developed by CLP India Private Limited

Project	Capacity (MW)	Location	Actual/expected date of commissioning
Samana (Phase 1)	50.4	Gujarat	February 2009
Samana (Phase 2)	50.4	Gujarat	January 2011
Saundatti	72.0	Karnataka	December 2010

² ADB. 2008. *Report and Recommendation of the President to the Board of Directors: Proposed Loan, India: Gujarat Paguthan Wind Energy Financing Facility*. Manila.

Project	Capacity (MW)	Location	Actual/expected date of commissioning
Khandke	50.4	Maharashtra	June 2009
Theni	99.0	Tamil Nadu	July 2010
Andhra Lake	106.4	Maharashtra	March 2012
Harapanahalli	39.6	Karnataka	February 2011
Sipla	50.4	Rajasthan	January 2013
Tejuva	100.8	Rajasthan	March 2013
Bhakrani	102.4	Rajasthan	February 2013
Total	721.8		

MW = megawatt.
Source: CLP India.

10. **Beyond company impacts.** As of 31 March 2008, the total installed wind power generation capacity in Gujarat was 1,253 MW and in Karnataka was 1,011 MW. Between 2008 and 2012, this capacity increased by 129% in Gujarat and 91% in Karnataka. This is due to a combination of factors, including the demonstration effect of initial projects, incentives offered by central and state governments, and the increased willingness on the part of commercial banks to finance wind power projects. Table 2 lists the cumulative installed wind power generation capacity in Gujarat and Karnataka in 2008–2012. Details of industry and operations overview is in Appendix 3.

Table 2: Cumulative Installed Wind Power Generation Capacity in Gujarat and Karnataka (Megawatts)

State	FY2008	FY2009	FY2010	FY2011	FY2012	% increase (FY2008–2012)
Gujarat	1,253	1,567	1,764	2,076	2,866	129
Karnataka	1,011	1,327	1,473	1,727	1,934	91

FY = fiscal year.

Source: Ministry of New and Renewable Energy.

11. Renewable energy constitutes 16% of the total installed power generation capacity in Gujarat and 24% in Karnataka. Wind energy is the dominant form of renewable energy in the two states, constituting 81% of the total installed renewable energy capacity in Gujarat and 61% in Karnataka. Almost 100% of the wind energy capacity in the two states has been developed by the private sector. Table 3 lists renewable energy as a share of the total installed power generation capacity in the two states.

Table 3: Renewable Energy as a Share of Total Installed Power Generation Capacity, as of 31 March 2012 (Megawatts)

State	Installed renewable energy capacity	Total installed capacity	%
Gujarat	3,499	21,972	16
Karnataka	3,183	13,394	24

Source: Central Electricity Authority.

12. Given the strong impacts of the project, within and beyond the company, the overall impact of the project on private sector development is rated *excellent*. Private sector development indicators and ratings are in Appendix 2.

2. Business Success

13. Both wind farms have been commissioned and are operating successfully. The commissioning of the Samana (Phase 2) wind farm was delayed by 24 months, and the Saundatti wind farm by 18 months. The primary cause was the delay in obtaining the necessary permits from the forest department, as well as negotiating lease agreements with private land owners. The turbines have demonstrated very good reliability, with an average availability of over 95%.

Confidential information deleted

14. The wind farms have demonstrated reliability in operations and FIRR greater than the WACC. Hence the project is rated *satisfactory* for business success.

3. Economic Sustainability

15. The rating for economic sustainability is *satisfactory*.

Confidential information deleted.

4. Environment and Social Safeguards

a. Environmental, Social, Health, and Safety Performance

16. The project is classified as category B based on ADB's environmental safeguard policy. Comprehensive environmental impact studies for the Samana and Saundatti projects were completed in January 2008 in line with ADB's environmental safeguard policies for category B projects, even though the Ministry of Environment and Forest (MOEF) does not require environmental clearance for wind power projects.³

17. The implementation of the environmental management plan and monitoring arrangements have minimized and mitigated the impact of environmental disturbance during construction and operation. The construction of two wind farms involved only minor civil, mechanical, and electrical works, mainly for construction of the wind tower footing, which took place in several small sites, scattered over a wide area. During operations, WTGs do not generate gas or dust emissions. The Samana (Phase 1) project was registered under the Clean Development Mechanism in February 2010. As of December 2011, it has earned 83,599 CERs.

18. CIPL continues to follow the mitigating measures contained in the project environmental management plan. Regular safety, environment, and security audits are undertaken by the asset manager and these have revealed no major environmental or social issues.

19. The projects are classified as category C under ADB's involuntary resettlement safeguard policy. The WTGs are located in uninhabited areas, not suitable for agriculture. The construction and operation of the project did not entail any displacement (physical or economic) nor has it affected any existing structures. The projects are classified as category C under

³ As a general condition stated in MOEF notification SO1533 (14 September 2006) any project or activity specified in category B will be treated as category A if located in whole or in part within 10 km of the boundary of: (i) Protected Areas notified under the Wild Life (Protection) Act, 1972; (ii) Critically Polluted areas as notified by the Central Pollution Control Board from time to time; (iii) Notified Eco-sensitive areas; (iv) interstate boundaries and international boundaries.

ADB's indigenous peoples safeguard policy as the project construction and operation did not entail any impact on indigenous people.

20. Overall, the project's environmental, social, health, and safety performance is rated *satisfactory*. CIPL has always been in compliance with the applicable national and local environmental, social, labor, occupational health, and safety laws and regulations, as well as ADB safeguard policies. Annual environmental and social performance reports have been regularly submitted to ADB and these monitoring reports have demonstrated compliance. The contractor, EIL, has also adhered to all applicable laws and contractual obligations. No major accidents, fatalities, fire incidents or other emergencies were reported during the construction and operation of the Samana and Saundatti projects.

b. Social Safeguards and Public Engagement

21. As per the original configuration of the Samana project, 63 WTGs were expected to be located on degraded forest land, and 63 on government and private lands. In the case of the Saundatti project, out of 103 WTGs, 64 were expected to be located on degraded forest land, and 39 on private land. Use of forest land was expected to be secured through a lease arrangement with the respective government departments, while private land was to be acquired on a "willing-buyer, willing-seller" basis. Under both arrangements, no land use issue came up during construction or operation. Due to substantial delays in securing the requisite permissions for the use of forest lands, the Saundatti project had to be downsized to 90 WTGs. This represents a 13% reduction in capacity compared to the original estimate. As a result, the land requirement also decreased by 13%.⁴ In the case of the Samana project, delay in receipt of permission from the forest department resulted in a change of configuration, though the total number of WTGs remained the same.

22. CIPL's community engagement efforts are primarily focused on education, health, and environmental awareness. Most of the community programs cater to the development needs of the people living in the vicinity of the project sites, benefitting numerous men, women, and children. The child nutrition program provides nutritional supplements to more than 750 children and 120 pregnant or lactating women. The informal education program identifies school drop-outs and brings them back into mainstream education in the form of evening classes. The maternal and child health program is aligned with and complements a government-sponsored drive to improve the health of pregnant women and newborn infants. The environmental program focuses on increasing the environmental awareness of the community through sanitation drives, distribution of educational and environmental materials, and supporting community clean ups.

C. ADB Investment Profitability

23. Confidential information deleted.

24. Given the regular payments made by CIPL and the voluntary prepayment of the CWFPL loan, ADB's investment profitability is rated *satisfactory*.

⁴ This was computed by multiplying the number of tower footings by the land area per footing; from 103 to 90 tower footings, multiplied by 106.65 square meters.

D. ADB Work Quality

25. The quality of ADB's work in the area of screening, appraisal, and structuring is rated *satisfactory*. This project has substantially contributed to achieving development, financial, and economic outcomes.

26. In the area of monitoring and supervision, ADB's work quality is rated *satisfactory*. ADB has proactively managed this investment through regular contact with the borrower. As CIPL undertook internal reorganization, the Facility Agreement with ADB underwent five amendments.⁵ ADB was very responsive to the client, as evidenced by the quick turnaround of the CWFPL refinancing request, resulting in the timely prepayment of the CWFPL loan. CIPL has been appreciative of ADB's responsiveness and is currently discussing new financing opportunities with ADB in the solar energy sector in India.

27. ADB's role and contribution is rated *excellent*. As one of the first lenders to CIPL for wind power projects, ADB played an important role in mobilizing commercial financing. ADB took the lead in due diligence including identification and mitigation of key project risks.

28. Overall ADB work quality is rated *satisfactory*.

E. ADB's Additionality

29. The International Energy Association forecasts that 327 gigawatts (GW) of power generation capacity will be needed by India by 2020, which implies a yearly requirement of about 16 GW.⁶ Wind power could develop much further in India with adequate regulatory support and political will. By 2020, India could have 65 GW of wind power in operation, employing 170,000 people and saving 173 million tons of CO₂ emissions each year⁷. The World Institute for Sustainable Energy (WISE) estimates that just deploying the current generation of wind turbines could yield a potential onshore wind power capacity of 65–100 GW⁸.

30. ADB's additionality is considered *satisfactory* as, subsequent to ADB's financing of the projects, wind power financing (on a project finance basis) has now become fairly mainstream, with commercial lenders increasingly willing to take wind project risks.

F. Overall Evaluation

31. The overall rating of the project is *successful*. The results are set out in Table 7.

Table 7: Evaluation of the Gujarat Paguthan Wind Energy Financing Facility

Indicator/Rating	Excellent	Satisfactory	Partly Satisfactory	Unsatisfactory
Development Impact		X		
Private Sector Development	X			
Business Success		X		
Economic Sustainability		X		
Environment, Social, Health,		X		

⁵ The GPEC Facility Agreement (now CLP Facility Agreement) was originally signed on 23 October 2008. It was then followed by five amendments to date: (i) 26 May 2009, (ii) 15 June 2009, (iii) 21 May 2010, (iv) 01 April 2011, and (v) 27 June 2012.

⁶ Global Wind Energy Council. 2011. *Indian Wind Energy Outlook 2011*. Brussels

⁷ Ibid

⁸ Ibid

and Safety Performance				
ADB Investment Profitability		X		
ADB Work quality		X		
ADB Additionality		X		
Overall Rating	Highly Successful	Successful	Partly Successful	Unsuccessful
		X		

ADB = Asian Development Bank.

Source: Infrastructure Finance Division 1, Private Sector Operations Department, Asian Development Bank.

III. ISSUES, LESSONS AND RECOMMENDED FOLLOW-UP ACTIONS

32. **Wind resource assessment.** A comparison of the actual energy output of Samana (Phase 1) with the original energy estimate shows that, after correcting for the commissioning date of the wind turbines, the energy generation for 2009 was below the original long-term annual energy output estimate. Energy generation for 2010 was also below expectations. In June 2011, a reassessment of the long term energy yield did not find any fundamental problem with the original analysis of the energy yield and attributed the under performance of the wind farm primarily to the variability of wind over time, and the limited data available to accurately measure and model wind variability. However, the study did highlight issues related to lack of data at the appropriate mast height, the importance of adapting the data to the proposed layout and configuration of the wind turbines, and the need to update forecasting models.

33. In this case, as the ADB assistance was structured as a corporate finance facility (as opposed to a nonrecourse project finance facility) the reduction in energy yield did not affect the debt servicing on the ADB loan. However, when ADB considers financing wind power projects on a nonrecourse or limited recourse basis, it should carefully assess the wind resource studies and the energy yield forecasting models. It is recommended that the financial analysis use conservative assumptions of available wind resources, with sufficient debt service coverage to provide a cushion in case of lower wind availability. Thus, in addition to ensuring an adequate downside buffer in determining the level of debt the project is capable of servicing, sponsor analysis is crucial, since sponsors have to be able to absorb the wind and weather risk, or at least offload it to a creditworthy third party.

34. **Land acquisition.** It is recommended that for future infrastructure projects in India, forest locations are avoided as far as possible, even if the project is proposed to be located on degraded forest land. In case it is not possible to avoid forest land, it will be prudent to assume delays in securing the appropriate permissions and hence a delay in overall project completion.

35. **Security structure.** The original financing was a corporate loan with a comprehensive security structure. The security structure, in addition to a pledge over assets financed by ADB, also included a pledge over existing, non-ADB funded, fully operational and deleveraged assets. Although this structure was appropriate at the outset of the project, given ADB's limited risk appetite for wind power projects at that time, once the projects were commissioned, the security and/or collateral was significantly in excess of the outstanding loan amounts. This strong security package presented obstacles for CIPL to obtain nonrecourse financing for subsequent projects. Thus, changing the security package became a material negotiation with CIPL that led to prepayment of the CWFPL facility and other changes to the remaining facility. It is recommended that a standard security structure (in line with prevailing best market practices) be put in place to minimize limitations on a company to expand in similar undertakings.

PROJECT-RELATED DATA**A. Investment Identification**

- | | | |
|----|--|---|
| 1. | Country | India |
| 2. | Investment Number/Loan Number | 7277/2417 and 7277/2434 |
| 3. | Type of Business | Power Generation |
| 4. | Project Title | Gujarat Paguthan Wind Energy Financing Facility |
| 5. | Borrower | Gujarat Paguthan Energy Corporation (GPEC)
CLP India Private Limited (new name effective 3
February 2012) |
| 6. | Sponsor | China Light and Power Group (CLP Group) |
| 7. | Amount of Approved Asian Development Bank (ADB) Assistance
- Direct Loan (original) | \$112 million (US dollar equivalent rupee at
exchange rate in report and recommendation to the
President) |
| 8. | Signed Amount
- Direct Loan (restructured) | \$45 million (GPEC Facility Agreement)
\$60 million (CLP Wind Farms Private Limited
[CWFPL] Facility Agreement) |
| 9. | Environment Category | B |

PRIVATE SECTOR DEVELOPMENT INDICATORS AND RATINGS: INFRASTRUCTURE

Impact of the Project	Ratings				Justification/ Annotations
	Impact to Date	Potential Impact (sustainability) and Risk to its Realization		Combined Rate ^a	
1. Beyond Company Impact	Rating ^b	Rating	Risk ^c		
<p>1.1. Private sector expansion. Contributes as a pioneering or high-profile project to facilitating or preparing for more private participation in the sector and economy at large</p>	Excellent	Excellent	Low	Excellent	The project was the first investment in the wind power sector in India for CIPL. Based on the success of the project, CIPL has invested in 7 new projects with a cumulative wind power generation capacity of over 700 MW.
<p>1.2. Competition. Contributes new competition pressure on public and/or other sector players to increase efficiency and improve access and service in the industry</p>	Excellent	Excellent	Low	Excellent	The success of CIPL in the wind power sector has fostered increased competition. A number of independent power producers now operate in the wind sector, some of which are listed below: 1. Green Infra (438 MW) 2. INOX Renewables (570 MW) 3. NSL Power (850 MW) 4. Orient Green Power (440 MW).
<p>1.3. Innovation. Demonstrates efficient new products and services, including areas such as marketing, distribution, tariffs, production, and technology; and ways to cover or contain cost, manage demand, etc.</p>	Satisfactory	Satisfactory	Low	Satisfactory	The success of the project and the wind power sector in India in general has spurred wind turbine manufacturers to develop new turbines that are better suited to wind conditions in India. Further, the success of the sector has prompted the government to introduce innovative regulations such as RECs and RPOs.
<p>1.4. Linkages. Relative to investments, contributes notable upstream or downstream linkage effects to business clients, consumers, suppliers, key industries, etc. in support of growth</p>	Satisfactory	Satisfactory	Low	Satisfactory	CIPL has promoted linkages with local wind turbine manufacturers as well as other service providers.
<p>1.5. Catalytic element. Contributes by including pioneering and/or catalytic finance, mobilizing or inducing more local or foreign market financing and/or foreign direct investment in the sector</p>	Excellent	Excellent	Low	Excellent	ADB lending to initial wind power projects has had a valuable demonstration effect leading to better understanding of the risks associated with financing of wind farms. Commercial banks in India are now comfortable with lending to wind power projects as evidenced by the nonrecourse financing secured by CIPL and others for their ongoing wind power projects.
<p>1.6. Affected laws, frameworks, regulation. Contributes to improved laws and sector regulation for PPP, concessions, joint ventures, and BOT projects; and to liberalizing markets as</p>	Excellent	Excellent	Low	Excellent	The success of the wind power projects in India has prompted the government to withdraw the accelerated depreciation benefits, which were offered as an incentive to early projects. In

applicable for improved sector efficiency					its place the government has now introduced a REC scheme that is backed by RPOs, thus enabling the creation of a liquid market for renewable energy in India.
2. Company Impact with Wider Potential					
2.1. Skills contribution. Contributes to new strategic, managerial, and operating skills with actual or potential wider replication in the sector and industry	Satisfactory	Satisfactory	Low	Satisfactory	CIPL employs over 400 managerial and technical staff.
2.2. Demonstration of new standards. Demonstrates new ways to operate the business and compete, and investee performance against relevant best industry benchmarks and standards	Satisfactory	Satisfactory	Low	Satisfactory	Based on its international experience, CIPL not only introduced high level service standards, but also a professional work ethic and good corporate governance to its India operations.
2.3. Improved governance. As evident in set standards in corporate governance, stakeholder relations, ESHS fields, and/or in good energy conservation standards	Satisfactory	Satisfactory	Low	Satisfactory	CIPL is committed to reducing its carbon footprint and has set an internal target to develop 30% of its generation capacity from non-carbon emitting energy sources by 2020.
2.3. Other					
3. Overall PSD Rating. Unsatisfactory, partly satisfactory, satisfactory, and excellent. The rating is not an arithmetic mean of the individual indicator ratings, and does not have fixed weights. Actual positive or negative impacts, future impacts, and risks to its realization need to be considered	Excellent	Excellent	Low	Excellent	The Samana and Saundatti wind power projects were first projects undertaken by CIPL in the wind sector in India. CIPL has successfully scaled up its wind power operations in India to include 7 other wind farms. The demonstration effect of these early wind farm projects encouraged nonrecourse financing from local commercial banks, which resulted in the wind power sector growing by 129% in Gujarat and 91% in Karnataka in 2008–2012.

BOT = build, operate, and transfer; CIPL = CLP India Private Limited; ESHS = environmental, social, health, and safety; MW = megawatt; PPP = public–private partnership; PSD = private sector development; REC = renewable energy certificate; RPO = renewable purchase obligation; RRP = report and recommendation of the President.

^a The combined rating should weigh future impact and risk to its sustainable realization.

^b Unsatisfactory, partly satisfactory, satisfactory, and excellent. The rating is not an arithmetic mean of the individual indicator ratings, and these have no fixed weights. Consider already manifest actual impact (positive or negative) and the potential for impact as well as risk to its realization.

^c Rating scale: Risk: high, medium, modest, and low.

INDUSTRY AND OPERATIONS REVIEW

A. Background

1. The total installed power generation capacity in India is 206.5 gigawatts (GW) as of 31 July 2012.¹ However, India is in chronic need of additional power generation. The country continues to suffer from power shortages, with peak demand exceeding supply by 10.6% and an energy deficit of 8.5% in 2010–2011.² To address this shortage and keep up with economic growth, the government has set a target of 92.7 GW additional capacity during the 11th Five Year Plan period, 2007–2012, equivalent to annual growth of 11.4%.³ The International Energy Agency estimates that India will have to add 600–1,200 GW of additional electricity generation capacity by 2050 in order to provide universal access and fully satisfy demand.⁴

2. India also needs to at least maintain its mix of energy sources, not only to combat climate change but also to preserve its energy security. Availability of indigenous fuels is diminishing and India has to import increasing quantities of coal, liquefied natural gas, and uranium. Building wind and other renewable power plants mitigates this dependence on imports. Of the total installed capacity, 66.5% was derived from thermal sources (coal and gas), 19% from hydropower, 2.3% from nuclear power, and 12.1% from renewable energy. India's energy consumption growth rate is much higher than the gross domestic product growth rate, reflecting an increasing share of energy investment. India's energy sector contributes about 58% of the country's greenhouse gas emissions.⁵

B. Wind Power in India

3. The onshore potential for wind energy in India is estimated to be 48.5 GW.⁶ The current installed capacity is 17.3 GW. The states of Tamil Nadu, Karnataka, Maharashtra, and Gujarat together account for over 80% of the total installed wind energy generation capacity.

Table A3.1: State-wise installed wind power capacity (as of 31 March 2012)

State	Potential (MW)	Capacity (MW)	% of total installed capacity
Andhra Pradesh	8,968	246	1
Gujarat	10,645	2,966	17
Karnataka	11,531	1,934	11
Kerala	1,171	35	<1
Madhya Pradesh	1,019	376	2
Maharashtra	4,584	2,733	16
Rajasthan	4,858	2,071	12
Tamil Nadu	5,530	6,988	40
Others	255	3	<1
Total	48,561	17,352	100

MW = megawatt.

Source: Ministry of New and Renewable Energy, Indian Wind Energy Association.

¹ Central Electricity Authority (CEA). 2012. *Monthly Review of Power Sector – July*. New Delhi.

² Central Electricity Authority (CEA). 2012. *Monthly Review of Power Sector – April*. New Delhi.

³ Government of India, Planning Commission. 2006. *Towards Faster and More Inclusive Growth: An Approach to the 11th Five Year Plan*. Delhi.

⁴ International Energy Agency. 2011. *Technology Development Prospects for the Indian Power Sector*. Paris.

⁵ *The Guardian*. 2010. India's greenhouse gas emissions rise by 58%. 12 May.

⁶ Ministry of New and Renewable Energy.

C. Policy and Regulatory Framework

4. The power sector in India is regulated and administered through a complex multi-ministerial structure that involves the Ministry of Power, the Ministry of Coal, the Ministry of Petroleum and Natural Gas, the Ministry for New and Renewable Energy, the Department of Atomic Energy, the Central Electricity Regulatory Commission (CERC), the Planning Commission, and other government agencies. In addition, most states have a state-level Ministry of Power as well as State Electricity Regulatory Commissions (SERCs). Renewable energy policies are embedded in the existing framework of the Electricity Act, 2003; the National Electricity Policy, 2005; and the National Tariff Policy, 2006 (and as amended in December 2010).

1. Electricity Act, 2003

5. The Electricity Act, 2003 was a major step toward: (i) liberalizing the power market in India along the value chain, (ii) encouraging competition, and (iii) attracting private investment. Under Part VII, Section 61(h) of the act, the promotion of cogeneration and electricity generation from renewable sources is identified as a consideration in the establishment of tariff regulations, allowing CERC to establish a preferential tariff for renewable energy.⁷ Further, the open access provision allows licensed renewable energy generators access to transmission lines and distribution systems and only requires that the generators pay a wheeling charge⁸ for the use of the transmission lines and a fee to the load dispatch center.

2. National Electricity Policy, 2005

6. The National Electricity Policy, 2005, stipulates the need to increase the share of electricity from nonconventional sources and allows for the SERCs to establish a preferential tariff for electricity generated from renewable sources to enable them to be cost competitive.⁹ Section 5.12.3 of the National Electricity Policy encourages the development of cogeneration facilities and allows for SERCs to promote arrangements between cogenerators and distribution companies interested in purchasing excess electricity through a competitive bidding process.

3. National Tariff Policy, 2006

7. The National Tariff Policy announced in January 2006 mandates that each SERC specify a renewable purchase obligation (RPO) with distribution companies in a time-bound manner. These purchases are to be made through a competitive bidding process. The objective of this policy is to enable renewable energy technologies to compete with conventional sources. Section 6.4 of the policy calls for the relevant commission to establish preferential tariffs with distribution companies for the purchase of electricity based on nonconventional technologies.¹⁰ As of March 2012, 25 states had established RPOs or had draft regulations under consideration, with RPO requirements of 1–15% of total electricity generation.

⁷ Ministry of Power. *The Electricity Act, 2003*. http://www.powermin.nic.in/acts_notification/electricity_act2003/pdf/The%20Electricity%20Act_2003.pdf

⁸ “Wheeling charge” refers to the amount paid to the transmission company for transporting the electricity from the generating centers to the demand centers.

⁹ Ministry of Power. *The Gazette of India: Extraordinary Part I – Section 1*. http://www.powermin.nic.in/whats_new/national_electricity_policy.htm

¹⁰ Ministry of Power. 2006. *Tariff Policy*. http://www.powermin.nic.in/whats_new/pdf/Tariff_Policy.pdf

4. Tradable Renewable Energy Credits

8. In January 2010, CERC announced the terms and conditions for a tradable renewable energy credits (RECs) program. Under this program, renewable energy generators will have two options—either sell the renewable energy at a preferential tariff fixed by the relevant state electricity regulatory commission, or sell the electricity generated, and the environmental attributes associated with the generation, separately.¹¹ On choosing the second option, the environmental attributes can be exchanged in the form of a REC. The price of the electricity component is equivalent to the weighted average purchase cost for the distribution company, including short-term power purchases, but excluding the renewable power purchase cost. The RECs will be issued by CERC and the value of one REC will be equivalent to 1 megawatt-hour (MWh) of electricity delivered to the grid from renewable energy sources. The RECs can be traded only on power exchanges approved by CERC, within floor and ceiling prices to be determined by CERC from time to time.

Table A3.2: Non-Solar Volume and Ceiling Price of Renewable Energy Certificates in 2012

Month	Cleared Volume (REC)	Cleared Price (Rs/REC)
January	171,524	3,051
February	206,188	3,065
March	199,737	2,907
April	71,226	2,201
May	168,675	2,379
June	236,485	2,405
July	158,220	2,014
August	273,893	1,505
September	264,446	1,500
October	222,700	1,500

REC = renewable energy certificate.

Source: Renewable Energy Certificate Registry of

India <https://www.recregistryindia.in/>

Power Exchange India Limited

<http://www.powerexindia.com/PXIL/>

5. Accelerated Depreciation Benefits under the Income Tax Act

9. The accelerated depreciation scheme was a fiscal incentive created by the government for wind power generators. Under this scheme, 80% depreciation is allowed in the first year post construction and the rest is spread over the life of the project. Accelerated depreciation benefits were intended to assist early development of the sector and they have helped the wind industry to achieve scale in India. Recently the Government of India withdrew accelerated depreciation benefits for wind farms commencing operations after 31 March 2012. With the expiry of the accelerated depreciation benefits, wind power generators will be eligible for only 15% depreciation benefits in the first year, as specified under the Income Tax Act for plant and machinery. An additional 20% benefit is available for power equipment.

¹¹ CERC. 2010. *CERC Announces Renewable Energy Certificate (REC) Regulation—A Step Forward for Green Energy Promotion*. CERC Press Release. 18 January.

6. Generation Based Incentive

10. Under this scheme, a generation based incentive (GBI) of Rs0.50 per unit of electricity fed into the grid will be provided to wind electricity producers for a period of 10 years, with a limit of Rs6.2 million per MW. GBIs were initially available for wind turbines commissioned on or before 31 March 2012. It is expected that the government will reintroduce the GBI scheme for wind farms later in 2012. The GBI scheme is implemented through the Indian Renewable Energy Development Agency (IREDA). A project cannot avail of both GBI and accelerated depreciation benefits.