The Socialist Republic of Viet Nam

Ex-Post Evaluation of Japanese ODA Loan Project

Central Vietnam Rural Telecommunication Network Project

External Evaluator: Masami Tomita, Sanshu Engineering Consultant

0. Summary

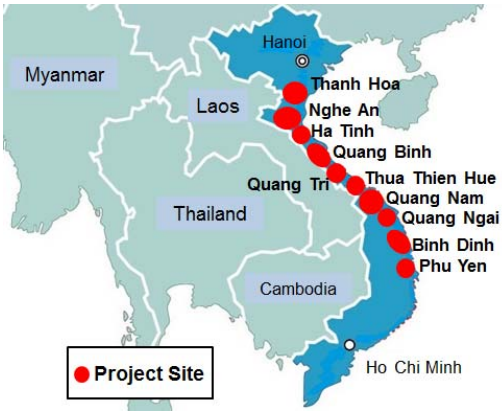
This project aimed at eradicating villages with no telecommunication network and improving telecommunication services in central Vietnam, which lagged behind economically compared with northern and southern Vietnam, by constructing telecommunication networks in the region.

Relevance of this project is high, as the project is consistent with priority areas of Vietnam's development plans and Japan's ODA policy, and moreover development needs for the project are high. As a worldwide trend in the telecommunication sector, while needs for fixed-line phones are decreasing, needs for mobile phones are rapidly increasing at the time of ex-post evaluation. Accompanying this trend, the utilization ratio of digital switching systems etc. procured under the project has been decreasing, however, core transmission lines developed under the project are also used for mobile and internet communications, and thus this project has contributed to the diffusion of mobile phones and internet in recent years[1]. This project has contributed to eradication of villages with no telecommunication network in the project-targeted areas, actual figures of telephone density in 2010 largely exceed the estimated figures, and telecommunication services in the project-targeted areas have been improved by the diffusion of both fixed-line and mobile phones, and thus effectiveness and impact of the project are high. Efficiency of the project is fair, as actual project period largely exceeded planned period, while actual project cost was within the planned cost. While no major problem has been observed in institutional and technical aspects of operation and maintenance (O&M) at the time of ex-post evaluation, financial situation of O&M agency could not be sufficiently verified, as its financial statements were not provided. Moreover, reorganization of the O&M agency is planned in the near future, and its influence on future O&M is somewhat uncertain. Thus, sustainability of the project is fair.

In light of the above, this project is evaluated to be satisfactory.

[1] Core transmission lines (optical fiber cables) developed under the project are also used for mobile and internet communications and sufficient transmission capacity to support a rapid increase of an usage of mobile phones and internet in recent years is secured, and thus this project has contributed to the diffusion of mobile phones and internet in recent years.

1. Project Description



Project Locations

Digital Switching System

1.1 Background

Telephone density in Vietnam was merely 0.18% on average in 1985, which was improved to 1.05% in 1995, which was at the time of project appraisal, and switching systems in the country was fully digitalized in the same year, and the Vietnamese government was promoting expansion of telephone networks in provinces, cities and districts all over the country[2]. However, 1.05% of telephone density was still low, compared with that of other ASEAN countries (14.7% in Malaysia, 4.7% in Thailand, 1.7% in the Philippines, and 1.3% in Indonesia)[3]. Moreover, regional disparities on telephone density in Vietnam were large, for example, while telephone density was approximately 20% in two large cities like Hanoi and Ho Chi Minh, it was particularly low in regional areas and approximately 0.6% in central Vietnam at the time of project appraisal, which was the area targeted by the project[4]. Under such situation, the Vietnamese government planned to improve telephone density to 5% on average by 2000, and while telecommunication networks in large cities were to be developed with private funds in principle, those in regional areas, where profitability is low, were to be developed with financial assistance from donors, and the ODA loan for this project was requested by the government[5]. This project was implemented under such situation.

1.2 Project Outline

The objective of this project is to eradicate villages with no telecommunication network and improve telecommunication services in central Vietnam, which lagged behind economically compared with northern and southern Vietnam, by constructing telecommunication networks in the region, thereby contributing to the reduction of regional disparities and promotion of economic development of central Vietnam.

[2] Source: JICA appraisal document
[3] Source: same as above
[4] Source: same as above
[5] Source: same as above

Loan Approved Amount/ Disbursed Amount	11,332 million yen / 5,912 million yen	
Exchange of Notes Date/ Loan Agreement Signing Date	March 1998 / March 1998	
Terms and Conditions	Interest Rate	1.8%
	Repayment Period	30 years
	(Grace Period)	(10 years)
	Conditions for Procurement:	General Untied
Borrower / Executing Agency(ies)	Government of the Socialist Republic of Viet Nam / Viet Nam Posts and Telecommunications (VNPT)	
Final Disbursement Date	January 2010	
Main Contractor (Over 1 billion yen)	Marubeni (Japan)/Ericsson (Sweden)(JV), Siemens AG (Germany), Commuture (Japan)/Marubeni (Japan)/Fujikura(Japan)(JV)	
Main Consultant (Over 100 million yen)	Deutsche Telepost Consulting GMBH (Germany)	
Feasibility Studies, etc.	F/S conducted by VNPT (1997)	

2. Outline of the Evaluation Study

2.1 External Evaluator

Masami Tomita, Sanshu Engineering Consultant

2.2 Duration of Evaluation Study

Duration of the Study: October, 2013 –September, 2014

Duration of the Field Study: December 7– December 28, 2013 / March 16–April 6, 2014

2.3 Constraints during the Evaluation Study

In the ex-post evaluation, in order to analyze financial aspects of sustainability, financial statements in recent three years of Viet Nam Posts and Telecommunications (VNPT), which is the O&M agency of equipment procured under the project, were requested. However, they were not provided on the grounds that they are highly confidential. Thus, financial situation of VNPT could not be sufficiently verified.

3. Results of the Evaluation (Overall Rating: B[6])

3.1 Relevance (Rating: ③[7])

3.1.1 Relevance to the Development Plan of Vietnam

At the time of project appraisal, as explained above, telephone density in Vietnam was 1.05% on average (1995), which was low compared with that of other ASEAN countries, and telephone density in regional areas was particularly low (0.6% on average in 10 provinces that were targeted by the project) [8]. Therefore, the Vietnamese government planned to promote construction of telecommunication networks in the country and improve telephone density to 5% by 2000 during the period of "the Sixth Five-Year Socio-Economic Development Plan (1996-2000)"[9]. Moreover, development and economic growth of central Vietnam, which lagged behind economically compared with northern and southern Vietnam, was an important goal for the Vietnamese government, and this project targeted 10 provinces, where economic growth was expected, out of 19 provinces in total in central Vietnam[10].

At the time of ex-post evaluation, "the Development Plan of National Telecommunications in Vietnam until 2020" (issued in 2012) states that the country will construct and develop modern (high volume and high speed) telecommunication infrastructures in remote areas as well as in socio – economically underdeveloped areas, to enhance the quality of life of people[11]. Specific goals stated in the Plan are; to increase fixed-line phone density to 15-20% and mobile phone density to 140% by 2015 and to increase fixed broadband internet density to 15-20% and mobile broadband internet density to 35-40% by 2020 etc.[12]

Therefore, to improve telephone density in Vietnam including economically lagged behind areas is emphasized in Vietnam's national plans both at the time of project appraisal and ex-post evaluation, and the project objective is consistent with national policies.

3.1.2 Relevance to the Development Needs of Vietnam

At the time of project appraisal, in 10 provinces at coastal areas that were targeted by the project, there was no telecommunication network in over 800 villages out of approximately 2,000 villages in total, and these villages were located at mountainous areas that were not reachable by automobiles, and there was no public communication means in these villages except for postmen who visited them twice or three times a week, which required urgent intervention for social welfare in the region[13].

At the time of ex-post evaluation, as explained below, telephone density in the project-targeted areas has been largely improved since the time of project appraisal. However, as a recent trend in the telecommunication sector which can be seen in specific goals stated in the Development Plan of

[6] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[7] ③: High, ② Fair, ① Low
[8] Source: JICA appraisal document
[9] Source: same as above
[10] Source: same as above
[11] Source: document provided by the executing agency
[12] Source: same as above
[13] Source: JICA appraisal document

National Telecommunications in Vietnam mentioned above, needs for fixed-line phones have been decreasing and needs for mobile phones have been increasing. This project aimed at increasing fixed-line phone density, as it was planned during the 1990s, however, core transmission lines (optical fiber cables: OFC) installed under the project are utilized for mobile phone communications as well, and thus, needs for the expansion of telecommunication networks have not been diminished today. Moreover, at the time of ex-post evaluation, an industrial port and oil refine industrial park were developed in the project-targeted provinces, which raised demands for provision of telecommunication networks[14].

Therefore, telecommunication networks are needed in the project-targeted areas both at the time of project appraisal and ex-post evaluation, and needs for the project are high.

3.1.3 Relevance to Japan's ODA Policy

The previous ODA Charter of Japan (issued in 1992) states that East Asia is a dynamic region in the world and to maintain and promote economic development in the region is important for development of the world economy, and at the same time, the region contains countries with a large population who suffer from poverty, which requires a continued emphasis on Asian region for assistance[15]. Moreover, prioritized areas for assistance were stated as global scale issues, basic human needs, technological improvement through development of human resources and research cooperation, and infrastructure development etc., and this project was categorized as infrastructure development[16].

Therefore, this project was consistent with Japan's ODA policy at the time of project appraisal.

This project has been highly relevant to Vietnam's development plan, development needs, as well as Japan's ODA policy. Therefore its relevance is high.

3.2 Effectiveness[17] (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

While no operation and effect indicator was set except for the number of no-telecommunication villages in the project-targeted provinces at the time of project appraisal, effectiveness of the project is evaluated at the time of ex-post evaluation using basic indicators to evaluate a telecommunication project such as utilization ratio, telephone density, waiting list for main lines, telephone traffic, fault ratio, and internet density, as well as the number of no-telecommunication villages.

3.2.1.1 Telephone Main Lines in Operation - Exchange Capacity Ratio (Utilization Ratio)

Telephone main lines in operation – exchange capacity ratio (utilization ratio) of digital switching systems procured under the project after the project completion is shown in Table 1.

[14] Source: answers to the questionnaire
[15] Source: Ministry of Foreign Affairs HP (http://www.mofa.go.jp/mofaj/gaiko/oda/seisaku/taikou/sei_1_1.html)
[16] Source: same as above
[17] Sub-rating for Effectiveness is to be put with consideration of Impact.

Table 1: Telephone Main Lines in Operation - Exchange Capacity Ratio (Utilization Ratio)

(Unit: %)

Province	Actual (2011)	Actual (2012)	Actual (2013)
Thanh Hoa	100	100	77
Nghe An	94	59	50
Ha Tinh	76	68	67
Quang Binh	87	83	79
Quang Tri	100	100	99
Thua Thien Hue	96	91	86
Quang Nam	58	54	50
Quang Ngai	90	90	90
Binh Dinh	57	86	84
Phu Yen	95	60	57
Average	85	79	74

Source: answers to the questionnaire

Note: target figures were not set in JICA appraisal document.

In the field surveys for ex-post evaluation, it was found out that installation of digital switching systems was completed and they started to be used in 2005, which was 6 years before the project completion (2011), and they have been utilized for 8 years[18]. According to the executing agency, the utilization ratio was very high at almost 100% after the switching systems started to be used, however, the ratio is decreasing currently. Moreover, according to the executing agency, the life of switching systems is approximately 7 years in general in Vietnam, and thus installation of new switching systems will be needed soon. The utilization ratio was very high at almost 100% after the switching systems started to be used, and while the ratio is decreasing currently, it is still relatively high at 74%, and the reason for the decrease is due to the decreasing trend of fixed-line phones in recent years, and thus this should not be judged negatively in evaluating effectiveness.

3.2.1.2 Number of No-Telecommunication Villages in 10 Provinces

Actual figures of the number of villages with no telecommunication network in 10 provinces covered by the project at the time of project appraisal and target and actual figures after the project completion are shown in Table 2.

[18] Source: interviews with the executing agency

Table 2: Number of No-Telecommunication Villages in 10 Provinces

(Unit: village)

Province	Actual (1997)	Target (after project completion)	Actual (2010)	Actual (2011) (Project Completion)	Actual (2012)	Actual (2013)
Thanh Hoa	350	0	2	2	0	0
Nghe An	178	0	0	0	0	0
Ha Tinh	81	0	0	0	0	0
Quang Binh	47	0	2	0	0	0
Quang Tri	25	0	4	4	4	4
Thua Thien Hue	1	0	0	0	0	0
Quang Nam	83	0	16	16	16	16
Quang Ngai	25	0	0	0	0	0
Binh Dinh	N/A	0	0	0	0	0
Phu Yen	17	0	0	0	0	0
Total	807	0	24	22	20	20

Source: actual figures in 1997 and target figures: JICA appraisal document, actual figures after 2010: answers to the questionnaire
Note: above figures show the number of villages where subscribers of VNPT do not exist (fixed & mobile).

At the time of ex-post evaluation, the number of villages with no telecommunication network in 10 provinces is 20 in total. However, according to VNPT provincial offices, actual figures in Table 2 show the number of villages where subscribers of VNPT do not exist, and 4 villages in Quang Tri and 9 villages in Quang Nam are provided with telecommunication services from other providers[19]. Thus the real number of no-telecommunication villages is 7 only.

3.2.1.3 Telephone Density in 10 Provinces

Actual figures of telephone density in 10 provinces covered by the project at the time of project appraisal and estimated and actual figures after the project completion are shown in Table 3.

[19] At the time of project appraisal, a telecommunication service provider in Vietnam was VNPT only, however, there are many providers such as Viettel and EVN Telecom etc. at the time of ex-post evaluation.

Table 3: Telephone Density in 10 Provinces[20]

(Unit: %)

Province	Actual (1995)	Estimated (2010)	Actual (2010)		Actual (2011) (Project Completion)		Actual (2012)		Actual (2013)	
			Fixed	Mobile	Fixed	Mobile	Fixed	Mobile	Fixed	Mobile
Thanh Hoa	0.32	5.9	13.71	10.49	12.59	12.08	7.60	12.97	4.78	13.29
Nghe An	0.47	8.8	7.97	9.74	5.49	10.03	4.26	11.71	3.84	12.54
Ha Tinh	0.30	6.8	5.55	N/A	3.74	N/A	2.52	N/A	1.90	N/A
Quang Binh	0.48	5.1	8.77	21.23	6.13	20.45	4.83	21.93	4.15	23.06
Quang Tri	1.05	8.3	8.15	11.84	6.35	16.23	5.17	29.25	4.20	19.00
Thua Thien Hue	1.08	18.4	12.16	11.77	12.07	14.56	10.47	17.79	10.17	14.10
Quang Nam	0.59	8.7	4.63	4.58	3.69	6.21	2.97	11.83	2.52	6.49
Quang Ngai	0.71	10.9	7.72	13.38	6.00	8.48	4.23	9.24	3.32	7.47
Binh Dinh	0.75	12.0	7.26	9.44	6.85	8.32	4.17	10.55	3.70	8.60
Phu Yen	0.65	9.7	4.91	9.22	3.80	16.72	3.15	19.66	2.97	22.78
Average	0.64	9.5	8.08	11.30	6.67	12.56	4.94	16.10	4.15	14.15

Source: actual figures in 1995: JICA appraisal document, actual figures after 2010: answers to the questionnaire
Note: Estimated figures for 2010 = estimated number of VNPT subscribers in each province written in JICA appraisal document / population in each province in 2010 x 100. Actual figures = actual number of VNPT subscribers in each province / population in each province x 100.

In line with the tendency in the telephone market in Vietnam in recent years, fixed phone density has been decreasing, and on the other hand, mobile phone density has been rapidly increasing in the project-targeted areas. As core transmission lines (OFC) installed under the project are utilized for mobile phone communications as well, this project also contributed to the increase of mobile phone density in recent years. Moreover, comparing actual figures (fixed and mobile) in 2010 with estimated figures (no distinction between fixed and mobile) in 2010, actual figures largely exceed the estimated figures.

3.2.1.4 Waiting List for Main Lines (Fixed-Line Phone) in 10 Provinces

The number of waiting applicants (waiting list for main lines) of fixed-line phones in 10 provinces has been zero since the project completion, accompanying the decreasing number of fixed-line phone subscribers[21].

3.2.1.5 Telephone Traffic in 10 Provinces

Actual figures of telephone traffic between fixed-line phones in 10 provinces covered by the project are shown in Table 4, actual figures of telephone traffic between fixed-line and mobile phones are shown in Table 5, and actual figures of telephone traffic between mobile phones are shown in Table 6.

[20] While a telecommunication service provider in Vietnam was VNPT only at the time of project appraisal, according to HP of Ministry of Information and Communications in Vietnam, a market share of VNPT among fixed-line phone service providers in Vietnam in 2011 is 68%, and the share of VNPT (Vinaphone only) among mobile phone service providers is 30%.
[21] Source: answers to the questionnaire

Table 4: Telephone Traffic (Fixed-Line to Fixed-Line) in 10 Provinces

(Unit: thousand call-minutes)

Province	Actual (2010)		Actual (2011) (Project Completion)		Actual (2012)		Actual (2013)	
	Local	Long Distance	Local	Long Distance	Local	Long Distance	Local	Long Distance
Thanh Hoa	199,795	12,693	102,749	7,202	49,526	4,026	32,878	2,896
Nghe An	72,258	9,696	34,492	5,567	20,713	4,010	14,568	3,095
Ha Tinh	22,216	4,418	9,385	2,342	4,937	1,418	3,114	989
Quang Binh	43,491	3,084	23,191	2,098	13,437	1,467	9,055	1,181
Quang Tri	34,925	3,586	19,305	2,189	11,431	1,381	7,938	1,061
Thua Thien Hue	75,856	5,826	55,797	4,488	37,919	3,527	28,718	2,946
Quang Nam	42,117	6,647	18,649	4,633	13,981	3,924	11,532	3,444
Quang Ngai	45,502	5,295	25,548	3,493	15,326	2,492	11,156	2,034
Binh Dinh	50,586	4,840	33,164	4,015	22,469	3,505	19,208	2,086
Phu Yen	19,937	2,305	13,714	1,661	10,386	1,417	8,747	1,461
Total	606,682	58,389	335,996	37,687	200,127	27,165	146,915	21,194

Source: answers to the questionnaire

Note: Baseline and target figures were not set in JICA appraisal document. Above figures show traffic volume (number of calls x average call time) between fixed-line phones using VNPT network in each province.

Table 5: Telephone Traffic (Fixed-Line and Mobile) in 10 Provinces

(Unit: thousand call-minutes)

Province	Actual (2010)	Actual (2011) (Project Completion)	Actual (2012)	Actual (2013)
Thanh Hoa	90,598	58,923	99,799	72,843
Nghe An	51,922	32,631	26,749	24,189
Ha Tinh	22,228	13,197	9,749	7,985
Quang Binh	29,309	19,907	15,425	13,290
Quang Tri	18,650	13,765	11,092	9,615
Thua Thien Hue	42,994	33,618	30,589	25,382
Quang Nam	45,201	28,897	27,085	26,821
Quang Ngai	35,699	27,435	22,202	20,182
Binh Dinh	39,571	32,879	27,022	17,316
Phu Yen	10,930	9,378	10,244	13,231
Total	387,102	270,629	279,956	230,854

Source: answers to the questionnaire

Note: Baseline and target figures were not set in JICA appraisal document. Above figures show traffic volume (number of calls x average call time) between fixed-line and mobile phones using VNPT network in each province. Above data could not be divided into local calls and long distance calls.

Table 6: Telephone Traffic (Mobile to Mobile) in 10 Provinces

(Unit: thousand call-minutes)

Province	Actual (2010)	Actual (2011) (Project Completion)	Actual (2012)	Actual (2013)
Thanh Hoa	N/A	N/A	751,964	908,209
Nghe An	N/A	N/A	N/A	N/A
Ha Tinh	N/A	N/A	N/A	N/A
Quang Binh	N/A	N/A	N/A	N/A
Quang Tri	N/A	79,216	138,574	151,644
Thua Thien Hue	156,398	255,015	321,934	255,515
Quang Nam	98,891	108,911	132,872	164,628
Quang Ngai	74,819	93,605	42,845	38,371
Binh Dinh	N/A	N/A	N/A	N/A
Phu Yen	28,670	59,459	79,164	68,003
Total	358,778	596,205	1,467,353	1,586,369

Source: answers to the questionnaire

Note: Baseline and target figures were not set in JICA appraisal document. Above figures show traffic volume (number of calls x average call time) between mobile phones using VNPT network in each province. Above data could not be divided into local calls and long distance calls. Mobile phone services utilizing core transmission lines installed under the project are provided by Vinaphone among VNPT Group, and many VNPT provincial offices do not have traffic data between mobile phones.

Accompanying a decrease of fixed-line phone density, telephone traffic between fixed-line and fixed-line phones and between fixed-line and mobile phones has been decreasing. On the other hand, telephone traffic between mobile and mobile phones has been increasing and the volume is a lot larger than the volume of fixed-line phones. As core transmission lines (OFC) installed under the project are utilized for mobile phone communications as well, this project is considered to have contributed to the increase of telephone traffic between mobile phones to a certain extent.

3.2.1.6 Fault Ratio in 10 Provinces

Detailed data in each province was unable to be obtained, however, according to the executing agency, fault ratio is nearly zero such as 0.001%, and thus there is considered to be no major problem in terms of the quality of phone calls.

3.2.1.7 Internet Density in 10 Provinces

Actual figures of internet density at the time of project appraisal and after the project completion in 10 provinces covered by the project are shown in Table 7.

Table 7: Internet Density in 10 Provinces

(Unit: %)

Province	Actual (1995)	Actual (2010)	Actual (2011) (Project Completion)	Actual (2012)	Actual (2013)
Thanh Hoa	0	1.57	2.03	2.09	2.16
Nghe An	0	1.97	2.36	2.54	2.77
Ha Tinh	0	1.88	1.93	1.97	2.20
Quang Binh	0	2.80	2.83	2.90	3.02
Quang Tri	0	1.70	2.20	2.90	3.80
Thua Thien Hue	0	1.59	2.08	4.14	4.95
Quang Nam	0	1.51	1.59	1.74	1.83
Quang Ngai	0	1.66	1.57	1.66	1.85
Binh Dinh	0	2.04	2.66	2.45	2.61
Phu Yen	0	1.96	2.08	2.44	2.75
Average	0	1.87	2.13	2.48	2.79

Source: answers to the questionnaire

Note: Target figures were not set in JICA appraisal document. Above figures show the ratio of the number of subscribers of VNPT's fixed broadband internet against population in each province.

The number of broadband internet subscribers in Vietnam is still small[22], however, it has been increasing gradually, and as core transmission lines (OFC) installed under the project are utilized for internet as well, this project is considered to have contributed to the increase of internet density in recent years.

3.3 Impact

3.3.1 Intended Impacts

3.3.1.1 Reduction of Regional Disparities and Promotion of Economic Development of Central Vietnam

At the time of project appraisal, this project aimed at contributing to reduction of regional disparities and promotion of economic development of central Vietnam. While it is difficult to present specifically the degree of contribution of the project, monthly average income per capita by region from the time of project appraisal to the time of ex-post evaluation is shown in Table 8 for reference.

Table 8: Monthly Average Income per Capita by Region

(Unit: thousand VND)

Region	1999	2004	2008	2012
North Central and Central Coastal Areas	229	361	728	1,469
Central Highlands	345	390	795	1,631
Northern Midlands and Mountain Areas	199	327	657	1,285
South East Area	571	893	1,773	3,241

Source: Vietnam National Statistical Office

[22] According to Vietnam ICT White Book 2011, the number of broadband internet subscribers is 4.20 persons per 100 persons in 2010 (national average).

The project-targeted areas are included in “North Central and Central Coastal Areas” above, and the increasing rate of income per capita in the region from 1999 to 2012 is 541% (the increasing rate in other regions is; 373% in central highlands, 546% in northern midlands and mountain areas, and 468% in south east area), and central Vietnam has seen a remarkable economic development in the past 10 years. This project is considered to have contributed to the increase of income per capita to some extent, by improving telecommunication services in the region.

3.3.2 Other Impacts

3.3.2.1 Impacts on the Natural Environment

At the time of project appraisal, no negative environmental impact due to the project was expected, and an environmental impact assessment (EIA) report was to be submitted to relevant authorities during detailed design and to be approved[23]. However, as the loan agreement of this project was as old as 1998, which is 16 years ago, the EIA report was not available. According to the executing agency, there was no negative environmental impact caused under this project.

3.3.2.2 Land Acquisition and Resettlement

At the time of project appraisal, no land acquisition or resettlement of residents was expected[24]. According to the executing agency, while compensation was paid to some land owners to bury transmission cables, all these areas were restored to their original state, and no land acquisition or resettlement was required under the project.

As explained above, as a worldwide trend in the telecommunication sector, while needs for fixed-line phones are decreasing, needs for mobile phones are increasing. Thus, the utilization ratio of telecommunication equipment for fixed-line phones procured and installed under the project, fixed-line phone density and telephone traffic of fixed-line phones have been decreasing in recent years. However, core transmission lines (OFC) developed under the project are also used for mobile and internet communications, and thus this project has contributed to the diffusion of mobile phones and internet in recent years. Moreover, this project has contributed to eradication of villages with no telecommunication network, which was the objective of this project, and actual figures of telephone density at the time of ex-post evaluation largely exceed the estimated figures for 2010. Despite of its decreasing trend, fixed-line phones are still used and telecommunication services in the project-targeted areas have been improved by the diffusion of both fixed-line and mobile phones, and this project is considered to have contributed to the reduction of regional disparities to some extent. Therefore its effectiveness and impact are high.

[23] Source: JICA appraisal document
[24] Source: same as above

3.4 Efficiency (Rating: ②)

3.4.1 Project Outputs

Outputs of the project (planned and actual) are shown below.

Table 9: Comparison of Outputs (Planned/ Actual)

Item	Planned	Actual
Construction Works/ Procurement	・ Digital Switching System: 118,728 lines ・ STM[25] : 157 set ・ Network Management System: 10 set ・ Optical Fiber Cable: 1,681 km ・ Microwave Transmission System: 8 set ・ Outside Plant (Cable): 498,690 pair-km ・ Wireless Local Loop: 9,100 lines	・ Digital Switching System: 138,173 lines ・ STM : 219 set ・ Network Management System : 10 set ・ Optical Fiber Cable: 2,656 km ・ Microwave Transmission System: 4 set ・ Outside Plant (Cable): cancelled ・ Wireless Local Loop: 7,043 lines
Consulting Service (CS)	・ Review of F/S and detailed design ・ Preparation of bidding documents and tender assistance for evaluation of contractors ・ Supervision of delivery and installation of equipment ・ Foreign CS: 148M/M, Local CS: 918M/M	・ Review of F/S and detailed design ・ Preparation of bidding documents and tender assistance for evaluation of contractors ・ Supervision of delivery and installation of equipment ・ Foreign CS: 271M/M, Local CS: 974M/M

Source: planned: JICA appraisal document, actual: answers to the questionnaire and interviews with the executing agency

As shown in Table 9, actual outputs of the project were changed from the plan. Reasons for the change are below:

1) Telecommunication needs in the project-targeted areas changed while the project implementation was prolonged (see 3.4.2.2 Project Period for details), which required changes of outputs, and moreover, layouts of infrastructures including roads, ports, industrial parks etc. were changed, which also required changes of project outputs[26].

2) In addition to the above, the procurement amount of switching systems and core transmission lines needed to be increased in order to secure telecommunications in the project areas, as these areas were often hit by floods and hurricane[27].

3) Actual amount of microwave transmission systems procured under the project was decreased, because VNPT procured some equipment using other source of funds, due to a delay of project implementation[28].

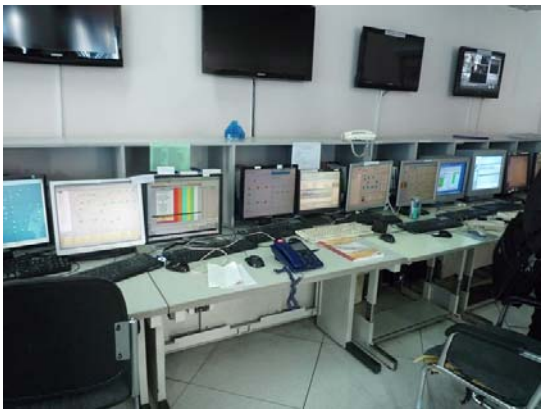
4) The portion of outside plant (copper cables) was cancelled under the project, because the contractor could not afford the contract due to a sharp rise of the copper price, then VNPT procured some equipment using own funds for the urgently needed areas, and the rest was to be covered by

[25] STM stands for Synchronous Transport Module, and this is a virtual telecommunication line which is a multiplexing unit in SDH (Synchronous Digital Hierarchy).
[26] Source: JICA internal document and interviews with the executing agency
[27] Source: same as above
[28] Source: same as above

wireless local loop (WLL) and OFC[29].

5) Actual amount of WLL was decreased, as the number of villages which were to be covered by WLL decreased, due to a delay of project implementation[30].

According to Vietnam ICT White Book 2011, fixed-line phone density in Vietnam started to decrease after 2010, which was close to the project completion, and thus there seems to have been no major change of project outputs caused by the decrease of fixed-line phone density[31].



Network Management System

Microwave Transmission Tower

3.4.2 Project Inputs

3.4.2.1 Project Cost

The planned project cost at the time of project appraisal was 13,332 million yen (foreign currency: 10,282 million yen, local currency: 3,050 million yen), of which Japanese ODA loan portion was 11,332 million yen[32]. On the other hand, the actual project cost was 8,112 million yen (foreign currency: 5,171 million yen, local currency: 2,941 million yen), of which Japanese ODA loan portion was 5,912 million yen[33], and it was lower than planned. The planned project cost taking into account the increase and decrease of major project outputs is 11,084 million yen, and comparing this amount with actual project cost, the actual cost is 73% against the plan[34]. Reasons for the actual cost being much lower than the planned cost are a cancellation of outside plant (cables), falling prices of telecommunication equipment and fluctuation of exchange rate (1 yen = 98.55 VND at the time of

[29] Source: JICA internal document and interviews with the executing agency
[30] Source: same as above
[31] Source: interviews with the executing agency
[32] Source: JICA appraisal document
[33] Source: answers to the questionnaire and JICA internal document
[34] Taking into account major changes of project outputs, 1) the revised planned cost of digital switching systems is 420 million yen more than the original cost (an increase of 19,445 lines x 180 USD (unit cost at the time of appraisal) x 120 yen (exchange rate at the time of appraisal)), 2) the revised planned cost of OFC is 585 million yen more than the original cost (an increase of 975 km x 5,000 USD (unit cost at the time of appraisal) x 120 yen), 3) the revised planned cost of outside plant is 2,459 million yen less than the original cost (due to cancellation), and 4) the revised planned cost of WLL is 794 million yen less than the original cost (a decrease of 47 set of base stations x 140,000 USD (unit cost at the time of appraisal) x 120 yen) + (a decrease of 18 set of terminal stations x 2,000 USD (unit cost at the time of appraisal) x 120 yen). From the above, the revised planned cost in total becomes 11,084 million yen, and the actual cost (8,112 million yen) is 73% against the plan.

loan agreement, and 1 yen = 198.37 VND at the time of disbursement completion) etc.

3.4.2.2 Project Period

The planned project period at the time of project appraisal was 34 months in total from March 1998 (signing of the loan agreement) to December 2000 (completion of construction works and operating test)[35]. On the other hand, the actual project period was 161 months in total from March 1998 (signing of the loan agreement) to July 2011 (completion of construction works and operating test)[36], and it was significantly longer than planned (474% against the plan). Reasons for the actual project period significantly exceeding the planned period are as follows;

1) Processes for selection of consultants, detailed design, selection of contractors and suppliers, and construction and installation works were delayed due to a long time required for obtaining necessary approvals from relevant domestic organizations for project implementation and delays in administrative procedures[37].

2) Telecommunication needs in the project-targeted areas changed while the project implementation was prolonged, which required resurvey, redesign, and changes of configurations and locations for installing telecommunication equipment[38].

3) For installation of SDH and microwave transmission systems, in addition to the above reasons, it was required to wait for a procurement of OFC to connect stations, and moreover, due to fault of equipment supplied by contractor, it took a long time to deal with the problem and replace faulty equipment[39].

4) Regarding WLL, related to the changes of locations explained above, it was found out that telecommunication networks were already provided by VNPT provincial offices in some project areas, that there were some areas where land acquisition was difficult and that some areas were affected by bombs and land mines, and thus VNPT requested to install a base station in a location different from the original plan, which required a long time for review and approval[40].

5) Regarding transmission cables, as explained above, after a contractor was selected, the copper price rose sharply and the contractor could not afford the contract, and thus the contract package for transmission cables was divided into 2 packages (OFC and copper cable). Then VNPT procured some copper cables using own funds for the urgently needed areas, and the rest was to be covered by WLL and OFC, and the bidding for copper cables was cancelled and re-bidding for OFC was conducted. This whole process required a long time[41]. Moreover, a long time was required for land clearance to install OFC, natural disaster (flood and hurricane) affected the project areas, and skills and management capabilities of contractors were low, all of which also caused a delay[42].

[35] Source: JICA appraisal document
[36] Source: answers to the questionnaire
[37] Source: JICA internal document and interviews with the executing agency
[38] Source: same as above
[39] Source: same as above
[40] Source: same as above
[41] Source: same as above
[42] Source: same as above

Table 10: Comparison of Project Period[43]

Content	Planned	Actual
Selection of Consultants	November 1997 – June 1998 (8 months)	July 1999 – March 2000 (9 months)
Detailed Design	July 1998 – August 1998 (2 months)	June 2000 – March 2001 (10 months)
Selection of Contractors	July 1998 – May 1999 (11 months)	Package 1: November 2002 – March 2004 (17 months) Package 2: August 2002 – September 2003 (14 months) Package 3: June 2004 – October 2005 (17 months) Package 4: October 2007 – September 2008 (12 months)
Construction and Installation Works	July 1999 – October 2000 (16 months)	Package 1: July 2004 – July 2005 (13 months) Package 2: March 2004 – October 2008 (56 months) Package 3: January 2006 – October 2008 (34 months) Package 4: November 2008 – July 2011 (33 months)
Operating Test	November 2000 – December 2000 (2 months)	Package 1: July 2005 Package 2: October 2008 Package 3: October 2008 Package 4: July 2011

Source: planned: JICA appraisal document, actual: JICA internal document and answers to the questionnaire

3.4.3 Results of Calculations of Internal Rates of Return (Reference only)

3.4.3.1 Financial Internal Rate of Return (FIRR)

While FIRR was estimated as 4.99% at the time of project appraisal, it cannot be calculated at the time of ex-post evaluation, as data on revenues from this project (financial data) was not available due to its high confidentiality.

3.4.3.2 Economic Internal Rate of Return (EIRR)

At the time of project appraisal, EIRR was not calculated on the ground that this project is to contribute to improving the quality of life of people by eradicating villages with no telecommunication network, which is not suitable for calculation of EIRR, and thus EIRR is not calculated in ex-post evaluation.

Although the project cost was within the plan even after taking into account major changes of project outputs, the project period exceeded the plan. Therefore efficiency of the project is fair.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance (O&M)

[43] Package 1: digital switching system, Package 2: SDH and microwave transmission system, Package 3: WLL, and Package 4: transmission cables

At the time of project appraisal, VNPT was to be responsible for O&M[44]. VNPT was in charge of post and telecommunication services and owned 39 subsidiary companies. It also had 67 P&T (Posts & Telecommunications, equivalent to its provincial offices) in provinces and major cities, and approximately 45,000 employees[45]. Actual inspection and maintenance works were to be conducted by P&T in each province in accordance with guidance from VNPT[46].

At the time of ex-post evaluation, VNPT has been reorganized as VNPT Group which consists of a parent company, 5 financially-independent subsidiary companies and some joint-venture companies, and total number of employees is approximately 50,000[47]. O&M of telecommunication equipment procured under the project except for WLL is conducted by VNPT provincial offices and O&M of WLL is conducted by Vinaphone (both VNPT provincial offices and Vinaphone belong to the parent company)[48]. The number of employees in each VNPT provincial office is shown below.

Table 11: The Number of Employees in VNPT Provincial Offices in 10 Provinces

(Unit: person)

Province	Total	Technical Staff	Breakdown of Technical Staff	
			Equipment Operation	Maintenance of Access Network
Thanh Hoa	787	480	175	305
Nghe An	1,052	683	300	383
Ha Tinh	Approximately 500	Approximately 200	28	99
Quang Binh	480	320	22	298
Quang Tri	370	148	23	125
Thua Thien Hue	551	237	90	147
Quang Nam	481	240	140	100
Quang Ngai	421	278	17	261
Binh Dinh	486	310	40	270
Phu Yen	351	182	36	146

Source: interviews with VNPT provincial offices

Note: According to VNPT provincial offices, assignment of works is changed according to actual needs and situations, and the breakdown of technical staff above is not fixed, and thus the breakdown above is for reference only.

Equipment procured and installed under the project are operated as part of the whole equipment operated by VNPT provincial offices, and thus the exact number of employees who are in charge of O&M of equipment procured under the project only is unknown. However, according to the executing agency, equipment procured under the project are approximately 10% of the whole equipment, and thus approximately 10% of employees above are considered to be in charge of O&M of equipment procured under the project. VNPT Group has a sufficient number of employees, and each provincial office also explained that the number of employees is sufficient, and thus no particular problem is seen in institutional aspects of O&M. However, according to VNPT Group, reorganization of the Group is

[44] Source: JICA appraisal document
[45] Source: same as above
[46] Source: same as above
[47] Source: VNPT HP (http://www.vnpt.vn/) and answers to the questionnaire
[48] Source: answers to the questionnaire

planned in near future. Currently the Group has two mobile phone companies such as Vinaphone and Vietnam Mobile Telecom Services Company (VMS MobiFone)[49], and the latter is expected to become separated from the Group, however, more details about the reorganization are unknown[50]. However, as explained above, O&M of equipment procured under the project are conducted by VNPT provincial offices and Vinaphone, and the separation of VMS MobiFone will not have a major impact on institutional aspects of O&M of equipment procured under the project, according to the Group[51].

3.5.2 Technical Aspects of Operation and Maintenance

Details on technical aspects of employees in VNPT provincial offices are shown below.

Table 12: Details on Technical Aspects of Employees in VNPT Provincial Offices in 10 Provinces

Province	Education	Average Years of Work Experience of Technical Staff
Thanh Hoa	Among 787 (the total number of employees) ・ Master degree: 4 ・ Bachelor in engineering: 412 ・ Bachelor degree (not engineering): 171 ・ Technical school: 200	Approximately 10 years
Nghe An	Among 683 technical staff ・ Master degree: 6 ・ Bachelor in engineering: 203 ・ Bachelor degree (not engineering): 64 ・ Technical school: 410	Approximately 13 years
Ha Tinh	Among approximately 500 employees in total, approximately 140 have a bachelor degree in engineering.	Approximately 10 years
Quang Binh	Among approximately 480 employees in total, approximately 220 have a bachelor degree in engineering.	Approximately 10 years
Quang Tri	Among 148 technical staff ・ Master degree: 9 ・ Bachelor in engineering: 50 ・ Bachelor degree (not engineering): 5 ・ Technical school: 84	Approximately 10 years
Thua Thien Hue	Among 237 technical staff ・ Bachelor in engineering: 101 ・ Bachelor degree (not engineering): 16 ・ Technical school: 120	Approximately 11 years
Quang Nam	Among 240 technical staff ・ Master degree: 4 ・ Bachelor in engineering: 116 ・ Bachelor degree (not engineering): 24 ・ Technical school: 96	Approximately 13 years
Quang Ngai	Among 278 technical staff ・ Bachelor in engineering: 54 ・ Bachelor degree (not engineering): 22 ・ Technical school: 202	Approximately 14 years

[49] VMS MobiFone was established as a joint stock company funded by the Vietnamese government and a Swedish company in 1993, and Vinaphone was established in 1996 fully funded by the Vietnamese government.
[50] Source: interviews with the executing agency
[51] Source: same as above

Binh Dinh	Among 310 technical staff ・ Master degree: 5 ・ Bachelor in engineering: 60 ・ Bachelor degree (not engineering): 33 ・ Technical school: 212	Approximately 20 years
Phu Yen	Among 182 technical staff ・ Master degree: 1 ・ Bachelor in engineering: 72 ・ Bachelor degree (not engineering): 25 ・ Technical school: 84	Approximately 12 years

Source: interviews with VNPT provincial offices

During the project implementation, various trainings on O&M of equipment procured and installed under the project were provided by contractors (lengths of these trainings differ from three days to one month, depending on training contents) and 655 employees in total attended[52]. Moreover, after the project completion, trainings on O&M are provided every year by inviting lecturers from inside and outside of VNPT provincial offices and O&M manuals are also in place in each provincial office[53].

Sufficient number of engineers and technicians are assigned, trainings have been provided for employees during and after the project implementation, and O&M manuals are in place, and thus no particular problem is seen regarding technical aspects of O&M.

3.5.3 Financial Aspects of Operation and Maintenance

Financial situation (sales revenue and profit) of VNPT at the time of project appraisal is shown below.

Table 13: Sales Revenue and Profit of VNPT (at the Time of Project Appraisal)

(Unit: billion VND)

	1995	1996
Sales Revenue	4,987	5,952
Profit Before Tax	1,202	1,708
Profit After Tax	658	939

Source: JICA appraisal document

According to the table above, after-tax profit rate was 13-16%, and moreover, capital-to-asset ratio was 62%, and VNPT was regarded as in a good financial condition[54].

At the time of ex-post evaluation, VNPT provincial offices, which actually conduct O&M of equipment procured and installed under the project, belong to VNPT Group (parent company), and part of revenues of provincial offices is received by the Group and in case of losses in provincial offices, such losses are financed by the Group[55]. As financial statements of the Group was not provided on the ground that they are highly confidential, sales revenue and gross profit of the Group in

[52] Source: answers to the questionnaire
[53] Source: interviews with the executing agency
[54] Source: JICA appraisal document
[55] Source: interviews with the executing agency

recent three years published on an online newspaper are shown below.

Table 14: Sales Revenue and Gross Profit of VNPT Group (at the Time of Ex-Post Evaluation)

(Unit: billion VND)

	2010	2011	2012
Sales Revenue	101,569	120,800	130,000
Gross Profit	11,200	10,000	8,500

Source: VnEconomy (http://vneconomy.vn/)

Sales revenue of VNPT Group has largely increased compared with the amount before the project implementation, and according to information provided by a project-related party, net profit of the Group has been positive in recent four years and net profit to sales is approximately 1 to 3%.

O&M cost (approximate calculation) of equipment procured and installed under the project in VNPT provincial offices is shown below.

Table 15: O&M Cost of Project Equipment in VNPT Provincial Offices (Approximate Calculation)

(Unit: million VND)

Province	O&M Cost	
Thanh Hoa	Equipment	1,300
	Salary	1,000
	Technical Support	1,700
	Total	**4,000**
Nghe An	Equipment	1,000
	Salary	2,100
	Technical Support	500
	Total	**3,600**
Ha Tinh	Equipment	280
	Salary	300
	Technical Support	N/A
	Total	**580**
Quang Binh	Equipment	300
	Salary	400
	Technical Support	100
	Total	**800**
Quang Tri	Equipment	150
	Salary	840
	Technical Support	270
	Total	**1,260**
Thua Thien Hue	Equipment	200
	Salary	750
	Technical Support	270
	Total	**1,220**
Quang Nam	Equipment	560
	Salary	600
	Technical Support	200
	Total	**1,360**
Quang Ngai	Equipment	360

	Salary	300
	Technical Support	485
	Total	**1,145**
Binh Dinh	Equipment	150
	Salary	250
	Technical Support	300
	Total	**700**
Phu Yen	Equipment	250
	Salary	400
	Technical Support	280
	Total	**930**

Source: interviews with VNPT provincial offices

O&M cost (approximate calculation) of equipment procured and installed under the project in VNPT provincial offices is approximately 700 million – 4,000 million VND (it varies depending on the number of subscribers and quantities of equipment procured etc. in each province), which is only 0.0005 - 0.003% of sales revenue of the Group, and the impact of the O&M cost on the Group's financial condition is very small. According to the executing agency, currently necessary expenses are fully covered by sales revenue and government subsidy is not provided, and thus there seems to be no major problem in the Group's financial condition. However, as explained above, since financial statements of the Group was not provided, the Group's financial condition could not be analysed sufficiently in detail, and it is also not very clear what impact the reorganization of the Group (separation of VMS MobiFone) will have on the Group's financial condition.

3.5.4 Current Status of Operation and Maintenance

O&M is regularly conducted based on O&M manuals etc. in VNPT provincial offices[56]. However, utilization ratio of digital switching systems (see "3.2 Effectiveness") and WLL facilities has been decreasing due to the decrease of subscribers of fixed-line phones in recent years[57]. Microwave transmission equipment is currently not used in Quang Tri and Phu Yen, due to the decrease of needs for fixed-line phones, low quality and not being suited for the local configuration network etc.[58] However, a capacity of microwave transmission is generally small, and thus it is usually replaced by OFC when the demand for telecommunication increases.

Therefore, no major problem is seen regarding current O&M status.

While no major problem has been observed in institutional and technical aspects of O&M at the time of ex-post evaluation, financial situation of O&M agency could not be sufficiently verified, as its financial statements were not provided. Moreover, reorganization of the O&M agency is planned in the near future, and its influence on future O&M is somewhat uncertain. Therefore sustainability of the project effect is fair.

[56] Source: interviews with the executing agency
[57] Source: same as above
[58] Source: same as above

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aimed at eradicating villages with no telecommunication network and improving telecommunication services in central Vietnam, which lagged behind economically compared with northern and southern Vietnam, by constructing telecommunication networks in the region.

Relevance of this project is high, as the project is consistent with priority areas of Vietnam's development plans and Japan's ODA policy, and moreover development needs for the project are high. As a worldwide trend in the telecommunication sector, while needs for fixed-line phones are decreasing, needs for mobile phones are rapidly increasing at the time of ex-post evaluation. Accompanying this trend, the utilization ratio of digital switching systems etc. procured under the project has been decreasing, however, core transmission lines developed under the project are also used for mobile and internet communications, and thus this project has contributed to the diffusion of mobile phones and internet in recent years. This project has contributed to eradication of villages with no telecommunication network in the project-targeted areas, actual figures of telephone density in 2010 largely exceed the estimated figures, and telecommunication services in the project-targeted areas have been improved by the diffusion of both fixed-line and mobile phones, and thus effectiveness and impact of the project are high. Efficiency of the project is fair, as actual project period largely exceeded planned period, while actual project cost was within the planned cost. While no major problem has been observed in institutional and technical aspects of O&M at the time of ex-post evaluation, financial situation of O&M agency could not be sufficiently verified, as its financial statements were not provided. Moreover, reorganization of the O&M agency is planned in the near future, and its influence on future O&M is somewhat uncertain. Thus, sustainability of the project is fair.

In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

None

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

Necessity to Implement a Telecommunication Project Promptly from Project Appraisal to Completion / Necessity to Evaluate Implementation Capacity of an Executing Agency and Related Risks: Actual project period was 161 months compared with planned period of 34 months, and overly exceeded the plan (474% against the plan). Ex-post evaluation was conducted 15 years after the loan agreement, and while the project aimed at increasing fixed-line phone density at the time

of project appraisal, mobile phone communications are dominant globally in recent years and the utilization ratio of digital switching systems procured under the project is decreasing at the time of ex-post evaluation. As technology innovation speed is fast in the telecommunication sector, a project plan needs to be prepared taking into account the speed of future technology innovation and future income levels in the given country very carefully and need to be implemented promptly. In addition, during appraisal, it is necessary to check in detail procurement procedures in a country where a project is going to be implemented, evaluate implementation capacity of an executing agency and related risks, and carefully consider whether the lending scheme as Japanese ODA loan is suitable for the project.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1.Project Outputs	・ Digital Switching System: 118,728 lines ・ STM：157 set ・ Network Management System: 10 set ・ Optical Fiber Cable: 1,681 km ・ Microwave Transmission System: 8 set ・ Outside Plant (Cable): 498,690 pair-km ・ Wireless Local Loop: 9,100 lines	・138,173 lines ・219 set ・10 set ・2,656 km ・4 set ・Cancelled ・7,043 lines
2.Project Period	March 1998 – December 2000 (34 months)	March 1998 – July 2011 (161 months)
3.Project Cost		
Amount paid in Foreign currency	10,282 million yen	5,171 million yen
Amount paid in Local currency	3,050 million yen (31 million VND)	2,941 million yen (22 million VND)
Total	13,332 million yen	8,112 million yen
Japanese ODA loan portion	11,332 million yen	5,912 million yen
Exchange rate	1VND = 97.46 yen (As of October 1997)	1 VND = 135.69 yen (Average between March 1998 and January 2010)