

WORKING PAPER

Water Supply Utility Businesses in Japan

Shoji KUSUDA

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In order to easy understanding for readers of this working paper, the unit of Japanese currency “Yen” is simply exchanged into US \$ descriptions by average annual exchange of CY2009 (1US \$ = 93.52 Yen).

1. Introduction

This paper comprehensively focuses on water supply utility businesses² in Japan. The water utility supply businesses in Japan, in principle, shall be operated by the municipal governments such as cities, towns and villages.

The huge investments for dam constructions aiming the stability of the source of tap water supply, the large cost to secure the superannuated reconstruction of facilities, and the surplus cost with introduction of the advanced water-purifying processing against the declining water quality for aiming the safety of tapping water etc. lead to increasing rates, such as depreciation cost for related facilities and raw water expense to the water supply business.

On the other hand, the water service demand itself has been decreasing by the progress of low birthrate and longevity of Japanese society, and by the shift to the water saving facilities, etc.

Under these circumstances, reexamination of management forms by local governments, such as business integrations and broadenings of water supply utility businesses have been performed step by step in Japan.

2. Legal framework, responsibility and organization for planning and programming

2.1 The Water Works Law

In Japan, in connection with postwar economic growth, the water service sector was positioned as an infrastructure indispensable to people's life, and the "Water Works Law" was enacted in 1957. Based on this law, clean, ample and cheap drinking water service supply had expanded rapidly from the postwar period over about 30 years, and the diffusion rate of drinking water service in Japan had been increasing rapidly by around 1975.

Whoever may desire to operate water utility business shall require the approval by the Minister of Health, Labor and Welfare under the "Water Works Law". And cities, towns and villages shall manage water utility businesses in

² There are different categories of Water supply utility businesses for especially industrial use in Japan. The amount of water consumption for industrial use is roughly 80% of water consumption for civil use. Water supply utility businesses for especially industrial use are not regulated by the "Water Works Law" but the different law called the "law of Water works for industrial use" is applied.

principle; any private party who may desire to operate such business shall only be authorized to operate it with the approval the municipal government of the district where the party shall wish to operate such business.

“Water utility business” defined as supplying water to more than 5000 population has the characteristics of the supply area for not only domestic use on urban sites but also large quantities consumers, such as business users. On the other hand “Small water supply system” defined as supplying water up to 5000 or less population has the characteristics of the supply area for agriculture, forest and fishing villages, containing small-scale city sites, for their daily life use. The small water supply systems have special legal settings like that (1) the installation of fire extinguishing shall not be applied, and also that (2) the period in which a water facilities supervisor takes his qualification acquisition shall be reduced by half in case water supplied population is of 2000 or less.

Furthermore, in regard to the “Private water supply system”, the number of the system was around 3700, but the number became more than doubled by the revision of the Water Works Law in 2001, and at the end of FY2008 the number of this system had been 7957. Before the Water Works Law revision in 2001, the “Private water supply system” shall be controlled for only the institution which supplies water to the resident exceeding 100 persons. In order to strengthen governing structure, the regulation now has been applied to the “Private water supply system” whichever supplies water to the resident or not, in case the water supply capability is equivalent to the maximum water supply of 20 m³/day or more per. In addition, “Private water supply system” is not called for the “rules of the water supply” normally applied such as to “Water utility businesses” in the law.

Table 1: Classification of water supply utilities

Classification	Contents	The number of businesses	Water supplied population
Water supply utility business	The business which supplying water by means of water facilities to meet the demand (the facilities to supply water to the population of 100 or less shall be excluded)		
Water utility business	Water supplied population is more than 5,000 persons' enterprise.	1,519	118,980,000
Small water supply business	The facilities to supply water to a population not exceeding 5,000	7,152	5,270,000
Sub-total		8,671	124,250,000
Bulk water supply business	The business of supplying water to the water utility business by means of water facilities	101	-

Private water supply system	The water supply system, other than those facilities operated by water utility business, to supply water to the lodging houses, apartment houses of private or public firms, medical treatment houses etc. in case the water supply capability is equivalent to the maximum water supply of 20m ³ or more per day	7,957	490,000
Total		16,729	124,740,000

Source: Ministry of Health, Labor and Welfare (statistics as of March 31, 2009)
<http://www.mhlw.go.jp/topics/bukyoku/kenkou/suido/database/kihon/syurui.html>

2.2 The Law of Municipal Enterprises as management frameworks for water supply utility business

“The Law of Municipal Enterprises” which serves as an optimal management legal form of water supply utility business was enforced in 1952, almost simultaneously with enforcement of “Water Works Law”. Before establishment of this Law of Municipal Enterprises, for the all kinds of municipal enterprises, general rules like the Local Government Act, the Local Finance Act, etc. were applied as the normal general administrative functions in addition to each business law. Under such regulations, municipal enterprises were regulated as one of the general administrative functions, in which there were difficulties of the management problem not aiming economical efficiency as enterprises. Based on this background of difficulties, the Law of Municipal Enterprises which manages for public welfare improvement and aiming efficiency had settled, and 8 types of municipal enterprises including water supply utilities had been specified now. Under this Law of Municipal Enterprises, the organization, the personnel engaged, financial affairs, the management of municipal enterprises, the measures for financial reconstruction of municipal enterprises are defined, additionally cooperative and the broader-based cooperation by regulation of the Local Government Act are also specified.

For water utility business, all of regulations of the Law of Municipal Enterprises are applied on now. But historically saying, the application scope by the regulation has been changing time to time. At the time of the enact of this Law of Municipal Enterprises in 1952, all of legal provisions were naturally to be applied in case 50 or more personnel sized water utility businesses, but in case less than 50 persons sized water utility businesses, it had become arbitrary application. Then, by the legal revision in 1960, water utility businesses whose personnel sizing less than 50 and 20 or more had been applied especially financial regulation etc., and then all personnel sizing water utility businesses were applied by the legal revision in 1966.

On the other hand, for the small water supply business it was arbitrary application from the beginning, but the parts of financial regulation etc. had been applied by the legal revision in 1963. However, it is again changed into arbitrary application (because it is applicable by setting for municipal ordinances), by the legal revision in 1966, and has been continuing up to now.

Table 2: Management types of water supply utilities

	Public management				Private, other management	Total
	Prefectures management	Municipal management	Town and/or village management	Cooperative and the broader- based cooperation management		
Water utility business	5	885	533	87	9	1519
Bulk water business	45	3	-	53	-	101
Sub-total	50	888	533	140	9	1620
Small water supply business	6276				876	7152
Private water supply system						7957

Source: Ministry of Health, Labor and Welfare (statistics as of March 31, 2009)
<http://www.mhlw.go.jp/topics/bukyoku/kenkou/suido/database/kihon/syurui.html>

2.3 The frame of water source development

Regarding to the source development of tap water supply, each local municipal body and/or cooperatives and the broader-based cooperation offices had once been secured separately. However, the “Law of water source development promotion” was enacted in 1961, and central government itself can perform the riverhead development of water supply now directly. And also in accordance with the report by the Living Environment Council of the Ministry of Health and Welfare, the broadening policy of the water supply service with “the wide operator supply object beyond the geological range of cities, towns and villages” had introduced in 1973. As a result, separate water source developments had gradually been abolished, broadening of the source of tap water supply has

been attained. But these broadening policies have been leave many water utility businesses depending upon a bulk water supply business of its supply.

In addition, corresponding to aggravation of raw water quality, new 2 laws called as “Law Concerning Special Measures for Conservation of Drinking Water Sources” and “Special Law regarding to Preservation of injury on specific water service use” was also enacted in 1994, and the water quality conservation of the source of tap water had been strengthened.

3. Provision and regulation of water services

3.1 The management of water supply utility business

The gross earnings of Japanese Water utility business (Small water supply businesses applied to the Law of Municipal Enterprises were also included) were 3.17 trillion yen (= 34 Mil US\$), and as for the aggregate total cost 2.90 trillion yen (= 31 Mil US\$), 263.9 million yen surplus as net profit in FY2007. The number of the utility businesses which produced ordinary profit was 1180, and the number of the utility businesses which produced the ordinary loss was 236. The number of the utility businesses which had accumulated deficits was 260, among those, six utility businesses were categorized doubtful debt level to bankruptcy.

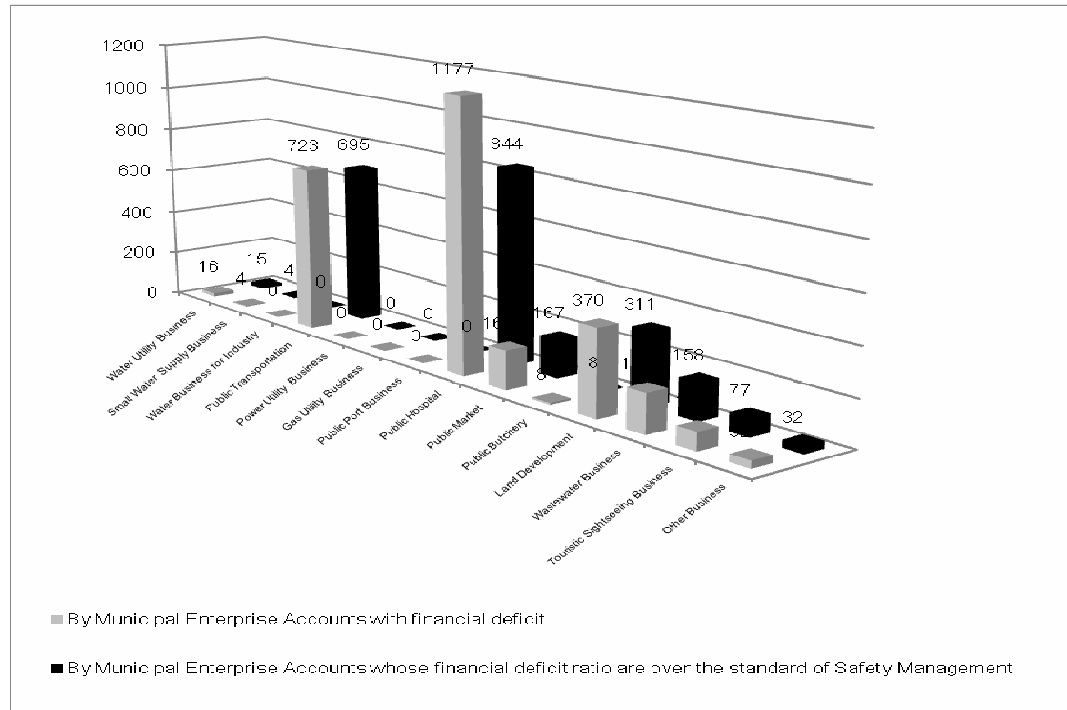
The water utility businesses in Japan carries out their operation by self-support accounting principle; costs for building necessary facilities and managing their daily operations shall be covered at the charge from their water service users. For such self-support accounting is managed by a special account setting based on the Local Finance Act. Furthermore, the issues of the local bond by Municipal authorities are accepted as one of the source of revenue which Municipal Enterprises take. There is a background of the reason why the issues of the local bond are assignable by the reliable refunding with water-rate receipts.

In order to improve comprehensively to Local-public-financial situations, new law called “the Improving and Healthy Financial Management to Local Finance” enacted in June, 2007. According to the new law, (1) expanding the candidate for surveillance to not only general accounts of the Municipal Authority but also Municipal Enterprises, Public Corporations, the Third Sector, etc., (2) introducing the judgment index of financial situations by having been considered and grasped towards not only a single fiscal year flow but also the stock side, (3) finding out the fiscal deterioration in the possible earliest stage, and making the improvement of financial condition are the main policy target of this new law.

Moreover, the business accounting system reform was introduced to Local government and Municipal Enterprises from the present cash basis to actual basis, and from single-entry bookkeeping to changing double entry bookkeeping as public-sector accounting. And the Ministry of Internal Affairs and Communications, showed the standard model and its revised model which local government should consider as reference in May, 2006, and the point of asset evaluation, the principle of connection between local government and Municipal Enterprises, etc. in October, 2007. Based upon the direction of Property and Debt Reform, and concrete measures with “local administrative reform new indicator” are imposed in by FY2009 depending on the situation of the financial improvement judgment ratio.

The Ministry of Internal Affairs and Communications reported the result of trial annual accountings in FY2007 using the healthier-public-finances index in “White paper on Municipal Public Finance, 2009 edition”. In this white paper, 5 organizations were financial deficits in the Water supply utility business in relation to the financial deficit ratio, 3 organizations of those were over the criteria of exceeding 20% for financial shortage, and the total deficit were 1.5 billion yen.

Figure 1: Total Amounts of Financial Deficit by Municipal Enterprise category in 2007



Note: Unit: 100 mil.yen.

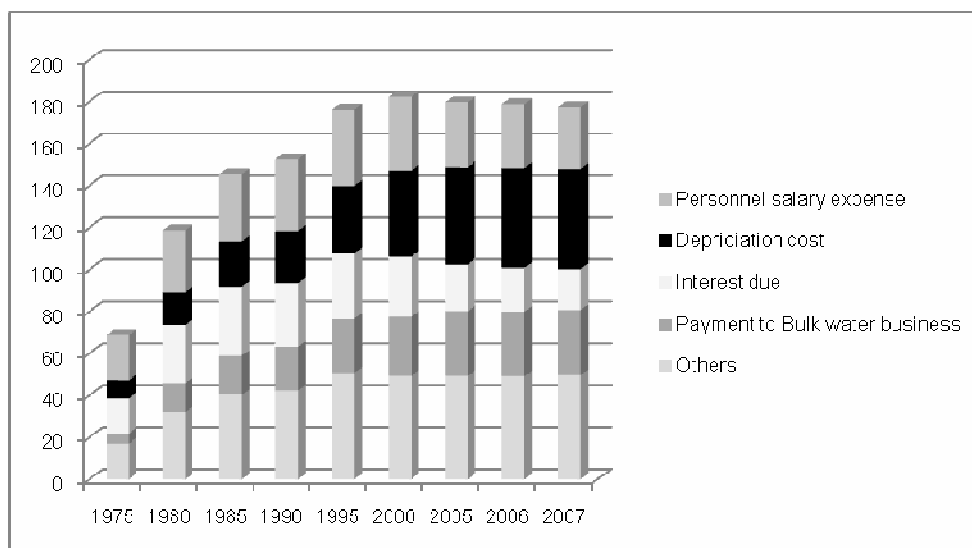
Source: Ministry of Internal Affairs and Communications (2009), “White paper on Municipal Public Finance, 2009 edition” p. 142.

In addition, according to “White paper on Municipal Public Finance, 2009 edition”, 872 Small water supply business enterprises were run by the Municipal Enterprises in FY2007. Among those 24, 2.8% Small water supply business were under the Law of Municipal Enterprises, their amount of the total income were 106 billion yen, aggregate total costs were 83 billion yen, and the gross earnings were 23 billion yen in FY2007.

3.2 Water supply cost

While such as personnel salary expense and interest due are decreasing, the supply cost per m³ of tap water has been increasing. Depreciation cost and the payment to Bulk water business the main factors of cost push. The background of these increasing factors are considered by the introduction of the advanced water-purifying processing, accompanying reconstruction of the superannuated facilities, the investment in the dam construction for securing the safety of water quality and the stability of the source of tap water, and the declining raw water quality etc.

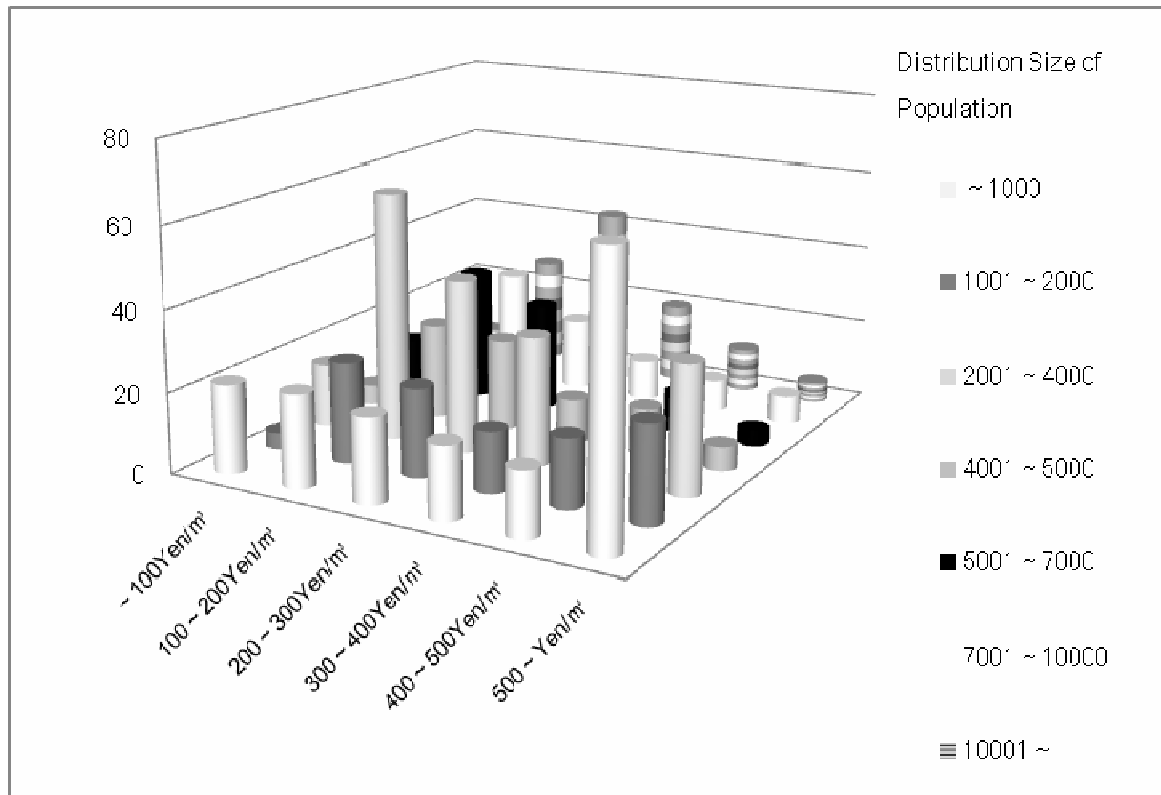
Figure 2: Water supply cost Yen/m³ for Water utility business



Source: Japan Water Works Association HP (water service data room).

On the other hand, the water supply cost in the Small water supply business has been increasing for five years, and is 264.33 yen/m³ in FY2007, 49% higher than that of Water utility business. Because the capital charge per unit quantity, a power cost, etc. become comparatively high-priced by the degree of concentration of population, the geographical feature factor etc., there is a general tendency for the water supply cost to become high as the small water supply business with a small scale.

Figure 3: Water supply cost of the small water supply business by distribution size of population in FY2007



Note: The Small water supply businesses neither under construction nor under the Law of Municipal Enterprises are not included.

Source: Author made this Fig by the Ministry of Internal Affairs and Communications (2009), “The Small water supply businesses yearbook, the 31st collection”.

3.3 Business enforcement staff

The number of the personnel engaged in the Water utility business and the Small water supply business as the Municipal Enterprises were 55,109 persons in FY2007. The Water utility business and the Small water supply business has been trying to promote of outsourcing including inspection-of-metering business and control-of-maintenance business, the increase in efficiency of water purification plant operation management business etc., the number of the personnel engaged has been decreasing in recent years.

Table 3: The number of the personnel engaged in the water utility business and the small water supply business

	FY2003	FY2004	FY2005	FY2006	FY2007
Water utility business	59,351	57,899	56,262	54,708	52,799
The number of personnel under the general account	52,677	51,340	49,772	48,387	46,489
The number of personnel under the capital account	6,674	6,559	6,490	6,321	6,310
Small water supply business	2,784	2,689	2,471	2,422	2,310
The number of personnel under the general account	2,572	2,457	2,239	2,166	2,065
The number of personnel under the capital account	212	232	232	256	245
Businesses under the Law of Municipal Enterprises	59,439	57,985	56,337	54,781	52,875
Businesses not under the Law of Municipal Enterprises	2,696	2,603	2,396	2,349	2,234
Sum total	62,135	60,588	58,733	57,130	55,109

Note: Businesses under the Law of Municipal Enterprises are the sum total of the Water utility business and the Small water supply business under the Law of Municipal Enterprises.

Source: Municipal Enterprises management study group “Municipal Enterprises yearbook in FY2007” Institute of Local Finance.

The amount of an average monthly salary per one personnel was 596,069 yen (= 6374 US\$) in FY2007. According to the Classification of water supply utilities, the Water utility business: 594,766 yen, the Bulk water business: 613,097 yen and the Small water supply business end water supply business: 497,222 yen. And there are tendencies that the allowances are decreasing in general in proportion to water-supplied-population scale.

According to “The water utility business management index in FY2007” for the survey of 1325 Water utility business, not only the water supplied population per one personnel but also the water supply profit per one personnel have been rising every year.

Table 4: The labor productivity index per one personnel in the Water utility business

	FY2003	FY2004	FY2005	FY2006	FY2007
Profit of water supply (1000 yen)	49,941	51,839	53,389	54,606	56,870
Population of water supply (person)	2,429	2,507	2,603	2,690	2,814

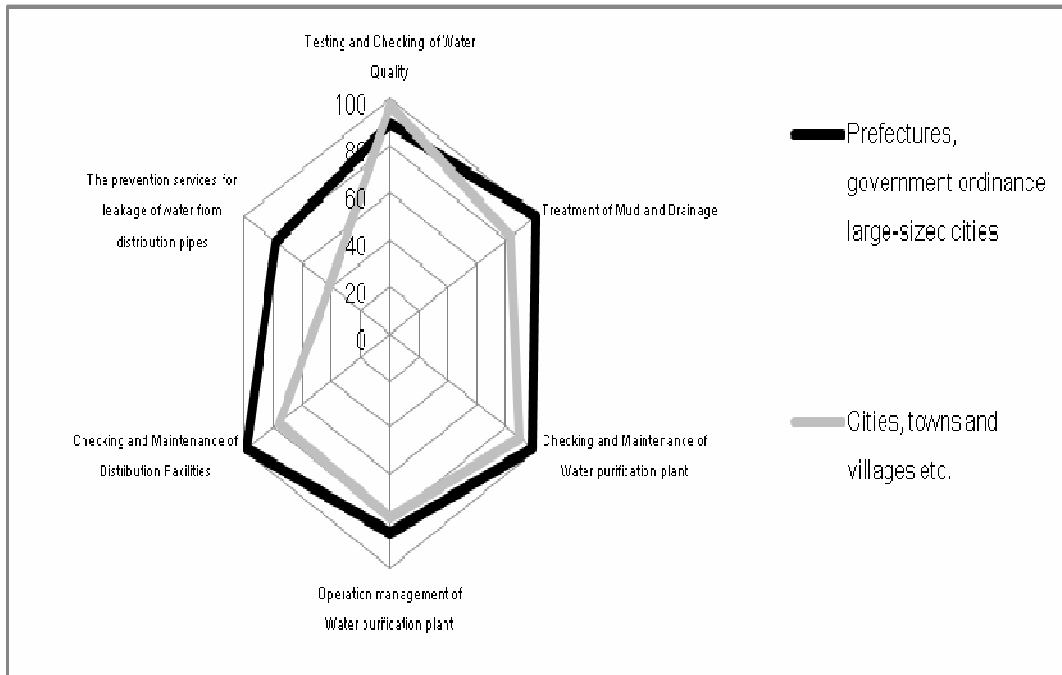
Source: the Ministry of Internal Affairs and Communications (2009), “The water utility business management index in FY2007”.

3.4 Outsourcing of business

There are many Water utility businesses which are carrying out outsourcing from a viewpoint of financial efficiency. The enforcement rate to outsource (the number of organizations which is carrying out a certain outsourcing comparatively) is generally as high as 60-80% in the Enterprises of all prefectures, government ordinance large-sized cities, etc., but it has only been about 40% in the Enterprises of city water supply in cities, towns and villages etc., probably because the prevention services for leakage of water from distribution pipes are rather small burden for them. And also the performing design audits of water supply business etc. are low enforcement rate to outsource, rather under direct management from a viewpoint of safety security of water supply in many cases.

On the other hand, the enforcement rate of outsourcing is less than 50% in the Small water supply business. Because there are many small-scale business units generally, it is considered that the financial efficiency effect does not show up easily in many cases.

Figure 4: The enforcement rate to outsource in the Bulk water supply business



Source: The Ministry of Internal Affairs and Communications (2009), "The Comprehensive check Implementation of management to the Municipal Enterprises (as of April 1, 2009)".

4. Financing

4.1 Capital stock and annual investing activities of the water supply utility business

It is estimated at about 40 trillion yen (= 0.43 tri US\$) and more at the end of FY 2005, if the Capital stock is evaluated as accumulation of year by year amounts of investments by the water supply utility businesses in Japan. Also it is expected that the investing cost for renewal demand of the existing facilities will be 550 billion yen/year (= 5.9 bil US\$/year, the end of FY2005). Based on “the Water Service Vision (revised edition)” by the Ministry of Health, Labor and Welfare in July, 2008, this estimated amount of investing activities for renewal demand of the existing facilities would be also 1.5 time in the 2020’s. On the other hand, “White paper on local-public-finance, 2009 edition” by the Ministry of Internal Affairs and Communications indicates us that the total assets are 30.93 trillion yen (= 0.33 tri US\$), total debts are 1.36 trillion yen (= 0.15 tri US\$), and capitals are 29.57 trillion yen (= 0.32 tri US\$) on 2007 annual accounting for the water supply utility businesses of which the Law of Municipal Enterprises has been applied.

The annual total capital expenditures by the water utility business were 2.260 trillion yen (= 24 Mil US\$) in FY2007, composing of 0.96 trillion (42.3%) as the construction improvement cost, and 1.22 trillion yen (54.1%) as the repayment cost for Issue of Bonds. At the same time, the annual total capital revenues were 2.256 trillion yen (= 24 Mil US\$) in FY2007, composing of 1.24 trillion yen (54.8%) from inside fund, 1.20 trillion yen (45.2%) from outside fund. Main outside fund were 0.71 trillion yen (31.4%) from Issue of Bonds, and 75.5 billion yen (3.3%) from subsidy by national/prefecture governments. The annual total capital shortfalls in FY2007 were 4.3 billion yen.

In regard to the small water supply business, the annual total capital expenditures were 157.3 billion yen (= 1.7 bil US\$) on FY2007 annual accounting, composing of 89.3 billion yen as the construction improvement cost, and 67.3 billion yen as the repayment cost for Issue of Bonds. On the other hand, the annual total capital revenues were 134.3 billion yen, composing of 60.9 billion yen from Issue of Bonds, and 23.5 billion yen from subsidy by national/ prefecture governments, 62.8% occupied by these two outside items. The annual total capital shortfalls in FY2007 were 22.9 billion yen, larger scale and ratio than that of by Water utility business.

4.2 Participation by Japanese national/prefecture government concerning investing activities of the water supply utility businesses

Although annual subsidy by Japanese national/ prefecture government and the amount of Bonds issued had been increased constantly since 1985, the Fiscal Structure Reform Council stressed to modify the expanding plan of public-works expense by Japanese national/ prefecture government in FY1997, and cut down one by one including subsidy to investing activities of the water supply utility businesses from the budget for FY1998. Not only Government Subsidy but also Issue of Bonds had been decreasing since then.

And the new Democratic Party Administration decided drastic reduction of draft budget for FY2010 prepared by former Liberal Party Administration after political shift in 2009, and government subsidy to investing activities of the water supply utility businesses have decreased even to 73.7 billion yen, 61% downwards compared with FY2000.

Table 5: Government Subsidy and Issue of Bonds concerning investing activities of the water supply utility businesses

Fiscal year		1995	2000	2005	2006	2007	2008	2009	2010 (proposal)
Water Utility businesses	Government Subsidy	1,499	1,437	885	823	758	711	674	524
	Issue of Bonds	8,350	9,090	4,898	4,458	3,875	3,799	3,199	N.A.
Small water supply systems	Government Subsidy	412	476	348	337	316	297	284	212
	Issue of Bonds	855	1,059	578	569	499	464	371	N.A.
Sum total	Government Subsidy	1,911	1,913	1,233	1,160	1,074	1,008	958	737
	Issue of Bonds	9,205	10,419	5,476	5,027	4,374	4,263	3,570	3,524

Note: Government Subsidy: the amount at the beginning of the FY, Issue-of-Bonds: the amount at the beginning of their plan. Unit: 100 million yen.

Source: The water service utility newspaper co. (2009), "Water service yearbook 2010 edition" and other.

Government subsidies to investing activities of the water supply utility businesses in FY2010 have their target with 73.7 billion yen budget draft composing 52.4 billion yen for the source development of tap water, 21.2 billion yen for the reorganization promotion and modernization of Small Water Supply Systems.

- ① Maintenance and modernization of the Small Water Supply Systems used as a local life base
- ② Strengthening of broadening/management base of water service

③ Strengthen of the water utility facilities against disaster, such as an earthquake
 ④ Maintenance of the water service supporting the safe and satisfied life are the main policy targets for Japanese national/prefecture government. More specifically, Government subsidies are characterized as follows:

- Working expenses for enhancement of lifeline function 11.8 billion yen
- Maintenance expense, such as an advanced water-purifying facilities 5.3 billion yen
- Working expenses for outspread water service area dissolution 4 billion yen
- Working expenses for promotion of Small Water Supply Systems reorganization 13 billion yen
- Working expenses for Life base modernization 3.3 billion yen

5. Monitoring (and regulation) of provision, quality and development of accessibility to/of services

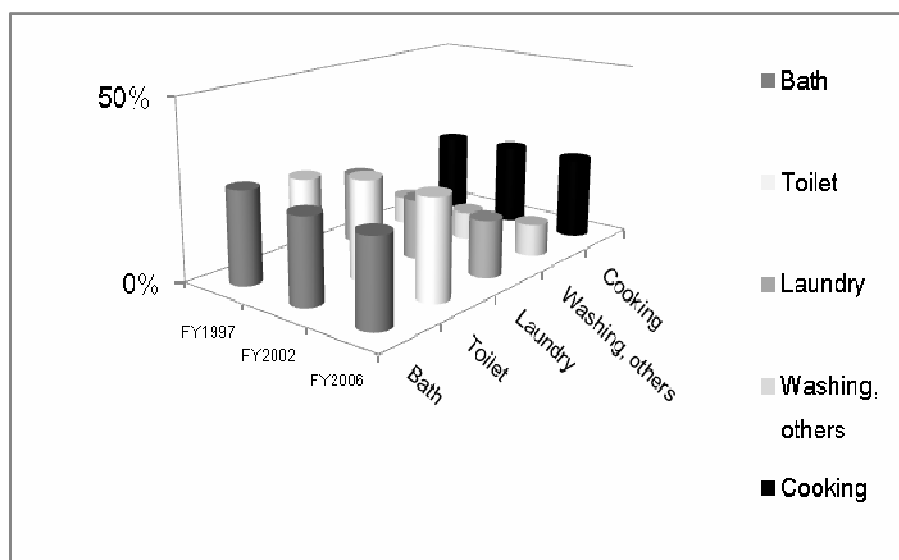
5.1 The Coverage of water services & the purpose of water use

By the end of FY2008, the coverage of water services in Japan was 97.5%, where the drinking water supplied to the population of 124,740,000 people. Historically saying, the coverage of water services was only 26.2% in 1950, it was just 30 years for Japanese water supply utility business to spread and promote of their services in 3 or more times, the coverage had been reached at 91.5% in 1980. 100% coverage area of water services are Tokyo, Osaka and Okinawa prefectures, but only 2 Prefectures of northern Akita Prefecture (89.9%) and southern Kumamoto Prefecture (85.9%) are 80 percent level of coverage of water services in Japan.

The main purposes of water use at ordinary home are for toilet and bathing in Japan. High ratio of the water use for bathing is especially famous for Japanese people's clean and healthy daily life, but in addition to these historical features, by progress of low birth rate and of tendency of small-sized family in Japan, the water use structure at ordinary home have been changing.

Table 6: Figure 5: The purpose of water use at ordinary home

	FY1997	FY2002	FY2006
Bathing	26%	24%	24%
Toilet	24%	28%	28%
Laundry	20%	17%	16%
Washing, others	8%	8%	9%
Cooking	22%	23%	23%



Source: Tokyo Waterworks Bureau (1997, 2002, 2006), “Survey for the purpose of water use at ordinary home”.

5.2 Regulation of water-rates

The water utility businesses in Japan carries out their operation by self-support accounting principle; costs for building necessary facilities and managing their daily operations shall be covered at the charge from their water service users. Therefore, charges differ for every water utility businesses. The differences of charges are coming from the variety of factors, that is to say, place and quality of water resources, the passing year of water service facilities construction, scales of economy, personnel expenses, the administrative and maintenance expense of institutions, etc. are the major factors.

Regarding to the charge of water utility businesses, they have to prepare “the rule of water supply” under the article 14 of the Water Works Law. The water utility business shall be required to lay out the rules in connection with the rate of charge, the sharing of construction cost of the water supply facilities and other conditions. And according to this article, the chargers are considered fair and rational based on reasonable costing under efficient business operation, and the chargers are clearly established with fixed rate or price.

In the case that the water utility businesses change the water rate, there are two procedures needed for realize those changes. (1) If the utility businesses are municipal enterprises, they have to submit the notice of this change to the Minister of Health, Labor and Welfare, and (2) if the utility businesses are not

municipal enterprises, they have to get approval of this change from the Minister of Health, Labor and Welfare.

In addition to these, when the rule of water supply including the issue of charges by non municipal enterprises is considered as remarkably unsuitable by change of a social economical situation etc., the Minister of Health, Labor can order to change the rule of water supply in view point of public interest.

Moreover, when the water utility businesses are municipal enterprises, the charges of water utility businesses are based on the proper cost price under appropriate and efficient management under Article 21 of the Law of Municipal Enterprises.

5.3 Water-rates system

As for the water-rates system in Japan, there are three categories; first one is by category of users, second one is by calibers, and last one is other types. Although there were accustomed to apply the water-rates system by category of users which took burden capability of users into consideration, the water-rates system according to caliber is popular in recent years which the water utility businesses can explain it theoretically. Moreover, the complex system called two-part tariff composing of the basic charge of a fixed amount unrelated to actual water consumption and the amount charge of according to real water consumption is adopted.

Table 7: Types and the number of water-rates system

Water-rates system by category of users	Two-part tariff	736 utility businesses
	Mono tariff	1 utility business
Water-rates system by calibers	Two-part tariff	884 utility businesses
Other types	two-part tariff	229 utility businesses

Source: Small water supply business study group (2005), “A management guide to Small water supply business” Institute of Local Finance, p. 21.

Note: This table is simplified and edited by author.

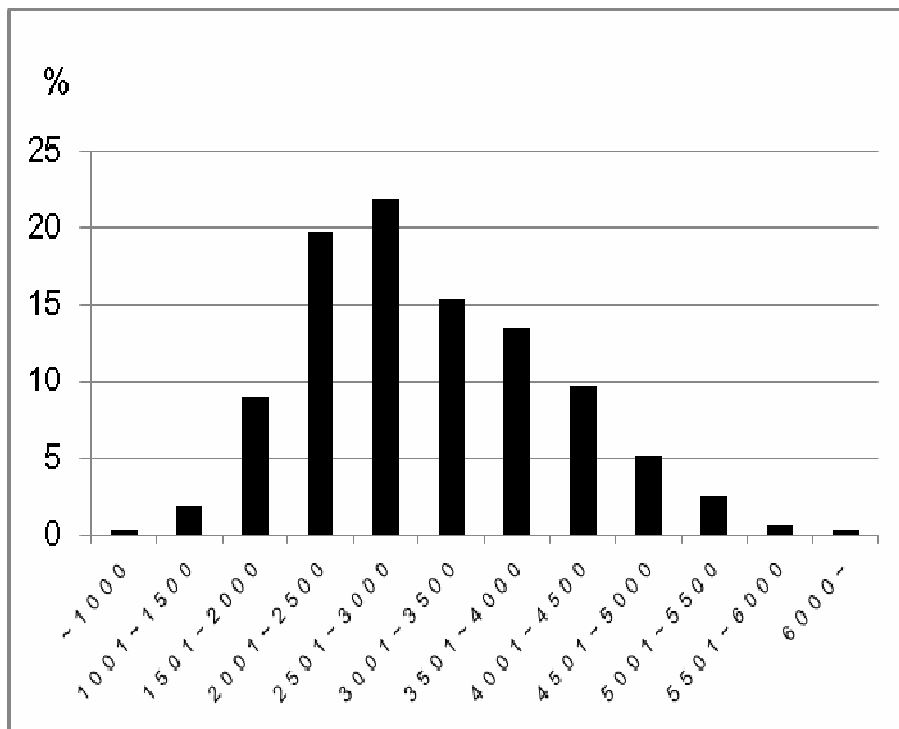
In addition, in the case of small water supply businesses, 2860 businesses or 38.5% are adopting water-rates system by category of users, and 2306 businesses or 31.0% are adopting water-rates system by calibers.

5.4 Water-rates level and the consumer burden to water-rates

According to the Institute of Local Finance, the average Water supply cost is 174.62 yen/m³, composing of capital charge (66.93 yen, 38.5%), expense to the bulk water supply business (30.7 yen, 17.6%), personnel salary expense (28.66 yen, 16.4%) at the end of FY2007. On the other hand the average Supply unit price is 173.29 yen/m³ less than the average Water supply cost. These statics are based on the data of all Water utility businesses and Small water supply businesses which are based on the Law of Municipal Enterprises.

There are wide ranges of supply unit price in Water utility businesses. Fig. 6 shows the charge of water-rates for home use, categories of 2000-3500 yen/20m³/month are most popular range, for 56.9% utility businesses. But, exceptionally saying there are 5 enterprises whose water-rates are under 1000 yen/20m³/month, at the same time there are 4 enterprises whose water-rates are over 6001 yen/20m³/month.

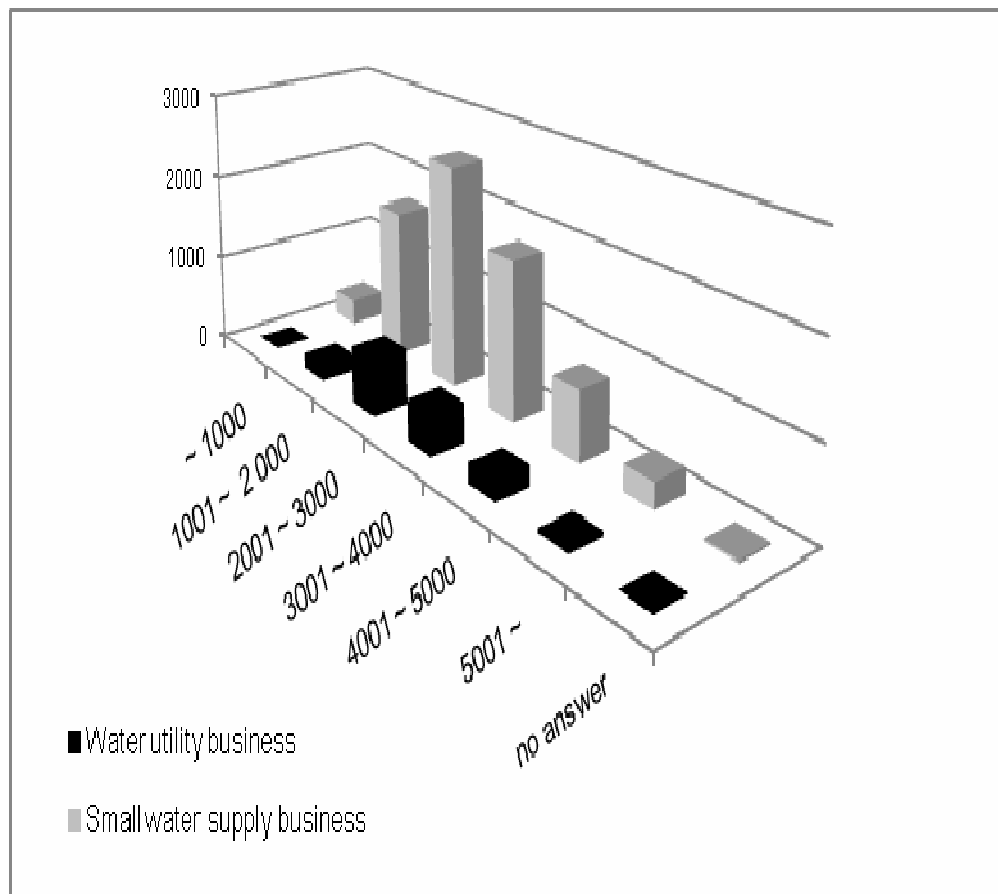
Figure 6: The number classified by water-rates of Water utility businesses (the end of FY2007)
(Charge of water-rates for home use, unit: yen/20m³/month, including TVA tax)



Source : Japan Water Works Association
<http://www.jwwa.or.jp/shiryou/water/water.html>

Although compared with the Water utility business, the Water supply cost of the Small water supply business was averagely 49% higher, the water rates (supply unit price) were left the level of 11% downwards in FY2007. Moreover the charge recovery rate (supply unit price / water supply cost) in the Small water supply business had been only 58.2% (the Water utility business: 99.3%). Water supplied population are rather small in the case of the Small water supply business, there is a tendency for a charge recovery rate to become low. The Small water supply business is usually characterized as small scale and their management base are vulnerable, and this is the reason why their accounts are sometimes filled up by the local-public-finance measures.

Figure 7: The comparison of enterprise numbers based on Charge range of water-rates between Water utility business and Small water supply business (unit: yen/20m³/month, including TVA tax)

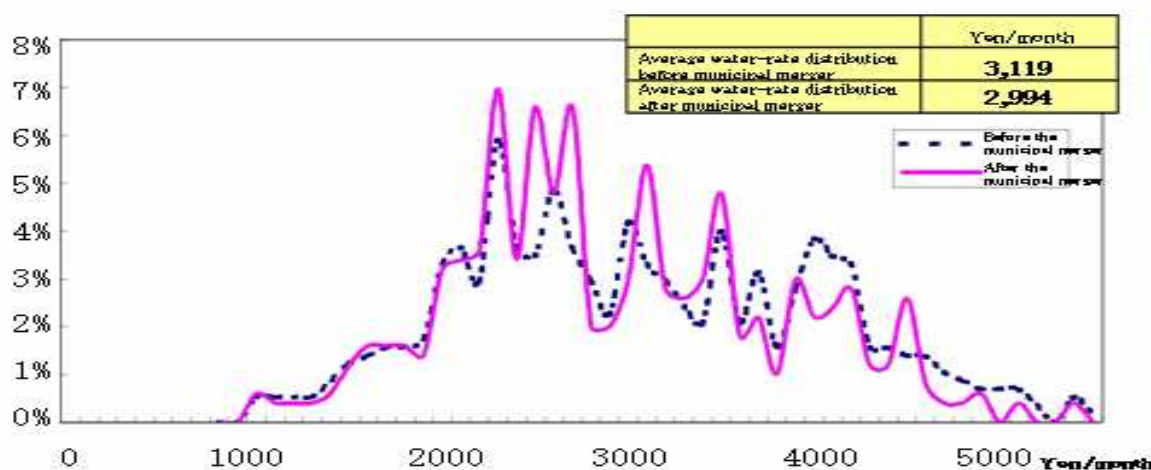


Source: National small water supply business conference (2009), “National small water supply business statistics in FY2007”, and Japan Water Works Association HP.

The Relationship between broadening of water supply utility business and municipal merger, so-called HEISEI merger (1999-2006) for scale up of municipal administration is interesting topics to be analyzed. The Cabinet Office carried out the survey about nine kinds of public utility charges including water-rates in the cities, towns and villages by the end of September, 2004. The title of

the report was “the survey of the influence on public utility charges by municipal merger”. In the case of water-rates, the status quo was about 55%, price reduction was about 25% before and after the municipal merger and the average amount of water-rates was about 4% downwards from 3119 yen/20m³/month to 2994 yen/20m³/month after the municipal merger. They concluded that the burdens were lower side shift where services were higher side shift to the municipal merger.

Figure 8: Water-rates distribution before and after the municipal merger



Note 1: The charge for use of the water service by the unit of yen /20m³/month, with a caliber of 13 mm at ordinary homes.

Note 2: Dot line: before the municipal merger, Gray line: after the municipal merger.

Source: Cabinet Office (2005), “the survey of the influence on public utility charges by municipal merger” p. 6.

The charge which the Japanese consumer pays for water service is about 0.7% (2,188 yen/month) on the average household expenditure.

Table 8: The rate of the water-rates to the amount of the average household expenditure

	FY 1980	FY 1985	FY 1990	FY 1995	FY 2000	FY 2007
The total households expenditure (yen)	234946	278592	317289	334069	321332	299695
Water-rates (yen)	1294	1802	2057	2130	2188	2188
Percentage (%)	0.55	0.65	0.65	0.64	0.68	0.73

Note 1: All the households of the city with population of 50,000 or more.

Note 2: Water-rates are based on the Water Service Statistics, and the total households expenditure is based on the Ministry of Internal Affairs and Communications Statistics Bureau “Family Income and Expenditure Survey; annual report”.

Source: Author reedited the water service utilities newspaper co. (2009), “Water Service Yearbook 2010 edition” p. 45.

5.5 Customer satisfaction to tap water in Japan

In regards to the customer satisfaction to tap water, Cabinet Office carried out interesting survey in June, 2008. Among a lots of survey issues in Cabinet Office (2008), I would like to show 2 issues; the first one is the evaluation of the quality of the tap water and the second one is costumer's preference for drinking water.

The answer to the first question was as follows; the rate of those who answered "the quality of the tap water was satisfied" was 50.4%, those who answered "was satisfied in uses other than drinking water" was 39.9%, and then those who answered "was satisfied in no uses" was 8.0%.

Analyzing the first question by city size, the rate of those who answered "was satisfied in all the uses" was high in towns and villages. By sex, the rate of those who answered "was satisfied in all the uses" was high in male, and the rate of those who answered "was satisfied in uses other than drinking water" was high in woman, respectively. By age, the rate of those who answered "Was satisfied in all the uses" was high in aged 70-old and over, and the rate of those who answered "Is satisfied in uses other than drinking water" was high in aged 40 years-old and 20 years-old, respectively.

The answer to the second question was as follows; the rate of those who answered "as it is without taking any measures in particular" against how they drink tap water in daily life was 37.5%, and hereafter, the rate of those who mentioned "installing water purifier in their houses to tap water" was 32.0%. Others were, such as "purchasing mineral water etc. on behalf of tap water" was 29.6% and "being boiled once and drunk" was 27.7%.

Analyzing same way the second question by city size, the rates of those who mentioned "drunk tap water as it is, without taking a measure in particular" was high in towns and villages. "The rate of those who answered" installing water purifier in their houses to tap water "was high in big city, and the rates of those who mentioned" purchasing mineral water etc. on behalf of tap water are high in big and mid-sized city, respectively. By sex, the rate of those who mentioned "tap water is drunk as it is, without taking a measure in particular" was high in male, on the other hand, the rate of those who mentioned "installing water purifier in their houses to tap water", "purchasing mineral water etc. on behalf of tap water", and "tap water having been boiled once and been drunk" was high in woman, respectively. By age, the rate of those who mentioned "tap water is drunk as it is, without taking any measures in particular" was high in aged 70 and over, the rate of those who mentioned "installing water purifier in their houses to tap water" was high in 40 years-old, and the rates of those who mentioned "purchasing mineral water etc. on behalf of tap water" was high in 20 years-old and 40 years-

old, and the rate of those who mentioned “tap water having been boiled once and been drunk” was high in 60 years-old, respectively.

6. Case studies

Case 1. The first example to introduce the individual supply-and-demand water service contract system which large consumers can self-choose to the water utility business: Waterworks Bureau, City of Okayama

[Related data]

- Water supplied population 693,222 persons
- Water supply capability 368,442m³/day
- Gross earnings 14,807 million yen (= 158 MUS \$) Aggregate total cost 14,094 million yen (= 151 MUS \$)
- Net profit 713 million yen (7.6 MUS \$)
- Water supply cost 161.7 yen/m³ (= 1.73 US \$/m³) Supply unit price 157.5 yen/m³ (= 1.68 US \$/m³)
- The number of the personnel engaged 358 persons
(Source: Waterworks Bureau, City of Okayama, The year of statistics: 2007 fiscal year).

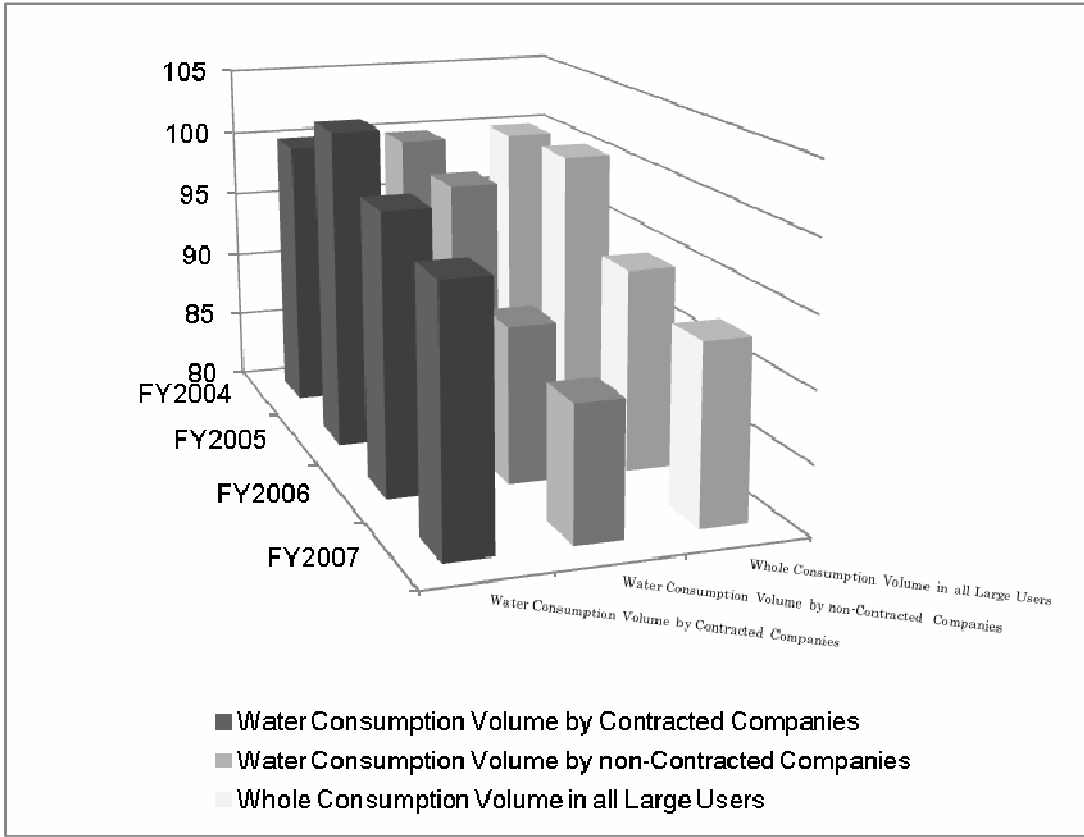
[Case introduction]

- The Waterworks Bureau, City of Okayama had introduced “the individual supply-and-demand water service contract system” for the first time in Japan since April, 2005. It is mentioned that the demand structure concerning the water service in the city of Okayama had been drastically changing as one of the backgrounds of introducing of this system. When we explain the water service demand trends of Okayama by industrial classification, the demand for the welfare institutions for the aged and the prison had been increasing, but the demand in many largely consuming users, such as hospitals, touristic hotels, wholesalers, government and municipal offices, and public and private schools had been decreasing. The amount of annual water supply of the waterworks has been continuously decreasing since FY1996 at the peak (103 million m³), especially by caliber classification, depression of largely consuming users with the caliber of 75mm or more had been intense. In fact, compared with the demand of FY1997, it had decreased no less than 13.6% in FY2004, the previous year of this system introduced. In order to explore the cause of depression of the water service demand in such largely consuming users at the beginning of 2004, the Waterworks Bureau, City of Okayama carried out the survey for 131 companies of which the demand reduced about 10-20%. As results of this survey, they had grasped the cause as follows; 39 were by the strict water-saving, 24 were by the repair of leakage-of-water, 16 were by the reduction of the quantity of their

production, and 22 were by the reducing number of visitors in touristic hotels and reduction of tenants in the institutions and offices, and 9 were by the change of the weather.

- In spite of the change of the water service demand structure in Okayama, a new dam by bulk water supply side had completed. And the volume of water supply and the expense for this sale by the bulk water supply business has been increasing to the Waterworks Bureau, City of Okayama. Then the Mayor of Okayama ordered his staffs to promote a research for effective use of the abundant water supply, and water sales promotion. In response to this top initiative, this individual supply-and-demand water-service contract system was founded by the Waterworks Bureau under this situation by the referential idea of power utility sectors.
- Under the individual supply-and-demand water-service contract system, largely consuming users can continue the normal contract (gradual increasing unit cost type as its water-rate structure) from starting time. However, largely consuming users also can select this contract system with the economically attractive incentive of unit price as 70 yen/m³ which is around 1/3 level price compared with the normal contract (unit price as 216 yen/m³) when they consume the water exceeding the defined standard amount of water. However, at the same time, the users must receive the increasing fee burden for a period of adjustment at the time of water shortage. This contract system limits the user whose water consumption are about 6 thousand m³ or more in two months, based on the contract-base track record of consumption per previous one year as the standard amount of water.
- For the Okayama Municipal Assembly, the deliberations in 2004 had contained lots of water service ordinance revision matters like the amendment bill for the water-rate, an average of 9.5% of price increase for eight years, and the introduction of the individual supply-and-demand water-service contract system as a large system change. After all, although many cons occupied, deliberation approval had been carried out, and this system had started since April, 2005.
- Although the number of the companies which have the status of challenging the individual supply-and-demand water supply contract was 100 (110 contracts based on their offices and factories), and this number of contracts were merely 0.04% of all supply contracts in whole city, but the total amount of water consumption by these users were equal to about ten percent of the whole waterworks demand in the city of Okayama. 33 companies (38 offices and factories) in 100 companies (110 offices and factories) have been introducing this individual supply-and-demand water supply contract up to 2007 fiscal year. In fact, all sales managers of the Waterworks Bureau, City of Okayama made a lot of efforts to explain this new type of contract visiting all related possible users individually from January, 2005.

Figure 9: Consumption Situation by Largely consuming users in the City of Okayama by comparison of those who contracted and non-contracted (100 as of Consumption in FY2004)



Note: Since the number of contracts changed along with fiscal years, on the basis of the present number of user businesses (with the whole (100 companies) largely consuming users, those with contracted (33 companies), and non-contracted (67 companies)), we standardized FY 2004 as 100 for the water consumption volume before the individual supply-and-demand water supply contract system introduction. And then the comparison by 3 categories was performed to each fiscal year.

Source: Author created by using the Okayama Waterworks Bureau data-base.

- The total standard water consumption volume in which largely consuming users had introduced the individual supply-and-demand water supply contract system reached 3.23 million m³ at the end of FY 2007. The amount of water in which contractors had used exceeding this standard amount of water was 64 thousand m³ in FY2005, 83 thousand m³ in FY2006 and 64 thousand m³ in 2007 fiscal years. Exceeding rate to this standard amount of water became 2-2.6%. The amount of increase of income as the Okayama Waterworks Bureau corresponding to this was about 4.5 million yen (= 48 thousand US \$), 5.9 million yen (= 63 thousand US \$), and 4.5 million yen (= 48 thousand US \$) in each fiscal year.

- From these track records, it can be said that these new contract system itself contributed slightly with 0.03-0.04% increase compared with the revenue receipt plan on fiscal plan (FY2005 to FY2008) set by the Okayama Waterworks Bureau after the water-rates amendment from April, 2005. However, if it takes into consideration that the amount of non-contracted 67 companies had been decreasing no less than 10.4% in FY2007 as compared with system introduction before (FY2004), it can be strongly said that there was an effect on the water service demand decline deterrence as the whole large consuming users by introducing this system (Figure 9).

Case 2. The first example to introduce a Designated Management System into Water utility businesses and Small water supply businesses in connection with the municipal merger in the era HEISEI: Waterworks Bureau, City of Takayama

[Related data]

- Water supplied population 93,584 persons (Water utility business: 72490 persons, Small water supply business: 21094 persons)
- Water supply capability 59,496 m³/day (Water utility business: 40,970 m³/day, Small water supply business: 18,526 m³/day)
- Gross earnings 1,939 million yen (= 21 MUS \$) Aggregate total cost 1,741 million yen (= 19 MUS \$)
- Net profit 198 million yen (= 2.1 MUS \$)
- Water supply cost (Water utility business: 131.0 yen/m³, Small water supply business: 192.5 yen/m³) Supply unit price (Water utility business: 158.0 yen/m³, Small water supply business: 136.4 yen/ m³)
- The number of the personnel: 35 persons (31 persons: Water utility business, 4 persons: Small water supply business)
(Source: Waterworks Bureau, City of Takayama, The year of statistics; 2007 fiscal year).

[Case introduction]

- Old Takayama city and neighboring 9 towns and villages merged in February, 2005, and new Takayama city with a population of around 94,000 which has the vastest municipal area in Japan which is equal to metropolitan city of Tokyo (2178 km²) has been born. Takayama city has Michelin Guide recommendable touristic attracts based upon old atmosphere in the old era EDO. New Takayama city set their comprehensive plan (7th order, 2005 to 2014 the gestation period), composing of simple and efficient administrative managements as first essential item of their main policies. And as part of administrative reform, it was mentioned that practical use of utilization of private sectors, such as consignments of administrative affairs, and also

- Designated Management Systems as management contracts should be recommended to introduce.
- Focusing on Water utility business sector, new Takayama city has been succeeding not only the Water utility businesses of old Takayama city, old Kokufu-cho town, and also 35 Small water supply businesses, 5 Private water supply systems, and 7 drinking-water supply equipments. Since there were varieties of different management organizations, the control-of-maintenance methods and also varieties of fee structure with each institution, one nature business model as the new city had been most important issue to be secured in the early stage. Although Waterworks Bureau, City of Takayama initially had examined the possibility to introduce the third party commission system based on the Water Works Law from a viewpoint of attaining unification of management organization and the method control-of-maintenance, but they had achieved towards introducing after all a Designated Management System into their Water utility businesses and Small water supply businesses based on Article 244 of the Local Government Act. They finalized it in February, 2006 by the decision of Takayama municipal assembly.
 - The Designated Management System into their Water utility businesses and Small water supply businesses of Takayama had introduced in three-year term from April, 2006 to March, 2009. Two task commissions were carried out based on two memoranda composed of the Takayama Water utility businesses water and the Iwataki Small water supply businesses, as first commission, the Takayama Small water supply businesses, as the other commission. Private sector established a special-purpose company (SPC) called “Takayama pipe equipment group” in which three companies; Tsukishima techno-maintenance service company (TSK), Toyo sekkei company and Takayama local pipe equipment industrial cooperative jointly invested. Tsukishima techno-maintenance service company (TSK) is has their experiences of the maintenance service by Private Finance Initiative (PFI) of a water supply utilities in Japan, Toyo sekkei company is a design consulting company which had whole design track record of Water utility businesses and Small water supply of Takayama city. Takayama local pipe equipment industrial cooperative is a pipe equipment group based on Takayama city. As scope of commission, it had been limited in the field of the control-of-maintenance of many facilities from water obtaining to water distribution, 19-person had been engaged in their SPC organization, and Waterworks Bureau, City of Takayama payed them 300 million yen/year (= 3.2 mil US \$/year) for their commission fee.
 - When the Waterworks Bureau, City of Takayama reported the accounts settlement Water utility business in FY2006 as the first year of the commission contract of the Designated Management System to the municipal assembly in September, 2007, they explained that an income surplus was the same amount (about 260 million yen) comparable as the

FY2005 and introduction of the Designated Management System attained cost rationalization amounted about 38 million yen in spite of decreases of water demand by osmosis of water-saving consciousness.

Table 9: Operational & accounting comparison of Water utility business, City of Takayama

	FY2005	FY2006	FY2007	FY2007/ FY2005
Water supplied population	73,089 persons	72,672 persons	72,490 persons	▲0.8%
Volume of profitable water distribution	9.18 billion m ³	8.94 billion m ³	8.88 billion m ³	▲3.3%
Gross earnings	1490 million yen	1441 million yen	1442 million yen	▲3.2%
Aggregate total cost	1237 million yen	1182 million yen	1187 million yen	▲4.0%
Net profit	253 million yen	259 million yen	255 million yen	+0.8%

Source: Waterworks Bureau, City of Takayama (2006, 2007, 2008), “the profile of Waterworks, City of Takayama”.

- In the question by the municipal assembly member to this report, it was reported that the settlement of accounts in FY2006 by “Takayama pipe equipment group” operating SPC under Designated Management System disbursed up a 312 million yen, about 7 million yen deficit against 305 million yen in amount of revenue, according to an information disclosure claim of a question lawmaker. The municipal assembly member also pointed out the structural problem on the contract. That is, if water supply increases under the conditions of the charge regularity of management, it will lead to cost increase, and the Designated Management System income and outgo are worsened by this increase in expenditure.
- Under the Designated Management System, the number of total man-days needed for water operational services in the criteria of the management rules required was not changed with the former direct management by Waterworks Bureau, City of Takayama. But the personnel-expenses unit 5.22 mil yen/person which was quoted from the average-wages level of Takayama City, rather lower labor annual payment than the average personnel expenses of the Takayama City Office. And here was the fortunate financial resources whose decrease of cost became possible under the Designated Management System.
- On the other hand, Small water supply businesses under the Designated Management System in Takayama City had not recorded better accounting results. Along with the sharp decrease (▲11.5%) of the volume of profitable water distribution, decreasing ratio of net profit was ▲14.6%, larger than that. Water supply cost was 192.5 yen/m³ in FY2007, compared with the cost of Water utility business (131.0 yen/m³), it might be said that it was 46.9% highly cost supply system. Especially, Small water supply businesses

in Takayama City had invested a lot amounting 637 mil yen in spite of limited amount of capital revenue (448 mil yen) in FY2007.

Table 10: Operational & accounting comparison of Small water supply businesses,
City of Takayama

	FY2005	FY2006	FY2007	FY2007/ FY2005
Water supplied population	21,358 persons	21,284 persons	21,094 persons	▲1.2%
Volume of profitable water distribution	3.13 million m ³	2.82 million m ³	2.77 million m ³	▲11.5%
Gross earnings	487 million yen	489 million yen	497 million yen	+2.1%
Aggregate total cost	302 million yen	338 million yen	339 million yen	+12.3%
Net profit	185 million yen	151 million yen	158 million yen	▲14.6%

Source: Gifu Prefecture (2007, 2008), “Statistics of Gifu Prefecture”.

- The Designated Management System into Water utility businesses and Small water supply businesses in connection with the municipal merger in Takatama city had finalized on the end of FY2008. We cannot analyze and evaluate comprehensively to the first 3 years challenge by Waterworks Bureau, City of Takayama and by “Takayama pipe equipment group” lacking of its data availability. The Designated Management System under the Local Government Act originally has its potentiality to execute more non-restricted activities including that the contractors themselves can decide the water-rates system, but when this system once is applied to water utility businesses, the Waterworks Bureau, City of Takayama and the contractor must obey other restricted legal frame, under “Water Works Law”. At present “Takayama pipe equipment group” has no right to control the water-rates system. However, “Takayama pipe equipment group” has been continuing this operation under new 3 years contract from FY2009. This fact means that the Designated Management System into water utility business might be in some way economical and sustainable system at least for Takatama city and “Takayama pipe equipment group”.

7. Conclusion

In Japan, although reexamination of management forms by local governments, such as business integrations and broadenings of water supply utility businesses have been also performed, as a whole, the speed of introduction for principle-of-competition in this sector is rather slow compared with other public sectors.

However, I would like to point out that the actors who try improvements for new systems have been appearing with such as introduction of the consumer-oriented, self-selection charge system, and also introduction of the designated management system into a water utility business and small water supply systems as case-studies. These cases are not exceptional in Japan in light of innovative steps for gradual change of the existing structure in this sector.

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