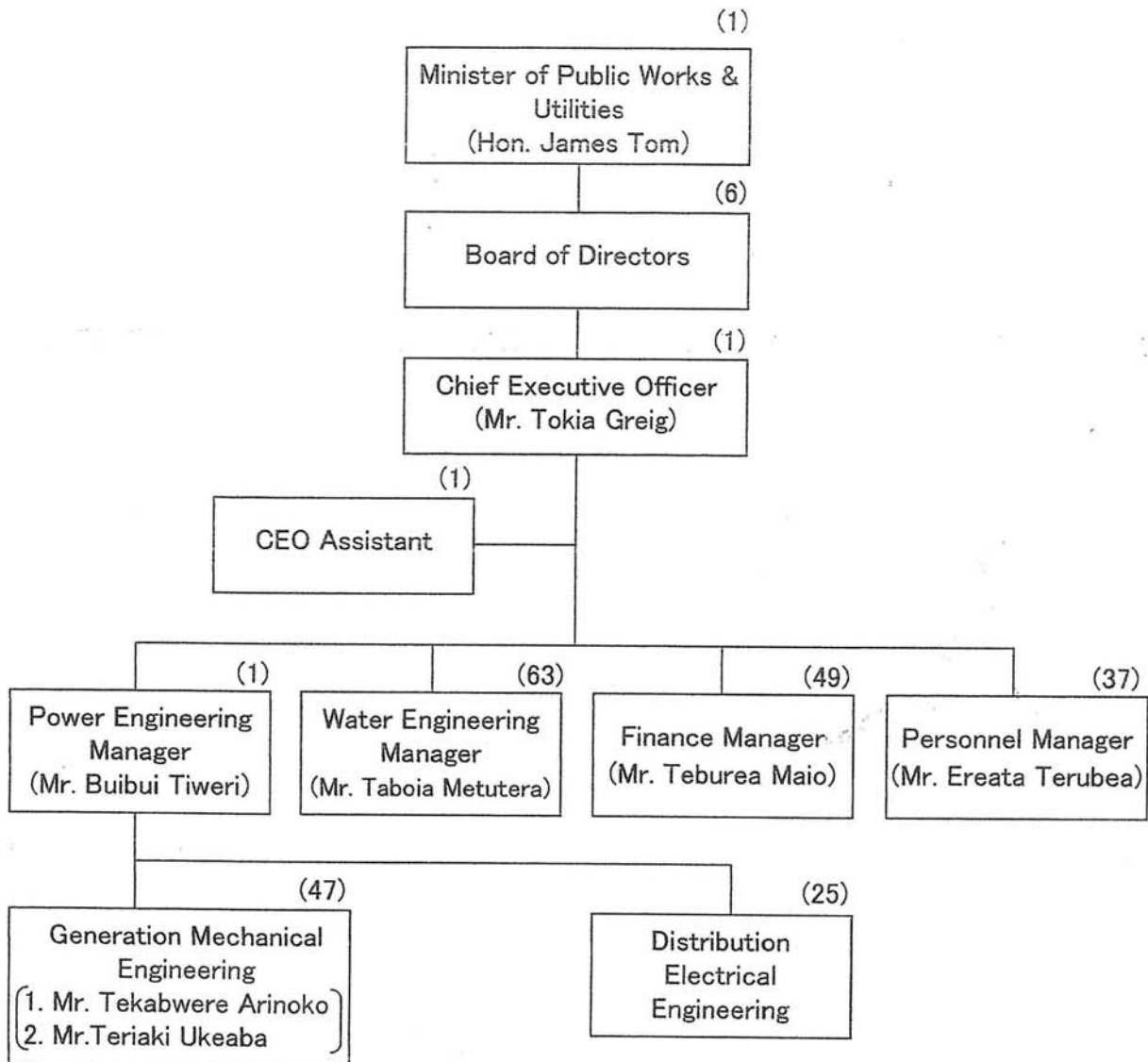


ORGANIZATION

PUBLIC UTILITIES BOARD (PUB)



(Total 231)

Remarks: Numerical values in parenthesis indicate the number of staffs in the section or department.

(As of 4th December 2003)

JAPAN'S GRANT AID SCHEME

The Grant Aid scheme provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

Japan's Grant Aid Scheme is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using Japanese consulting firms.

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Scheme, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes (E/N) signed by the Governments of Japan and the recipient country.

Finally, for the smooth implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project"), is to provide a basic document

necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

1. Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
2. Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view;
3. Confirmation of items agreed upon by both parties concerning the basic concept of the Project.
4. Preparation of a basic design of the Project.
5. Estimation of cost of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For smooth implementation of the Study, JICA uses registered consulting firms. JICA selects firms based on proposals submitted by interested firms. The firms selected carry out a Basic Design Study and write a report, based upon terms of reference set by JICA.

The consulting firms used for the Study are recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

3. Japan's Grant Aid Scheme

1) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

- 2) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedure such as exchanging of the Notes, concluding contracts with consulting firms and contractors and final payment to them must be completed.

However, in case of delays in delivery, installation or construction due to unforeseen factors such as natural disaster, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

- 3) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

- 4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability of Japanese taxpayers.

- 5) Undertakings required to the Government of the recipient country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as the following:

1. To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the Project,
2. To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,
3. To secure buildings prior to the procurement in case the installation of the equipment,
4. To ensure all the expense and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,
5. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the verified contracts,
6. To accord Japanese nationals, whose services may be required in connection with supply of the products and services under the Verified contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

- 6) "Proper Use"

The recipient country is required to operate and maintain the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

7) "Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.

8) Banking Arrangement (B/A)

- a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the verified contracts.
- b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of recipient country or its designated authority.

9) Authorization to pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

(end)

Major Undertaking to be taken by Each Government

NO	Items	To be covered by Grant Aid	To be covered by Recipient side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot	●	
5	To construct roads		
	1) Within the site	●	
	2) Outside the site		●
6	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer	●	
7	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
8	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine(Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	
9	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
10	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		●
11	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
12	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●

(B/A: Banking Arrangement, A/P: Authorization to Pay)

基本設計概要表

1. 案件名
キリバス共和国 第二次タラワ環礁電力供給施設整備計画
2. 要請の背景（協力の必要性・位置付け）
<p>(1) キリバス共和国（以下「キ」国と称す）は、国家開発戦略（2004～2007）において、直面する逼迫した電力事情の改善には、発電設備と配電設備の更新が必要であるとしながらも、財政難のため自己資金での整備は困難であり、既存設備の延命と予備品の調達により、かろうじて首都圏の電力供給を維持している状態である。</p> <p>(2) 「キ」国の既存発電設備（合計5台）は、前回協力で建設した2台の発電設備を除き、製造後27年以上経過した老朽機であるため現有出力、稼働率は低下している。更に2002年には火災事故によりベシオ発電所8号機が運転停止を余儀なくされ、発電供給力が大きく低下している。また、配電設備も大部分が20～30年前の設備であり、配電容量不足や老朽化により故障事故が多発している。</p> <p>(3) 本計画は、「キ」国政府が主要目標としている「キ」国の経済成長と国民生活の改善促進を達成するため、首都タラワへの信頼度が高く、安定した電力供給および計画目標年次までの電力需要の増加に対応できる発電出力を確保するため、発電施設の建設、配電網の整備および待機需要家の電化を促進することを目的とするものである。</p>
3. プロジェクト全体計画概要
<p>(1) プロジェクト全体計画の目標（裨益対象の範囲及び規模）</p> <p>「キ」国南タラワにおいて安定した電力供給が確保される。</p> <p>《裨益対象の範囲及び規模》</p> <p>南タラワのベシオから北タラワのナベイナ地区間の住民約38,700人。</p> <p>(2) プロジェクト全体計画の成果</p> <p>南タラワの発電所および配電網が整備される。</p> <p>(3) プロジェクト全体計画の主要活動</p> <ol style="list-style-type: none">1) 発電所建屋・設備の増設<ol style="list-style-type: none">a) 発電所建屋（約400m²）の建設b) 発電設備（1,400 kW x 1台）の調達・据付c) 予備品・工具の調達2) 11 kV 配電線路の新設・改修<ol style="list-style-type: none">a) 新設配電線路長 約1.1 kmb) 改修配電線路長 約16.5 kmc) 遮断器盤（1面）および開閉器盤（4面）、配電用変圧器（1台）の調達・据付3) 車両・工具の調達 <p>(4) 投入（インプット）</p>

- 1) 日本側 (=本案件)：無償資金協力 7.97億円
- 2) 相手国側
 - a) 建設予定地の整備および障害物（高架水槽等）の撤去
 - b) 環境影響評価書の作成および環境省の承認取得
 - c) 低圧配電線路の建設および待機需要家への引込み線接続
- (5) 実施体制
 - 1) 主管官庁： 公共事業省（MPWU）
 - 2) 実施機関： 公共事業公社（PUB）

4. 無償資金協力案件の内容

- (1) サイト
「キ」国南タラワおよび北タラワのナベイナまでの地域
- (2) 概要
「キ」国南タラワにおける発電所建屋の建設、発電設備（1,400 kW x 1 台）の調達・据付、および 11 kV 配電線路の改修および新設
- (3) 相手国側負担事項
環境影響評価書の作成および環境省の承認取得
- (4) 概算事業費
8.15 億円（無償資金協力 7.97 億円、キリバス共和国側負担 0.18 億円）
- (5) 工期
詳細設計・入札期間を含め約 20 ヶ月（予定）
- (6) 貧困、ジェンダー、環境及び社会面の配慮
発電所からの騒音・排気ガスレベルなど環境面に配慮した設計とした。

5. 外部要因リスク

特になし。

6. 過去の類似案件からの教訓の活用

- (1) 予防保全の考え方を OJT を通じて先方運転・維持管理技術者に移転する。
- (2) 維持・管理用道具の使用方法を確実に先方技術者に教示する。

7. プロジェクト全体計画の事後評価に係る提案

- (1) プロジェクト全体計画の目標達成を示す成果指標

番号	項目	単位	現状	計画後	備考
1.	発電可能出力	kW	3,850	5,250	約 36%増加
2.	一般待機需要家数	戸	401	0	
- (2) その他の成果指標
 - 1) 電力品質の向上
現状の需要家端における電圧降下が 10%以上から 5%以下になる。

2) 効率的な電力供給体制の構築

現状の配電損失（16%以上）が約 10%となり、効率的な電力供給体制が構築される。

(3) 評価のタイミング

2006 年以降（機材稼働開始後 1 年経過後）

収集資料リスト

調査名：キリバス共和国第二次タラワ環礁電力供給施設整備計画基本設計調査

番号	資料の名称	形態 図書・ビデオ 地図・写真等	オリジナル・ コピー	発行機関	発行年
1	List of Ministries	図書	コピー	Ministry of Public Works and Utilities (MPWU)	2003年
2	National Development Strategies 2000 - 2003	図書	コピー	Ministry of Finance and Economic Planning (MFEP)	2000年
3	National Development Strategies 2004 - 2007	図書	コピー	Ministry of Finance	2003年
4	2004 Budget:	図書	コピー	Ministry of Finance	2003年
5	Kiribati Statistical Yearbook 2002	図書	コピー	MFEP	2002年
6	South Tarawa Report on the 2000 Census	図書	コピー	MFEP	2002年
7	Public Utilities Board: Staff List 2003	図書	コピー	Public Utilities Board (PUB)	2003年
8	Draft Financial Statement for the Year Ended December 31 2002	図書	コピー	PUB	2003年
9	Environment Act 1999	図書	コピー	Ministry of Environment and Social Development:	2000年
10	Environment Regulations 2001	図書	コピー	MESD	2001年
11	Kiribati POPs Project country Plan	図書	コピー	South Pacific Regional Environment Programme	2002年
12	Tide Predictions for Kiribati - Betio	図書	コピー	National Tidal Facility Australia	2003年

運転実績(1/2)

Bikenibeu:No.3 (2003)

Rated Output: 1,400 [kW]

Description	Unit	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
														12
1. Generated Energy	[kWh]	667,540	641,715	700,730	712,470	761,892	758,080	765,036	717,925	667,615	714,600	679,960	671,540	8,459,103
2. Auxiliary Consumption	[kWh]	3,569	3,230	3,584	3,585	3,957	4,595	4,208	4,870	4,678	3,978	3,510	3,668	47,431
3. % to Generated Energy	[%]	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.6	0.5	0.5	0.6
4. Delivered Energy	[kWh]	663,971	638,485	697,147	708,885	757,935	753,486	760,828	713,056	662,937	710,622	676,450	667,872	8,411,673
5. F.O. Consumption	[Liter]	166,820	161,830	186,500	189,330	191,070	191,630	194,440	192,820	190,780	172,660	184,040	192,683	2,214,603
6. L.O. Consumption	[Liter]	0	301	0	90	190	203	240	858	640	665	425	125	3,737
7. Operation Hour	[Hr]	740	668	740	716	740	716	740	740	672	716	716	735	8,639
8. No. of Starting	[Time]													0
9. Periodical Maintenance	[Hour]	4	4	4	4	4	4	4	4	48	28	4	9	121
10. Emergency shut-down or trip	[Hour]													
11. Max. Continuous Output (More than two hours continuously)	[kW]	1,250	1,250	1,300	1,400	1,375	1,300	1,300	1,350	1,350	1,400	1,350	1,300	1,400 (Average)

A8-(1/2)

A. Consumption Rate														
1) Fuel Oil	[Lit/kWh]	0.250	0.252	0.266	0.266	0.251	0.253	0.254	0.269	0.286	0.242	0.271	0.287	0.262
2) Lube Oil	[Lit/kWh]	0.00000	0.00047	0.00000	0.00013	0.00025	0.00027	0.00031	0.00120	0.00096	0.00093	0.00063	0.00019	0.00044
B. Thermal Efficiency (Gross)	[%]	39.7	39.3	37.3	37.3	39.6	39.2	39.0	36.9	34.7	41.1	36.6	34.6	37.9
(Net)	[%]	39.5	39.1	37.1	37.1	39.3	39.0	38.8	36.7	34.5	40.8	36.5	34.4	37.7
Low Heat Value (LHV) [Kcal/Kg]	10,200													
Specific Gravity	0.85													
C. Utilization Factor	[%]	64.1	68.2	67.3	70.7	73.1	75.2	73.4	68.9	66.2	68.6	67.5	64.5	69.0
day		31	28	31	30	31	30	31	31	30	31	30	31	365
D. Operating Factor	[%]	99.5	99.4	99.5	99.4	99.5	99.4	99.5	99.5	93.3	96.2	99.4	98.8	98.6

運転実績 (2/2)

Bikenibeu No.4 (2003)

Rated Output: 1,400 [kW]

Description	Unit	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1. Generated Energy	[kWh]	671,360	638,320	697,865	702,071	778,556	758,735	772,125	751,300	582,220	611,821	639,895	646,350	8,250,618
2. Auxiliary Consumption	[kWh]	3,569	3,230	3,584	3,585	3,957	4,595	4,208	4,870	4,678	3,978	3,510	3,668	47,431
3. % to Generated Energy	[%]	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.8	0.7	0.5	0.6	0.6
4. Delivered Energy	[kWh]	667,791	635,090	694,282	698,486	774,599	754,141	767,917	746,431	577,542	607,843	636,385	642,682	8,203,188
5. F.O. Consumption	[Liter]	167,590	161,820	184,150	187,940	193,830	189,980	197,350	194,070	153,450	173,250	173,715	192,563	2,169,708
6. L.O. Consumption	[Liter]	0	300	0	102	200	280	300	850	640	665	315	105	3,757
7. Operation Hour	[Hr]	740	668	740	716	740	716	740	740	576	740	716	740	8,572
8. No. of Starting	[Time]													0
9. Periodical Maintenance	[Hour]	4	4	4	4	4	4	4	4	144	4	4	4	188
10. Emergency shut-down or trip	[Hour]													
11. Max. Continuous Output (More than two hours continuously)	[kW]	1,320	1,250	1,320	1,370	1,330	1,300	1,300	1,400	1,205	1,275	1,275	1,300	1,400 (Average)

A8-(2/2)

A. Consumption Rate														
1) Fuel Oil	[Lit/kWh]	0.250	0.254	0.264	0.268	0.249	0.250	0.256	0.258	0.264	0.283	0.271	0.298	0.263
2) Lube Oil	[Lit/kWh]	0.00000	0.00047	0.00000	0.00015	0.00026	0.00037	0.00039	0.00113	0.00110	0.00109	0.00049	0.00016	0.00046
B. Thermal Efficiency (Gross)	[%]	39.7	39.1	37.6	37.1	39.8	39.6	38.8	38.4	37.6	35.0	36.5	33.3	37.7
(Net)	[%]	39.5	38.9	37.4	36.9	39.6	39.4	38.6	38.2	37.3	34.8	36.3	33.1	37.5
Low Heat Value (LHV) [Kcal/Kg]	10,200													
Specific Gravity	0.85													
C. Utilization Factor	[%]	64.5	67.8	67.0	69.6	74.7	75.3	74.1	72.1	57.8	58.7	63.5	62.1	67.3
day		31	28	31	30	31	30	31	31	30	31	30	31	365
D. Operating Factor	[%]	99.5	99.4	99.5	99.4	99.5	99.4	99.5	99.5	80.0	99.5	99.4	99.5	97.8

電力需給バランス

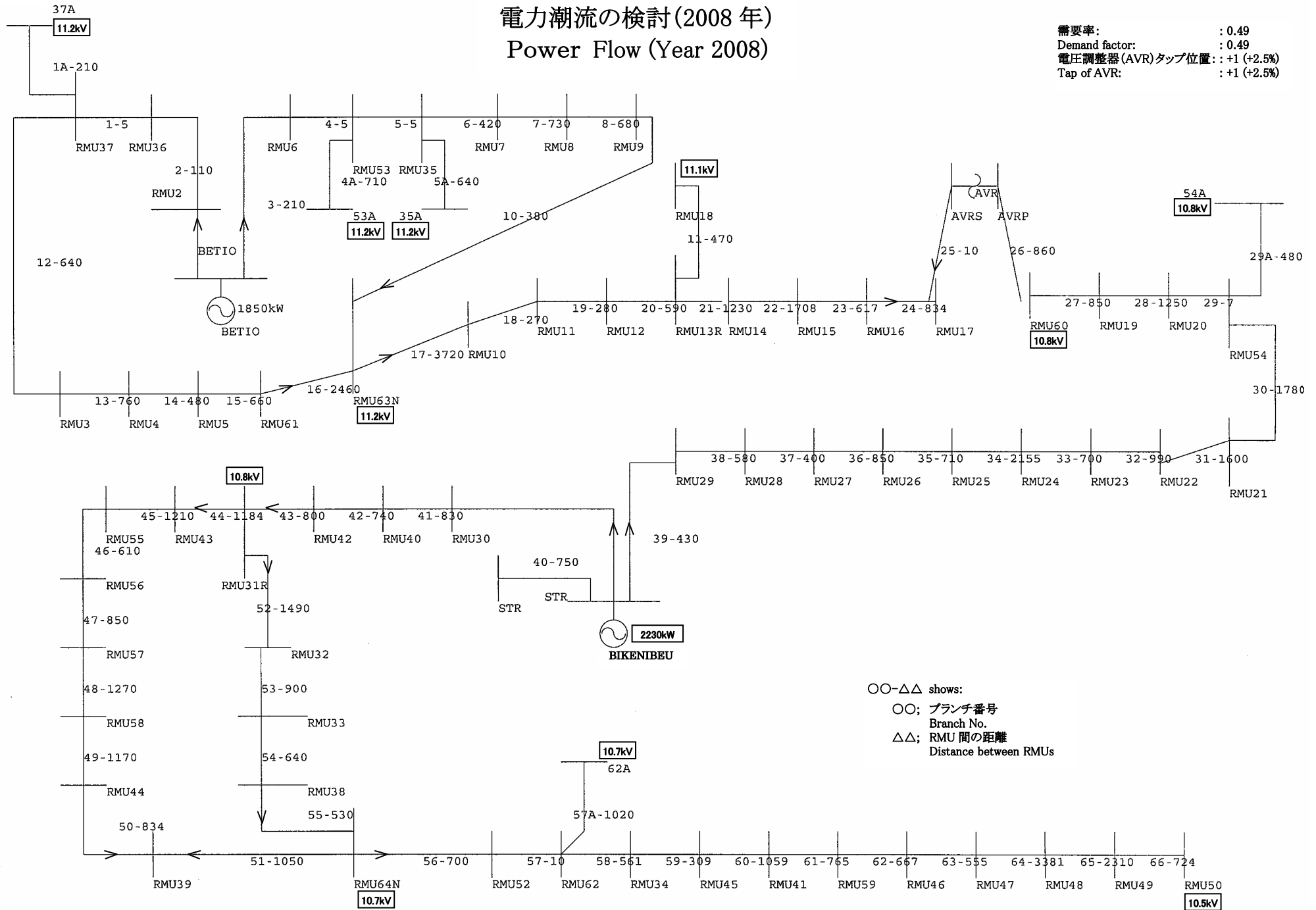
Description	Installed Capacity [kW]	Recorded					Forecast										Remarks	Base Load Operation
		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012		
1. PEAK DEMAND																	3 % annual increase (*1)	
1.1. Existing Consumer		2,060	2,200	2,695	2,857	2,550	3,093	3,190	3,600	3,860	3,980	4,100	4,220	4,350	4,480	4,610		
1.2. Waiting Consumer (*2)																		
1) Residential								40	40									
2) Public, commercial, etc.								264	106									
(Total)		2,060	2,200	2,695	2,857	2,550	3,093	3,494	3,746	3,860	3,980	4,100	4,220	4,350	4,480	4,610		
2. GENERATING OUTPUT (*3)																		
2.1 Betio Power Station (*4)																		
No.6 (1976)	750	700	700	650	650	650	600	600	600	550	550	550	(Retired)					
No.7 (1976)	750	700	700	650	650	(Stopped)											-by Crank Shaft Damage	
No.8 (1988)	1,080	350	850	850	850	(Stop)	(Retired)										-by Fire	
(*5) No.9 (2004)	1,250							1,250	1,250	1,250	1,250	1,200	1,200	1,200	1,200	1,150	Financed by Kiribati Government	○
(Subtotal of Available Capacity)		1,750	2,250	2,150	2,150	650	600	1,850	1,850	1,800	1,800	1,750	1,200	1,200	1,200	1,150		
2.2 Bikenibeu Power Station (*4)																		
No. 1 (1969)	600	500	500	500	500	450	(Stopped)											
No. 2 (1969)	600	500	500	500	500	450	450	450	450	(Retired)							-Waiting spare parts	
No. 3 (2002)	1,400					1,400	1,400	1,400	1,400	1,350	1,350	1,350	1,350	1,300	1,300	1,300	Japanese Grant Aid (Ph-I)	○
No. 4 (2002)	1,400					1,400	1,400	1,400	1,400	1,350	1,350	1,350	1,350	1,300	1,300	1,300	Japanese Grant Aid (Ph-I)	○
No. 5 (2005)	1,400							1,400	1,400	1,400	1,400	1,350	1,350	1,350	1,350	1,350	Request to Japan (Ph-II)	○
(Subtotal of Available Capacity)		1,000	1,000	1,000	1,000	3,700	3,250	3,250	4,650	4,100	4,100	4,100	4,050	3,950	3,950	3,950		
2.3 TOTAL AVAILABLE CAPACITY [kW]		2,750	3,250	3,150	3,150	4,350	3,850	5,100	6,500	5,900	5,900	5,850	5,250	5,150	5,150	5,100		
3. POWER BALANCE (2.3 - 1.) [kW]		690	1,050	455	293	1,800	757	1,606	2,754	2,040	1,920	1,750	1,030	800	670	490		
4. MAXIMUM UNIT CAPACITY [kW]		700	850	850	850	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,350	1,350	1,350	1,350		
5. STAND-BY CAPACITY (3. - 4.) [kW]		-10	200	-395	-557	400	-643	206	1,354	640	520	350	-320	-550	-680	-860		

- Remarks: *1: Average of Annual increasing ratio for Forecast is 3.0 %.
*2: This value is estimated by PUB as of November 2003.
*3: Decreasing factor of DEG output is supposed as 1 % per year.
*4: Numerical value in parenthesis means manufacturing year of Diesel Engine.
*5: Contract had been signed on Sep. 2003 and this unit will be put into commercial operation on June, 2004.
*6: Recorded data means the actual data at the end of year.

電力潮流の検討(2008年) Power Flow (Year 2008)

需要率: : 0.49
 Demand factor: : 0.49
 電圧調整器(AVR)タップ位置: : +1 (+2.5%)
 Tap of AVR: : +1 (+2.5%)

A10-(1/1)



○○-△△ shows:
 ○○; ブランチ番号
 Branch No.
 △△; RMU間の距離
 Distance between RMUs

