Document of
The World Bank

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Report No. 19510

PERFORMANCE AUDIT REPORT

CHINA

BEILUNGANG THERMAL POWER PROJECT (LOAN 2706-CHA), WUJING THERMAL POWER PROJECT (LOAN 2852-CHA), AND BEILUNGANG THERMAL POWER EXTENSION PROJECT (LOAN 2955-CHA)

June 29, 1999

Operations Evaluation Department
Sector and Thematic Evaluations Group

Currency Equivalents (annual averages)

Currency Unit = Yuan (Y)

1986	US$1.00	Y 3.46
1987	US$1.00	Y 3.73
1988	US$1.00	Y 3.73
1989	US$1.00	Y 3.73
1990	US$1.00	Y 4.86
1991	US$1.00	Y 5.36
1992	US$1.00	Y 5.49
1993	US$1.00	Y 5.75
1994	US$1.00	Y 8.60
1995	US$1.00	Y 8.30

Abbreviations and Acronyms

CIECC	China International Engineering Consulting Corporation
ECEPA	East China Electric Power Administration
ECEPDI	East China Electric Power Design Institute
ECG	East China Grid
ECPS	East China Power System
GOC	Government of China
ICB	International competitive bidding
ICR	Implementation Completion Report
MOEP	Ministry of Electric Power
MOF	Ministry of Finance
OED	Operations Evaluation Department
SEC	State Economic Commission
SMEPC	Shanghai Municipal Electric Power Company
SPC	State Planning Commission
SPG	Shanghai Power Grid
ZPEPC	Zhejiang Provincial Electric Power Company

Fiscal Year

Government:	January 1 – December 31

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The World Bank
Washington, D.C. 20433
U.S.A.

Office of the Director-General
Operations Evaluation

June 29, 1999

MEMORANDUM TO THE EXECUTIVE DIRECTORS AND THE PRESIDENT

SUBJECT: Performance Audit Report on China
Beilungang Thermal Power Project (Loan 2706-CHA)
Wujing Thermal Power Project (Loan 2852-CHA)
Beilungang Thermal Power Extension Project (Loan 2955-CHA)

Attached is the Performance Audit Report (PAR) prepared by the Operations Evaluation Department (OED) on the above three projects, approved in FY86, FY87, and FY88. The three loans, totaling US$590 million (US$225, US$190, and US$165 million), were almost fully disbursed and closed in FY94, FY95, and FY95, each two years behind the original schedule.

The three projects were representative of the "first generation" of a series of 22 Bank projects approved since 1982 in China's power sector (total lending of about US$5.6 billion). They shared the same primary objectives to (a) reduce severe power shortages in Eastern China via the construction of large modern coal-fired generating plants; (b) introduce the latest plant design and construction technology; and (c) improve utility efficiency through capacity building. Secondary objectives were to promote pricing reform and the introduction of modern utility accounting and auditing standards. The main project components were (a) construction of two 600 MW units at Beilungang (Zhejiang Province) and two 300 MW units at Wujing (Shanghai municipality), with related transmission lines and substations; (b) consultant services for plant engineering, distribution planning, organization and management, and a tariff study; and (c) wide-ranging training for the staff of the two utilities (Zhejiang Provincial Electric Power Company, or ZPEPC, in Zhejiang and Shanghai Municipal Electric Power Company, or SMEPC, in Shanghai). Provisions were also made for annual auditing arrangements, financial covenants, compliance with Bank environmental guidelines, and carrying out of appropriate environmental monitoring and resettlement plans. Considering the sector's fundamental structural weaknesses in the early 1980s and the Bank's support for China's gradualist approach to economic reform, the emphasis in the projects on technology transfer and capacity building as a prelude to more radical reform was fully appropriate.

The projects fully met their physical objectives, albeit with delays for Beilungang—largely due to ZPEPC's initial lack of experience with large-size units. The units were completed at very low cost (US$440-450 per kW) and are among the most efficient in the grid. The institution-building components of the projects and the experience gained during their implementation was critical in preparing ZPEPC and SMEPC for the technical and institutional challenges of the mid- and late-1990s: SMEPC is currently building cutting-edge supercritical 900 MW units at Waigaoqao (Loan 4197, FY97), and central

authorities have selected Zhejiang province to be the testing ground for the most radical steps in sector reform, including the ongoing introduction of a competitive wholesale market (with Bank asssistance). Both companies have remained financially healthy to this day. Progress was only partial, however, in the areas of tariff structure reform and in the introduction of modern accounting and auditing practices. Implementation of the resettlement plans (about 1,500 people) was satisfactory, but environmental monitoring at Wujing has not been as systematic as in Beilungang (where ground monitoring stations were financed under a subsequent Bank loan).

The audit rates the outcome of all three projects as satisfactory and their sustainability as likely (as did the ICRs, except for Wujing, which had been rated as highly satisfactory). The institutional development impact of the first Beilungang and Wujing projects is rated as substantial (as in the ICRs), while that of the Beilungang Extension project is rated as high (substantial in the ICR) in light of ZPEPC's impressive recent transformation, with continued substantial Bank support, into one of China's most efficient and leading reforming utilities. Both borrower and Bank performance for the Beilungang Extension project are rated as highly satisfactory. Borrower and Bank performance for the two other projects is rated as satisfactory (as in the ICRs).

Key lessons and recommendations that can be derived from these projects are:

- Initial technical problems at Beilungang point to the importance of establishing rigorous coal quality control systems in all existing and future coal-fired plants. The initial difficulties ZPEPC had in managing the interface between a large array of contracts points to the benefits inexperienced Chinese utilities can gain by hiring international engineering consultants to help in the procurement *and* management of complex construction projects.

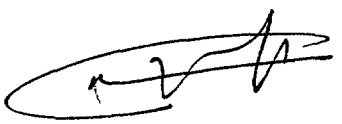
- The higher quality of environmental monitoring at Beilungang can be largely attributed to the Bank agreeing to finance the installation by ZPEPC of its own ground monitoring stations (in contrast, monitoring at Wujing was left to the Shanghai EPA). This approach should be considered in future similar projects to the extent possible. And the Bank's most recent initiative to carry out an ex-post environmental review of Bank-financed power plants *after* loan closing should be emulated in other countries where feasible.

- The remarkable progress ZPEPC achieved over the course of three successive Bank projects and the acknowledged demonstration effect it has had on the sector point to the benefits, in China at least, of the Bank and the government jointly "picking a leader" and "staying with it" over the long haul. A premature Bank withdrawal from this long-standing relationship would likely jeopardize the Bank's future policy leverage in the sector.

- The slow progress achieved in removing distortions in tariff structure points to the limits of the incremental and pragmatic approach followed by the Chinese government on tariff reform. While the dual "new plant-new price" policy addressed the sector's immediate financial needs, it went counter to basic economic principles and fostered inefficiencies. Also, the highly decentralized regulatory process has led to a proliferation, until very recently, of provincial and county-level surcharges, taxes, and fees, which have greatly complicated the central authorities' efforts at promoting rationale pricing.

- Continued uncertainty about the ownership structure of former centrally owned assets leaves a cloud over the reliability of many utilities' financial statements. Resolution of this issue should be a matter of priority for sector authorities and the Bank may consider making it a prerequisite for future lending; the Bank should also revisit its current auditing requirements for Chinese power utilities—and revenue-earning entities in general.

Attachment



Contents

This report was prepared by Mr. Alain Barbu (Task Manager) who audited the projects in March 1998. Mr. William Hurlbut edited the report. Ms. Soon-Won Pak provided administrative support.

Principal Ratings

Beilungang Thermal power Project (Loan 2706-CHA)

	ICR	*Audit*
Outcome	Satisfactory	Satisfactory
Sustainability	Likely	Likely
Institutional Development	*Substantial*	*Substantial*
Borrower Performance	Satisfactory	Satisfactory
Bank Performance	Satisfactory	Satisfactory

Wujing Thermal Power project (Loan 2852-CHA)

	ICR	*Audit*
Outcome	Highly satisfactory	Satisfactory
Sustainability	Likely	Likely
Institutional Development	Substantial	Substantial
Borrower Performance	Satisfactory	Satisfactory
Bank Performance	Satisfactory	Satisfactory

Beilungang Thermal Power Extension Project (Loan 2955-CHA)

	ICR	*Audit*
Outcome	Satisfactory	Satisfactory
Sustainability	Likely	Likely
Institutional Development	*Substantial*	*High*
Borrower Performance	Satisfactory	Highly satisfactory
Bank Performance	Satisfactory	Highly satisfactory

Key Staff Responsible

Loan 2706-CHA

	Task Manager	*Division Chief*	*Country Director*
Appraisal	K. C. Ling	Vineet Nayyar	Gautam Kaji
Completion	Shigeru Kataoka	Richard Newfarmer	Nicholas Hope

Loan 2852-CHA

	Task Manager	*Division Chief*	*Country Director*
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Completion	Shigeru Kataoka	Richard Scurfield	Nicholas Hope

Loan 2955-CHA

	Task Manager	*Division Chief*	*Country Director*
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Completion	Shigeru Kataoka	Richard Scurfiled	Nicholas Hope

Preface

This Performance Audit Report (PAR) is based on a review of the Implementation Completion Reports (ICRs), the Staff Appraisal Reports (SARs), loan documents, and project files for the three projects as well as discussions with Bank staff. An Operations Evaluation Department (OED) mission visited China in March 1998 for discussions with the government and the project implementing agencies. Their cooperation and assistance are gratefully acknowledged.

The ICRs for the three projects are of good quality and include detailed coverage on most aspects of project implementation. This audit report elaborates on environmental and auditing issues not covered adequately in the ICRs, identifies design characteristics and factors of performance common to all three projects, and provides some overall historical perspective to their evaluation. It does *not* attempt to extrapolate the evaluation of these three projects (all "first-generation" coal-based projects located in one region of China) into an overall evaluation of the Bank's assistance strategy in the power sector, given the latter's much broader scope (in terms of the sheer number of lending and non-lending interventions, subsectors addressed, types of projects financed and regions covered). This is the subject of OED's forthcoming China Energy Sector Impact Study.

Following standard OED procedures, this draft PAR was sent to the borrowers for their comments. Comments received are shown in Annex F.

1. Background

1.1 The Bank has made 22 loans to China's electric power sector since 1982, for a total of US$5.6 billion. The three projects being audited were approved in FY86 (Beilungang, Loan 2706 for US$225 million), FY87 (Wujing, Loan 2852 for US$190 million), and FY88 (Beilungang extension, Loan 2955 for US$165 million) and are representative of the "first generation" of Bank projects in the sector. In the 1980s, power supply shortages had become a severe constraint to the rapid economic growth fostered by economic reforms.

1.2 Thus, key sectoral objectives *at the time* were to:

- Expand generating capacity as fast as possible to reduce—and ultimately eliminate—shortages
- Introduce modern technology in plant design, construction, and operation
- Accelerate the pace of cheap hydro-power development
- Develop larger and more efficient coal-fired power stations (as the sector was expected to continue to rely on coal for the bulk of its generation)
- Remove financing constraints by increasing the financial autonomy of power enterprises and by introducing pricing reform.

1.3 While admittedly narrow in terms of policy change and broad institutional reform, even by the Bank standards of the mid-1980s for the power sector, these objectives have to be seen in context: China had just initiated its transition away from a centralized planning system, and its power sector was still characterized by fundamental structural deficiencies, including obsolete technology, absence of modern financial and managerial systems, and wholly inefficient pricing. In that context, and considering the Bank's support to China's gradualist approach to economic reform, the strategic emphasis on technology transfer and capacity building as a prelude to more radical reform was fully appropriate.

2. Project Objectives and Implementation

Objectives and Design

2.1 The three projects are in the East China Power system (Beilungang in Zhejiang province and Wujing in the Shanghai municipality).[1] This region was one of the fastest growing in China and consequently suffered from most severe shortages. Although it was not explicit in the SARs, it is clear from the record that the projects were also chosen for their demonstration potential, as the two utilities (Zhejiang Provincial Electric Power Company, or ZPEPC, in Zhejiang and Shanghai Municipal Electric Power Company, or SMEPC, in Shanghai) were already considered to be among the best performing in the country. All three projects shared the following primary objectives:

- Reduce power shortages via construction of large modern coal-fired generating units and related transmission lines
- Introduce the latest technology in plant design and construction
- Improve utility efficiency via technical assistance and training in technical, financial, and managerial areas

Secondary objectives were to:

- Promote power pricing reform in East China
- Promote the transition of the two utilities to modern accounting standards and greater financial autonomy.

2.2 To meet these objectives, the projects included the following components:

Physical components:

- Construction of two 600 MW units at Beilungang plus related coal unloading facilities and 500 kv lines and substations (Loans 2706 and 2955)
- Construction of two 300 MW units at Wujing and related 220 kv line (Loan 2852)

Institutional components:

- Engineering consultant services for the three projects (all three loans)
- Distribution planning studies for the cities of Shanghai, Hangzhou, and Ningbo (Loans 2852 and 2955)
- A study of ZPEPC's organization and management (Loan 2955)

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1. In addition to Zhejiang province and Shanghai, the East China interconnected power grid comprises the Anhui and Jiangsu provinces and currently accounts for about 20 percent of total power demand in China.

- A study of East China power tariffs (Loan 2706)

- A series of training programs for ZPEPC and SMEPC staff in most aspects of utility operation and management (all three loans)

2.3 In addition, financial objectives were addressed via requirements for audited statements (following international norms) and financial covenants (minimum self-financing and debt service coverage ratios). Finally, provisions were made for the two utilities to abide by the environmental guidelines of both the Bank and China and to carry out appropriate environmental monitoring and resettlement plans (about 1,400 people for the three projects).

2.4 The design of the three projects, with its heavy emphasis on physical objectives and incremental approach to institutional and financial objectives, was consistent with sector priorities at the time (see above). The transfer of technology objective was critical for the two 600 MW units at Beilungang since these were among the first ones of that size to be built in China. It was less obvious in the case of Wujing, since China already had proven capacity in manufacturing and constructing 300 MW units. In retrospect, the Bank's acceptance—after a lot of internal soul-searching—of the modified turnkey procurement arrangement[2] proposed by the Chinese for Wujing was unwise: there were clear indications beforehand that it might deter foreign competition, which it did—only one Chinese bid was received. For the Wujing project, meeting demand quickly was clearly the prime physical objective. The tariff study, the first in China, was, in principle, quite timely as Chinese officials were just starting to open up to the idea of economic pricing in key sectors of the economy.

Project Implementation

2.5 All project components were carried out, and some were even added later thanks to cost savings (financing of distribution works in Shanghai under Loan 2852). However, the two Beilungang units were commissioned with significant delays (18 months for one, 30 months for the other), in contrast with the Wujing units, which were completed 3 months ahead of schedule. Several factors explain this difference in performance:

- The higher complexity of the Beilungang units (which were among the first 600 MW units to be built in China) and the lack of experience of ZPEPC in managing projects of this type

- ZPEPC's (and the central authorities') decision to prematurely curtail the use of foreign consultants for the Beilungang extension project—a policy that was subsequently reversed for the implementation of the (next) Zhejiang Power Development project

- Different procurement arrangements: Wujing was implemented on a modified turnkey basis whereas the packaging of the Beilungang project required some more complex contract management arrangements on the part of a still-inexperienced ZPEPC

- Poor quality of some imported equipment under the Beilungang project, which required rectification on site.

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2. More specifically a single responsibility contract that encompassed all major equipment, but *not* erection works, which were still routinely carried out on force account by all Chinese power utilities at the time.

Cost and Financing

2.6 Costs were kept under control for all three projects. Indeed, at a realized average unit cost of US$440 per kW for the two Beilungang units and US$450 per kW[3] for Wujing (excluding transmission investments), the projects proved very low by international and even Chinese standards. Apparent overruns for *total* project costs reported in the Beilungang Extension and Wujing ICRs (6 and 19 percent, respectively, excluding IDC) are misleading as they primarily reflect a flaw in the calculation of price contingencies at appraisal.[4] The second Beilungang unit was originally expected (in the 1986 SAR for Loan 2706) to be financed by credits from suppliers. When China's external debt situation worsened two years later, the government changed its mind and requested Bank financing, which led to Loan 2955.

3. Achievement of Objectives and Sustainability

Physical Objectives

3.1 *Beilungang plant.* As previously mentioned, problems during construction, particularly of the first unit, delayed commissioning of the plant. In 1993, two years after the first unit was commissioned, the boiler exploded causing the death of 25 people. An investigation of the cause was inconclusive but suggested that the explosion resulted from a combination of factors: (a) poor design of the boiler; (b) substandard quality of the coal used; and (c) ZPEPC's lack of experience in operating this type of unit. Major improvements have since been made and both units have performed extremely well in recent years, as shown in Annex C. In fact, the Beilungang plant has been awarded the (top) "five-star" rating for operational efficiency by central authorities and is now showcased as a model to be emulated by other power plants in China.

3.2 *Wujing plant.* In contrast with Beilungang, the two Wujing units have been mostly problem-free since commissioning and have consistently outperformed other 300 MW units in the Eastern China grid (see Annex C). This excellent operating record has a lot to do with Chinese utilities' (and SMEPC's)' greater familiarity with the construction and operation of smaller 300 MW units.

3.3 Despite the delays at Beilungang, the main objective of reducing power shortages in the Eastern China grid has clearly been achieved with the completion and operation at high load factors of all four generating units. Given the very low unit costs per kW, high operating efficiency, and the absence of more economic alternatives (the region currently has no cheap sources of natural gas or hydro-power), this can be assumed to have been done at least cost (a full ex-post *system* least-cost analysis was not feasible within the scope of the audit). The ex-post economic rates of return (ERRs) for the projects (10.5, 14.1 and 17.1 percent respectively for Beilungang, Wujing and Beilungang Extension) exceed appraisal estimates (8.5, 11.7 and 15.0 percent, respectively). This largely reflects the significant tariff increases (in real term) that have taken place since appraisal (see para. 3.11 below).

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3. In current prices.

4. The exchange rate was assumed constant in spite of a significant differential in expected local and foreign inflation.

3.4 The distribution studies were satisfactorily completed, in part with the effective assistance of a Japanese utility. They helped contributed to the introduction of modern concepts of distribution planning, fostered cooperation between the two utilities, and prepared the ground for distribution works financed under subsequent Bank loans to ZPEPC and SMEPC. The full impact of distribution network modernization is difficult to measure accurately for two reasons: (a) a significant part of the agricultural and residential distribution system remains outside of the provincial/municipal utilities' immediate responsibility (being managed by counties and/or townships instead); and (b) data on quality of service at the retail level (e.g., outage durations, frequency fluctuation, etc.) remains spotty.

Resettlement

3.5 The ICRs provide extensive details on the resettlement programs carried out under the three projects. The nature of the projects kept the number of people needing resettlement relatively low (by Chinese standards), at about 1,500 (773 for Wujing and 723 for Beilungang). Most of these were relocated from areas where new transmission lines were being constructed. The information provided shows that the programs were carried out satisfactorily, that compensation levels were adequate, and that living standards were sustained. This is consistent with Chinese utilities' satisfactory resettlement record evidenced in a recent OED study.[5]

Environmental Aspects

3.6 The coverage of environmental issues in all three ICRs is superficial at best. The increasing emphasis the appraisals of the three projects give to environmental concerns—particularly air quality—illustrates the evolution of the Bank's approach in the late 1980s. The Beilungang I and Wujing SARs (1986 and 1987) give environmental issues a cursory review (one-page and one table) while the Beilungang Extension SAR (1988) includes the findings of an environmental impact report and detailed provisions for an environmental *emission* monitoring program. Even the latter, however, was far from the detailed analysis and reporting requirements included in more recent projects with the same two utilities, which put much more emphasis on the systematic monitoring of *ambient* air quality. Both the Beilungang and Wujing projects included high-efficiency, state-of-the-art electrostatic precipitators for removal of total suspended particulates (TSP) and high stacks to minimize ground concentration of sulfur dioxides (SO_2) and nitrogen oxides (NO_x). In both cases, the SARs stated that a flue gas desulfurization system (FGD) was unnecessary. While the latter assessment made sense for Beilungang, given its relatively isolated location, it certainly warranted further elaboration for Wujing, considering its proximity to Shanghai, a city which even at the time was one of the world's most polluted.[6]

3.7 The two utilities have regularly monitored *stack emissions* and, based on information provided to the audit mission, have been in compliance with both Bank and Chinese standards for TSPs, SO_2 and NO_x. However, monitoring of *ground concentrations* appears to have been carried out much more systematically at Beilungang (since 1996) than at Wujing. The records at Beilungang indicate compliance with Bank and Chinese standards whereas in Wujing the audit mission was unable to obtain data. This is largely explained by the fact that the Bank agreed to

5. "Recent Experience with Involuntary Resettlement. An OED Review" (1998).

6. The region pointed out that (a) proximity to Shanghai by itself does not necessarily mean that Wujing is a potentially significant polluter of Shanghai (as indicated by RAINS modeling); and (b) other methods, such as emissions trading can be cost effective alternatives to FGD.

finance ground monitoring stations at Beilungang, and included corresponding detailed reporting provisions, under the subsequent (Zhejiang Power Development) plant extension project. In contrast, ground monitoring at Wujing was (and remains) the responsibility of the Shanghai EPA and no regular reports were provided to the Bank by SMEPC in the period between plant commissioning (1992) and loan closing in 1995. In retrospect, the Bank should have pursued this issue more actively with SMEPC, both in the context of the last 3 years of project supervision and as part of the preparation of the subsequent Waigaoqao project[7] (particularly in light of the detailed environmental analysis carried out for that project). Indeed, the Bank might have considered financing monitoring stations, as well as pollution prevention and control measures, if warranted, at Wujing under the Waigaoqao loan. Alternatively, it could have considered ways to help the Shanghai EPA strengthen its own environmental monitoring and impact evaluation capacity. Most recently (May 1999), a Bank mission visited China to carry out an environmental review of eight Bank-financed coal-fired power plants (including Beilungang and Wujing). Although the mission's report is still under preparation, initial findings appear to corroborate this audit's assessment.

Institutional Objectives

3.8 The capacity building objectives of the projects have been exceeded beyond all expectations, thanks to a judicious and intensive use of technical assistance and training. New technologies were absorbed rapidly, despite initial problems with the 600 MW units. Witness the latest project financed by the Bank in Shanghai (Waigaoqiao), which involves the construction by SMEPC of supercritical 900 MW units at the cutting edge of coal-fired plant technology. And the experience and knowledge gained by ZPEPC through its exposure to foreign engineering consultants and extensive technical training in the Beilungang project was brought to bear in its so-far highly satisfactory execution of the next phase of the Beilungang extension (under the Zhejiang Power Development Project, Loan 3846, 1995). Finally, the staff of both SMEPC and ZPEPC had only praise for the broad-based middle-management training programs included in the projects and credit them with contributing to instill a new "commercial" culture in the two utilities.[8]

3.9 On the other hand, the ZPEPC organization and management study financed by Loan 2955 and carried out with the help of a French utility did not have much of an immediate impact folowing its completion in 1988. This is probably due to the unfavorable country and sector environment of that period—China's overall economic reform program was largely stalled between 1989 and 1993 due to political events. At most, it can be credited with sowing the seeds of the much more far-reaching restructuring and unbundling program that has been under way in both companies since 1993, under technical assistance activities financed by subsequent Bank loans.

Financial Objectives

3.10 *Tariffs.* The Eastern China tariff study can be credited with exposing a large number of sector officials to the concept of economic pricing and marginal cost methodology—a novelty in China at the time. However, its practical impact has been negligible as almost none of its detailed

7. Loan 4197-CHA, approved in FY97.

8. ZPEPC's ratings of the quality and impact of individual Bank-financed TA and training activities, provided at the request of the audit mission, were all in the 4/5 range (on a scale of 1 to 5).

recommendations have been implemented and severe distortions persist in the structure of tariffs (both at bulk and retail level), in the Eastern China grid as in the rest of the country. Indeed, further distortions have been introduced since that time by the implementation of the dual "new plant-new price" policy and the proliferation of provincial and county-level taxes and miscellaneous surcharges.[9] Incremental changes introduced in tariff policy over the past decade have resulted in a highly complicated system that is in need of drastic reform and simplification. This has been amply documented in recent Bank reports, and improvements are being pursued under recent Bank operations, although with some difficulty. In particular, ZPEPC's efforts over the past two years to reform its tariff structure (in accordance with commitments made under the Zhejiang Power Development Project) have been complicated by conflicting instructions issued by the provincial pricing commission and central authorities.[10]

3.11 *Finances.* Although the tariff system remains excessively complex and not conducive to efficiency, significant across-the-board tariff increases implemented during the past decade have helped maintain the sector on a sound financial footing. Specifically, ZPEPC's and SMEPC's average tariff increased by 4.8 and [3.9] percent per year *in real terms* between 1987 and 1997. As a result, both ZPEPC and SMEPC have remained financially healthy throughout the project's implementation period, as reflected in key financial indicators (Annex B). Both utilities have also increasingly diversified their sources of financing (away from an almost exclusive reliance on government funds until the early 1980s): reflecting overall sector trends, borrowings (both local and foreign) accounted for as much as a third of total funding in recent years (Annex E). However, one looming issue for SMEPC is the recent growth of its accounts receivable, which the audit mission was told is related to the increasingly difficult financial situation of large state-owned enterprises, which account for a substantial share of Shanghai's power demand.

3.12 *Accounting and auditing.* The projects have only partially achieved the objective of promoting the introduction of modern accounting and auditing standards in the two utilities. Recent annual financial reports published by the two companies follow western-style formats and are a major improvement over the type of financial information available only a decade ago when the projects were appraised. But information gathered during the audit mission, and a closer look at the reports, raises concerns about the reliability of financial data and the consistency of the accounting standards used in China. As a case in point, SMEPC provided the audit mission with *two* sets of 1995/96 audited statements:[11] one by the Shanghai Municipal Audit Bureau—the ones routinely sent to the Bank—and one by the Hong Kong branch of Arthur Andersen (commissioned by SMEPC in anticipation of the company's listing on international stock markets). Although differences between the two statements can be explained (they largely relate to the accounting treatment of the still-uncertain ownership structure of some assets devolved by the central government), and neither set of figures implies non-compliance with the Bank's financial covenants, there is an issue as to whether the Bank should continue to accept locally audited statements (as it does for *all* China projects) when audit reports from international firms are known to be available.

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9. The region pointed out that local surcharges were banned throughout China in January 1999.

10. The region pointed out that Zhejiang's unified tariff structure was finally approved by central authorities in May 1999.

11. Indeed, there is yet a *third* set of audited statements, i.e., that produced on the Wujing project accounts by the Municipal Audit Bureau (available only in Chinese).

Sustainability

3.13 Sustainability of all three projects on physical, economic, institutional, and financial grounds is highly likely in light of the plants' low cost, past operating record, and expected full utilization in future; of the impact of the technical assistance and training activities already demonstrated by the successful initial implementation of subsequent projects; and of the structural reforms currently under way in the sector. Whereas Beilungang's *environmental* sustainability seems assured given recent measurements (para. 3.7), that of the Wujing units needs to be verified by additional data on their impact on ground concentrations in the greater Shanghai area.

4. Borrower and Bank Performance

Performance of Borrower and Implementing Agencies

4.1 The performance of SMEPC was fully satisfactory in terms of project management, absorption of new technology, and its being at the forefront of enterprise reform in the sector (indeed it was to be among the first utilities to be partially privatized via listing on the London and Hong Kong stock markets, when the 1997 East Asia crisis required these plans to be put on hold temporarily). However, one area where SMEPC fell short is in the systematic environmental monitoring of the Wujing plant (see para. 3.7). Although ZPEPC's performance was unsatisfactory early in the course of project implementation (see above-referenced project management weaknesses and boiler accident), the company showed an ability to learn quickly from its mistakes and is now recognized as one of the most dynamic and innovative provincial power utilities in China. This is reflected by the fact that Zhejiang has been selected by central authorities to be the testing ground for the most radical steps in sector reform (e.g., introduction of a competitive wholesale market) and has become the largest recipient of Bank assistance (with preparation of a fourth project currently being finalized). The evolution of key annual performance indicators for the two companies (Annex B) illustrates the remarkable progress achieved over the past decade in all aspects of their operations.

4.2 Government performance during the three projects was generally satisfactory. Across-the-board tariff increases were granted to allow for the required financing of local costs. And the government actively fostered the dissemination of the knowledge transferred as part of the projects (e.g., on coal plant technology, financial information systems, tariff methodology) via the organization of sector-wide seminars, workshops, and other means. Furthermore, since 1993 the government has been carrying out an ambitious program of sector reform, with the support of the Bank (involving, *inter alia*, the unbundling of key provincial utilities, the separation of the state's commercial and regulatory functions, and the listing of selected utilities in international capital markets). However, in two areas government performance has clearly been wanting: (a) its slow implementation of tariff structure reform (see para. 3.10); and (b) its reluctance to foster greater coordination of external donors' activities in the sector (exemplified by the government's policy to assign different counterpart central ministries to different donors).

Bank Performance

4.3 The Bank's role in optimizing the design of the projects, helping resolve technical issues during implementation, and sensitizing Chinese officials to the need for exposure to foreign

technology and know-how was fundamental. The somewhat weak emphasis the Bank put on environmental monitoring at project design stage as well as during initial project implementation (particularly for Wujing), although clearly inadequate by today's standards, is more a reflection of the Bank's approach to environmental issues in the mid- and late-1980s than of poor appraisal quality. Indeed, subsequent projects with the same utilities appraised in 1995 (Zhejiang Power Development) and in 1997 (Waigaoqiao) include extensive provisions for such monitoring and have been the subject of systematic in-depth follow up by all recent Bank supervision missions. Furthermore, the region's most recent initiative to carry out an ex-post environmental review of a number of Bank-financed power plants *after* loan closing (para. 3.7) should be commended, as it represents a departure from the traditional narrow approach to project supervision.

4.4 Beyond the three projects, the Bank's assistance strategy in the sector—to promote institutional and policy change in a gradual and pragmatic manner—appears to have been successful judged by the progress achieved (particularly since 1993) on most fronts, with the exception of the issue of tariff structure.[12] Construction management and operating efficiency have improved tremendously; newer power projects are at the cutting edge of technology; shortages have been reduced; and sector finances have remained generally sound—despite the East Asia crisis. One area where the Bank might have performed better is in pursuing closer cooperation with other donors (at least in the technical assistance and training areas), although this was (and still is) not easy given the government's lack of enthusiasm in that regard (para. 4.2). Major factors behind the Bank's generally successful performance in the sector, which OED's forthcoming China Energy Sector Impact Study will analyze in more depth, include (a) a balanced combination of substantial lending and high-quality, focused, and highly participatory sector work; (b) continuity and high level of expertise of Bank staff involved in the program (which probably explain the surprisingly low average lending costs of China power projects); and (c) a two-pronged involvement—at the central and provincial levels.

5. Conclusions and Lessons Learned

Overall Assessment and Summary of Ratings

5.1 All three projects fully met their physical objectives (albeit with substantial delays for Beilungang), and even exceeded them considering the outstanding operating records of the plants in recent years. Ex-post ERRs are slightly above appraisal estimates and the Beilungang projects have largely met their institution-building objectives. However, environmental monitoring of the Wujing plant could have been more systematic, the companies' transition to modern accounting and auditing practices has not yet been fully completed (particularly in SMEPC) and the tariff study did not have the expected impact on tariff policy. For these reasons, project **outcome** is rated as only satisfactory for all three projects (the ICR for the Wujing project had rated outcome as highly satisfactory). **Institutional development impact** is rated as high (substantial in the ICR) for the Beilungang Extension project, considering ZPEPC's remarkable transformation, during the latter part of that project's implementation, into one of the most efficient and leading power utilities in China, and substantial (as in the ICR) for the first Beilungang and Wujing projects. The **sustainability** of all three projects is considered likely. **Borrower performance** is

12. Critics have argued that another weak area of progress has been in attracting foreign private investments–notwithstanding the fact that China has accounted for as much as a third of all such investments in East Asia. This topic is outside the scope of the audit but will be addressed in the forthcoming Energy Sector Impact Study.

rated satisfactory for the Beilungang and Wujing projects (instead of satisfactory and highly satisfactory in the respective ICRs) and highly satisfactory for the Beilungang Extension project (satisfactory in the ICR), in light of the remarkable progress achieved by ZPEPC in recent years, which more than offsets the delays in physical project completion. Similarly, **Bank performance** is rated satisfactory for the Beilungang and Wujing projects and highly satisfactory for the Beilungang Extension project (versus satisfactory in all three ICRs).

Lessons Learned and Recommendations

5.2 The following key lessons and recommendations emerge from the experience of the three projects:

- Initial technical problems encountered in Beilungang point to the critical importance of setting up rigorous coal quality control systems in all existing and future coal-fired plants (para. 3.1). And ZPEPC' s initial difficulties in managing the interface between a large array of contracts points to the benefits for inexperienced Chinese utilities of hiring international engineering consultants to help in the procurement and management of complex construction projects (para. 3.8).

- The higher quality of environmental monitoring at Beilungang can be largely attributed to the Bank agreeing to finance the installation by ZPEPC of its own ground monitoring stations (in contrast, monitoring at Wujing was left to the Shanghai EPA). This approach should be replicated in future projects to the extent possible (para. 3.7). And the Bank's most recent initiative to carry out an ex-post environmental review of Bank-financed power plants *after* loan closing should be emulated in other countries where feasible (para. 4.3).

- The remarkable progress ZPEPC achieved over the course of three successive Bank projects, and the acknowledged demonstration effect it has had on the sector as a whole, points to the benefits, in the Chinese environment at least, of the Bank and the government jointly "picking a leader" and "staying with it" over the long haul. A premature Bank withdrawal from this long-standing lending relationship would likely hamper the Bank's policy leverage in the sector (para. 4.1).

- The slow progress achieved in removing distortions in tariff structure points to the limits of the incremental and pragmatic approach followed by the Chinese government on tariff reform. While the "new plant-new price" policy addressed the sector's immediate financial needs, it went counter to basic economic principles and fostered inefficiencies (e.g., in plant utilization). Also, the highly decentralized regulatory process has led to a proliferation, until very recently, of provincial and county-level surcharges, taxes, and fees. which now greatly complicated the central authorities' efforts at promoting rationale pricing (para. 3.10).

- The continued uncertainty regarding the ownership structure of former centrally owned assets leaves a cloud over the reliability of many utilities' financial statements. Resolution of this issue should be a matter of priority for sector authorities and the Bank may consider making it a prerequisite for future lending. The Bank should also revisit its current auditing requirements for revenue-earning entities—and at the very least insist on receiving international auditors' reports whenever they have been prepared (para. 3.11).

Basic Data Sheet

CHINA: BEILUNGANG THERMAL POWER PROJECT (LOAN 2706-CHA)

Key Project Data *(amounts in US$ million)*

	Appraisal estimate	*Actual or Current estimate*	*Actual as % of appraisal estimate*
Total project costs	625.5	378.20	60%
Loan amount	225.0	224.36	
Local bank	400.5	149.73	
Other external sources	0.0	4.11	
Cancellation			
Date physical components completed	12/31/91	7/1/92	
Economic rate of return	8.5%	10.5%	

a. Financing for repair of the No. 1 boiler after the accident. The source of the financing was provided from production funds.

Cumulative Estimated and Actual Disbursements

	FY87	*FY88*	*FY89*	*FY90*	*FY91*	*FY92*	*FY93*	*FY94*
Appraisal estimate (US$M)	30.0	70.0	150.0	190.0	215.0	225.0		
Actual (US$M)	16.9	24.4	132.2	168.9	181.3	203.7	218.4	224.4
Actual as % of appraisal /a	56.3	34.9	88.1	88.9	84.3	90.5		
Date of final disbursement: October 31, 1994								

a. $630,741.76 was cancelled from the loan on 10/31/94. Total disbursement of $224,369,258.24 was made on 10/31/94. *Note:* The loan closing date was extended twice due to delays in procurement of training simulator 500 kV protection relay system for the third transmission line and ash-handling system for the second unit.

Project Dates

	Original	*Actual*
Identification	-	08/84
Preparation	03/85	10/84
Appraisal	06/86	07/85
Negotiations	02/86	04/86
Board approval	04/86	05/29/86
Signing	-	07/01/86
Effectiveness	-	08/27/86
Project Completion	12/30/91	07/01/92[a]
Closing date	06/30/92	05/30/94

a. Commercial operation.

Staff Inputs (staff weeks)

	Planned Staff weeks	*Actual Staff weeks*	*Actual US$ ('000)I*
Preappraisal		57.5	155.3
Appraisal	30.0	45.0	121.5
Negotiations		5.0	13.5
Supervision		68.0	183.6
Completion		3.0	8.1
Total		178.5	482.0

Mission Data

	Date (month/year)	No. of persons	Staff days in field	Specializations represented[a]	Performance rating[b]	Rating trend	Types of problems[c]
Identification/ Preparation	09/84	2	7	E, E			
Appraisal							
Supervision	11/87	3	8	E, E, FA	1		P
	03/89	3	10	E, E, FA	1		PM
	04/90	2	5	E, E	1		PM
	03/91	3	7	E, E, FA	1		PM
	06/91	1	3	E	1		PM
	06/92	1	3	E, E, FA	1		PM
	09/92	1	6	EC	1		PM
	06/93	1	8	E	2		BA
	04/94	1	2	E	1		PM
Completion							

a. E=Engineer; FA=Financial Analyst; EC=Economist.
b. 1= no significant problems; 2=moderate problems.
c. Types of Problems: P=Procurement; PM=Project Management; BA=Boiler accident.

Other Project Data

FOLLOW-ON OPERATIONS

Operation	Credit no.	Amount (US$ million)	Board date
Shuikou Hydroelectric Project I	Ln. 2775	140	1/6/87
Shuikou Hydroelectric Project II	Ln. 3515	100	9/1/92
Wujing Thermal Power Project	Ln. 2852	190	6/23/87
Ertan Hydroelectric Project	Ln. 3506	380	7/2/91
Ertan Hydroelectric II Project	Ln. 3933	400	8/22/95
Daguangba Multipurpose Project	Cr. 2305	37	10/31/91
	Ln. 3412	30	
Yanshi Termal Power Project	Ln. 3933	400	8/22/95
Zouxian Thermal Power Project	Ln. 3462	310	4/21/92
Tianhuangping Hydroelectric Project	Ln. 3616	300	5/18/93
Yangzhou Thermal Power Project	Ln. 3718	350	3/22/94
Zhejian Power Development Project	Ln. 3846	400	2/28/95
Sichuan Transmission Project	Ln. 3748	270	2/28/95
Henan (Qinb.) Thermal Power Project	Ln. 3980	440	2/27/96
Tuoketuo Power/Inner Project	Ln. 4172	400	5/27/97
Shanghai Waigaoqiao Thermal Power Project	Ln. 4197	400	6/24/97
E. China/Jiangsu Transmission Project	Ln. 4303	250	3/26/1998
Hunan Power Development Project	Ln. 4350	300	6/18/1998

CHINA: WUJING THERMAL POWER PROJECT (LOAN 2852-CHA)

Key Project Data *(amounts in US$ million)*

	Appraisal estimate	*Actual or current estimate*	*Actual as % of appraisal estimate*
Total project costs	321.9	381.8	119%
Loan amount	190.0	190.0	
Cofinancing			
Cancellation			
Date physical components completed	12/3/92	12/27/92	
Economic rate of return	11.7%	15.9%	

Cumulative Estimated and Actual Disbursements

	FY88	*FY89*	*FY90*	*FY91*	*FY92*	*FY93*	*FY94*	*FY95*	*FY96*
Appraisal estimate (US$M)	10.7	37.1	89.0	140.8	169.8	190.0			
Actual (US$M)	0.0	21.8	42.5	92.8	139.3	161.8	169.6	189.2	190.0
Actual as % of appraisal	0.0	58.8	47.8	65.9	82.0	85.2			

Date of final disbursement: August 2, 1995.

The loan closing date was extended twice for procurement of electrical equipment for improvement of the Shanghai distribution network.

Project Dates

	Original	*Actual*
Identification/Preparation		09/86
Appraisal	11/86	11/86
Negotiations	05/87	05/87
Board approval		06/23/87
Signing		02/03/88
Effectiveness		04/14/88
Project completion	12/31/92	12/27/92
Closing date	06/30/93	6/30/95

/a Commercial operation.

Staff Inputs (staff weeks)

	Actual	
	Staff weeks	*$'000*
Preparation to appraisal	n.a.	26.1
Appraisal	n.a.	n.a.
Negotiations through Board approval	n.a.	2.7
Supervision	50.1	111.0
Completion	1.6	11.2

Mission Data

	Date (month/year)	*No. of persons*	*Staff days in field*	*Specializations represented*	*IS*	*DO*	*Types of problems*
Identification/ Preparation	11/86	3		E, F, E			
Appraisal							
Supervision	03/89	3	5	E, E, FA	1		
	09/89	3	2	E, E, FA	1		
	10/90	3	5	E, E, FA	1		
	06/91	2	3	E, S	1		
	06/92	4	4	E, E, FA, S	1		
	06/93	1	3	E	1		
	06/94	2	2	FA, E	1		
	03/95	1	2	E	1		
Completion	07/95	2	2	FA, E			

Specialization: E=Engineer; FA=Financial Analyst; S=Support.
Implementation Status: 1=no significant problems.

CHINA: BEILUNGANG THERMAL POWER EXTENSION PROJECT (LOAN 2955-CHA)

Key Project Data *(amounts in US$ million)*

	Appraisal Estimate	*Actual or Current estimate*	*Actual as % of appraisal estimate*
Total project costs*	260.9	276.89	106%
Loan amount	165.0	164.94	
Cofinancing			
Cancellation	--	0.06	
Date physical components completed	5/31/92	11/18/94	
Economic rate of return	15.0%	17.1%	

* Excl. IDC.

Cumulative Estimated and Actual Disbursements

	FY89	*FY90*	*FY91*	*FY92*	*FY93*	*FY94*	*FY95*	*FY96*
Appraisal estimate (US$M)	25.0	100.5	140.1	151.0	165.0			
Actual (US$M)	19.0	48.6	111.7	130.5	136.7	140.7	145.6	164.9
Actual as % of appraisal /a	76.0	48.4	79.7	86.4	82.8			
Date of final disbursement: October 31, 1995								

/a US$55,505.73 was cancelled from the loan on 10/31/95. Total disbursement was $164,944,494.27.

Project Dates

	Original	*Actual*
Identification/Preparation		11/87
Appraisal	2/88	2/88
Negotiations	5/88	5/88
Letters of Development Policy		
Board approval	6/88	6/14/88
Signing		10/20/88
Effectiveness		02/02/89
Project completion	5/31/92	11/18/94 /a
Closing date	6/30/93	6/30/95

/a Commercial operation.

Staff Inputs (staff weeks)

	SWs	*$'000*
Preparation to appraisal	54.8	27.3
Appraisal	25.1	47.7
Negotiations through Board approval	16.4	33.8
Supervision	58.0	165.4
Completion	3.0	13.0
Total	157.3	287.2

Mission Data

	Date (month/year)	*No. of persons*	*Staff days in field*	*Specializations represented*	*Performance rating*	*Rating trend*	*Types of problems*
Identification/ Preparation	11/87	3	17	E, E, FA			
Appraisal	2/88	3	12	E, E, FA			
Supervision	03/89	3	5	E, E, FA	1		
	04/90	3	5	E, E, FA	1		
	11/90	2	4	EC, EC	2		IM
	03/91	3	7	E, E, FA	1		CW
	06/91	1	3	E	1		
	06/92	4	4	E, E, FA, L	1		SC
	09/92	1	6	EC	1		QU
	06/93	1	4	E	2		PM, Q
	04/94	1	2	E	1		PM, Q
Completion	03/95	1	3	E	1		

Specialization: E=Engineer; FA=Financial Analyst; EC=Economist; L=RMC staff.
Performance Rating: 1=no significant problems; 2=moderate problems.
Types of Problems: IM=Delay in implementation of a study on ZPEPB's organization and management; CW=Delay in civil work due to soft socil condition; SC=Delay in schedule; QU=Quality Control; PM=Project Management.

Key Performance Indicators

Beilungang and Wujing Thermal Power Projects (Loans 2706, 2955 and 2852)

ZPEPC

	1987	*1989*	*1991*	*1993*	*1995*	*1997*
• Energy Sales (Gwh)	14,187	16,372	20,569	26,935	34,123	
• System load factor (%)	86.5	85.9	85.3	86.6	87.3	88.6
• Average coal consumption (g/kwh)	410	408	397	388	342	
• No. of customers per employee	27	32	34	33	38	
• Net sales per employee (Mwh)	420	510	610	770	940	
• Average tariff (1997 fen/kwh)*	21.3	20.3	25.2	36.1	32.0	33.9
• Self financing ratio (%)	8	15	44	104		
• Debt service coverage (times)	2.0	2.4	2.1	3.5		
• Debt equity ratio	36:64	53:47	64:36	49:51		
• Accounts receivable (days of sales)						

* excl. VAT

SMEPC

	1987	*1989*	*1991*	*1993*	*1995*	*1997*
• *Energy Sales* (Gwh)	17,190	18,751	20,774	25,885	28,737	
• System load factor (%)	86.7	85.0	84.8	84.8	84.4	
• Average coal consumption (g/kwh)	360	357	351	334	333	
• No. of customers per employee	24	31	38	49	79	
• Net sales per employee (Mwh)	540	600	670	810	900	
• Average tariff (1997 fen/kwh)*	23.3	25.7	28.2	34.5	31.7	
• Self financing ratio (%)	31	32	24	28		
• Debt service coverage (times)		4.1	5.2	4.9		
• Debt equity ratio	43:57	47:53	57:43	52:48		
• Accounts receivable (days of sales)				24	29	

* excl. VAT

Semi-Annual Operational Data

Table 1. Beilungang Thermal Power Projects (Loans 2706 and 2955-CHA)

The Whole Plant	*Unit*	*97(FH)*	*97(SH)*	*97*	*96(FH)*	*96(SH)*	*96*	*95(FH)*	*95(SH)*	*95*
Power generation	MWh	3821380	3820620	7642000	2857350	3923400	6780750	2792470	3706070	6498540
Availability	%	88.81	94.21	91.53	64.25	91.44	77.92	76.41	80.92	78.68
Equivalent availability factor	%	88.52	93.51	91.03	62.60	90.75	76.76	73.96	77.35	75.67
House auxiliaries loss	%	3.86	4.28	4.07	3.98	3.98	3.98	4.78	4.46	4.60
Coal consumption (g/standard coal per kWh)	g/kWh	317.50	321.80	319.60	322.20	323.40	322.90	330.60	321.60	325.50
	Unit	*97(FH)*	*97(SH)*	*97*	*96(FH)*	*96(SH)*	*96*	*95(FH)*	*95(SH)*	*95*
Power generation	MWh	2032440	1889020	3921460	1637890	2163900	3801790	1743170	2253610	3996780
Availability	%	97.58	92.26	94.90	74.80	99.62	87.28	85.99	95.05	90.56
Equivalent availability factor	%	97.47	91.61	94.51	72.04	98.87	85.54	83.34	93.02	88.22
House auxiliaries loss	%	4.35	4.68	4.51	4.46	4.39	4.42	4.87	4.57	4.70
Coal consumption (g/standard coal per kWh)	g/kWh	318.30	320.80	319.50	320.60	322.90	321.90	327.20	320.90	323.60
	Unit	*97(FH)*	*97(SH)*	*97*	*96(FH)*	*96(SH)*	*96*	*95(FH)*	*95(SH)*	*95*
Power generation	MWh	1788940	1931600	3720540	1219460	1759500	2978960	1049300	1452460	2501760
Availability	%	80.05	96.15	88.16	53.70	83.27	68.56	66.83	66.78	66.80
Equivalent availability factor	%	79.56	95.41	87.55	53.16	82.63	67.98	64.58	61.67	63.11
House auxiliaries loss	%	3.30	3.88	3.60	3.32	3.47	3.41	4.63	4.29	4.43
Coal consumption (g/standard coal per kWh)	g/kWh	316.50	322.80	319.80	324.40	324.10	324.20	336.30	322.60	328.30

Note: FH=First half; SH=Second half

Table 2. Wujing Thermal Power Project (loan 2852-CHA)

Year	Unit no.		Efficiency	Coal consumption in power generation	Coal consumption in power supply	Electricity generated	Plant electrical consumption rate	Heat consumption	Steam rate	Equivalent available rate	Equivalent forced stop rate	Vacuum degree
			%	g/Kw.h	G/Kw.h	10MW.h	%	kj/kW.h	kg/kW.h			%
1993	Unit 11	1st semi-year	43.86	336	353	71091	5.03	8762	3.33	72.80	16.95	0.99
		2nd semi-year	38.41	344	364	82156	5.50	8384	3.18	84.45	8.87	0.99
	Unit 12	1st semi-year	39.60	335	353	77801	4.98	9116	3.29	79.03	10.06	0.99
		2nd semi-year	40.60	343	362	74223	5.26	8861	3.26	81.63	10.88	0.99
1994	Unit 11	1st semi-year	38.23	331	349	53465	5.15	9403	3.33	57.54	7.16	91.54
		2nd semi-year	38.59	338	356	89975	4.98	9344	3.37	74.42	4.52	89.34
	Unit 12	1st semi-year	39.92	332	350	86916	5.08	9026	3.35	90.43	3.91	94.53
		2nd semi-year	39.85	341	359	87258	5.06	9037	3.34	91.05	3.34	92.62
1995	Unit 11	1st semi-year	39.93	334	353	80203	5.32	9004	3.26	86.54	10.21	92.06
		2nd semi-year	40.00	335	353	96325	5.13	8953	3.32	89.32	2.91	89.86
	Unit 12	1st semi-year	40.50	333	352	53412	5.41	8864	3.23	58.20	6.05	93.41
		2nd semi-year	40.94	335	353	86773	5.04	8780	3.24	71.50	4.58	91.38
1996	Unit 11	1st semi-year	39.48	334	350	87927	4.65	9116	3.24	82.44	3.33	93.05
		2nd semi-year	38.97	336	353	87288	4.98	9238	3.32	84.07	2.23	89.44
	Unit 12	1st semi-year	41.91	333	349	91988	4.61	8594	3.18	87.15	2.90	94.17
		2nd semi-year	41.19	336	353	88784	4.95	8960	3.30	89.66	1.71	91.84
1997	Unit 11	1st semi-year	39.83	331	347	75903	4.62	9042	3.26	71.66	15.18	88.12
		2nd semi-year	38.92	336	353	98506	4.82	9254	3.29	83.75	7.06	89.13
	Unit 12	1st semi-year	41.16	331	347	94237	4.69	8750	3.24	88.37	0.14	92.99
		2nd semi-year	40.43	334	350	99793	4.60	8906	3.27	92.79	0.12	92.12

Note: The 2nd semi-year figures of Equivalent available rate, and Equivalent forced stop rate refer to the whole year's average value.

Average Tariffs by Consumer Category

Chart 1. ZPEPC Tariff (including VAT, no local surcharge)

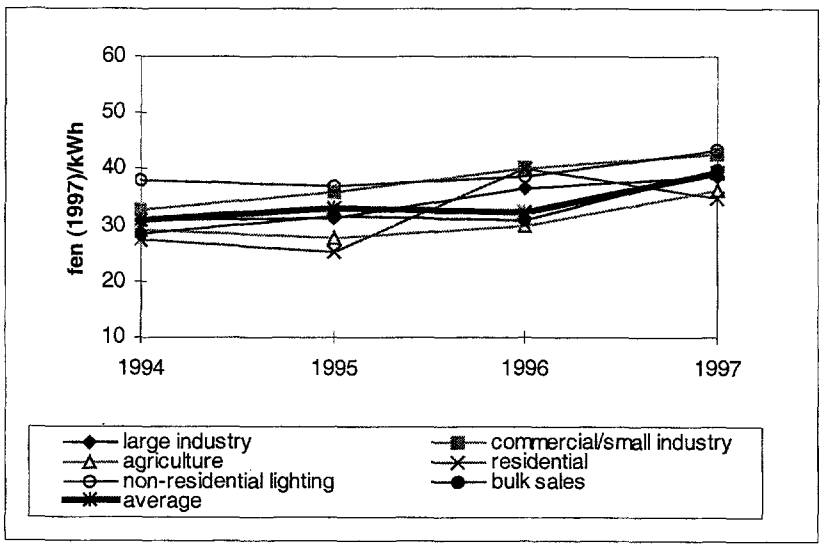
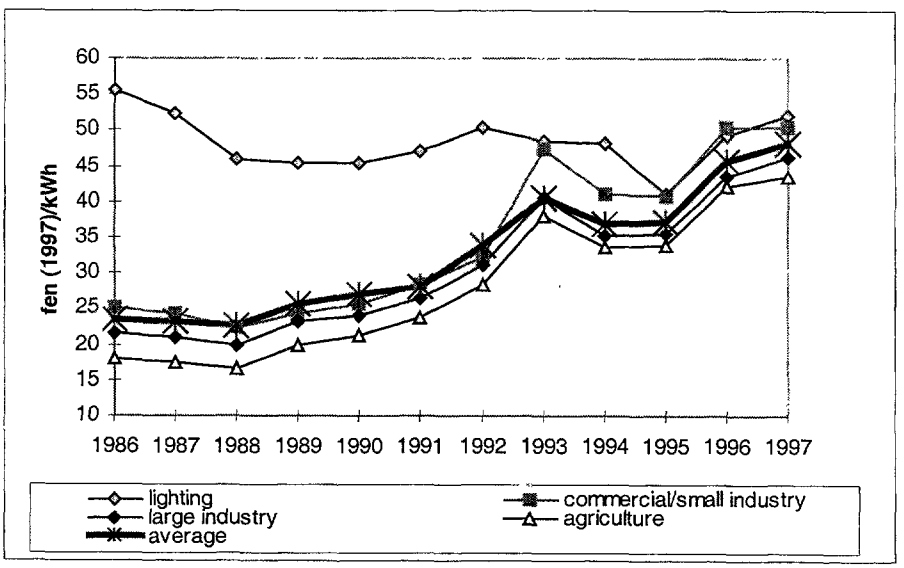


Chart 2. SMEPC Tariff (including VAT but excluding surcharges)



Sources of Financing for ZPEPC and SMEPC

Chart 1. Source of ZPEPC Investment

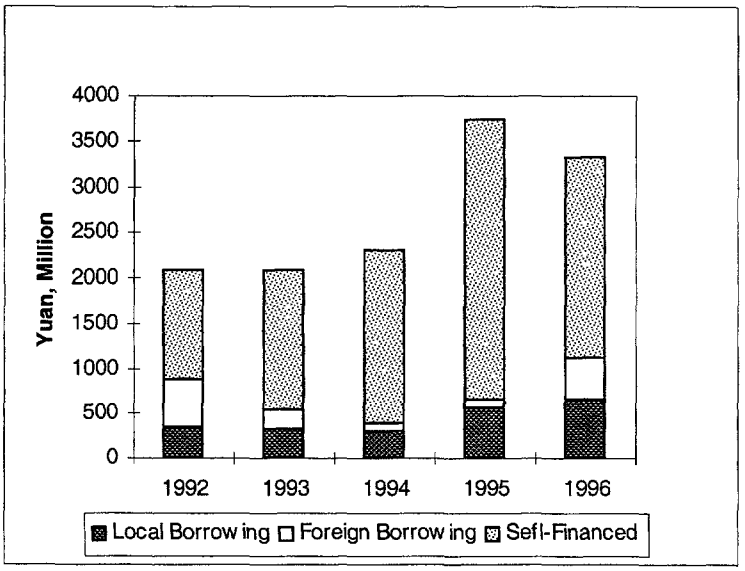
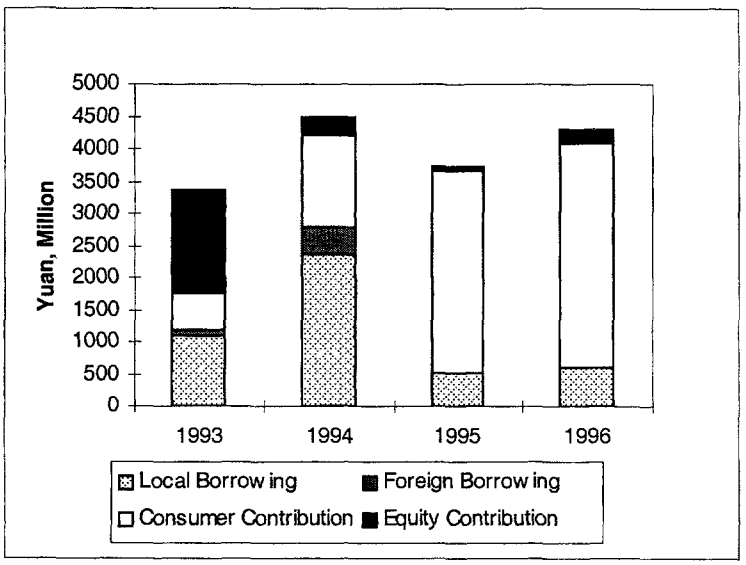


Chart 2. Sources of SMEPC Investment



Comments from Borrower

浙 江 省 电 力 公 司

ZHEJIANG PROVINCIAL ELECTRIC POWER COMPANY

Mr. Gregory K. Ingram
Manager
Sector and Thematic Evaluations Group
Operations Evaluation Department
The World Bank

July 13, 1999

Dear Mr. Ingram,

Beilungang Thermal Power Project (Loan 2706-CHA)
Beilungang Thermal Power Extension Project (Loan 2955-CHA)
Draft Performance Audit Report

The Draft Performance Audit Report has been received with thanks. We have no comments to the report.

We will try our best to learn the experience and lesson from the two projects and fulfil the objectives for Zhejiang Power Development Project.

Yours sincerely,

Chen Jimin
General Manager
Zhejiang Provincial Electric Power Company

SHANGHAI MUNICIPAL ELECTRIC POWER COMPANY

TO: Mr.Alain Barbu
THE WORLD BANK GROUP
FAX NO: 001-202-5223123
FROM: Cui Jianchou
Shanghai Municipal Electric Company
FAX NO: 0086-21-6329-1440

Thank you for your fax dated June 16,1999. We have no objection to the Performance Audit Report.

Best regards,

Cui Jianchou

Deputy Chief Engineer

SMEPC

崔剑仇

29.06.99