

# *Pollution Control Agreements in Japan: Conditions for Their Success\**

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## **1, Introduction**

Pollution Control Agreement(PCAs) have been concluded between local governments and businesses since the 1960s in Japan. At first they were regarded as a last resort to be taken by local governments which suffered from serious pollution problems but had no power to regulate the businesses causing the problems. However, even after the power to impose regulations on local businesses was given to local governments (in addition to the regulations set by the National Government), PCAs survived. Their numbers grew rapidly and there are more than thirty thousand PCAs today. Research conducted by the author on which policy instruments brought about the rapid reductions in sulphur oxide emissions from thermal power plants and also from integrated steelworks in Japan concluded that PCAs contributed the most to the emission reductions of these huge sources.<sup>1</sup> The Environment Agency<sup>2</sup>(EA) (1990) explained PCAs grew because they enabled the local governments to apply flexible pollution regulations to local geographical and social conditions and that local businesses were also ready to accept them because without the local residents' consent it was difficult for them to build new facilities. This explanation of the EA is plausible but it lacks evidences and analyses. In order to check their argument and to reveal the real state of things, the author conducted a survey in 1999 asking all of the local governments in Japan to answer questions about their environmental policy with special importance put upon PCAs. Using the results of this survey, this paper attempts to clarify the factors behind the current popularity of PCA's in Japan.

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\* This study was supported by the Institute of Social Sciences, Meiji University.

<sup>1</sup> See Matsuno and Ueta(2000) and Matsuno(1997a,b).

<sup>2</sup> The Environment Agency became the Ministry of Environment in 2001 government reform.

## 2, Brief History

The first PCA was an agreement signed by the Yokohama city government and a thermal power plant in 1964. An electric power company had a plan to build a thermal power plant in the city, but the air was already heavily polluted by factories and cars in the city. Even though the city government, led by the newly elected reformist<sup>3</sup> mayor, decided not to support the construction of the new power plant (as it would greatly increase the amount of pollution), local governments at that time had no power to regulate industrial pollution. However, the Yokohama city government was in a position to apply pressure on the electric power company as the land where the power plant was to be built had been originally reclaimed by the city and had been sold to another power company with the condition that transferring the site to a third party would need the city government's approval. The city government requested the Ministry of Trade and Industry<sup>4</sup>(MITI) to ensure the electric power company accepted their pollution prevention requirements. MITI, which in the 60s still enjoyed strong regulatory power in the field of industrial policy, especially in the energy industry, was at first reluctant to agree to the city government's request. But it finally accepted the request of the Yokohama city government because MITI had experienced Mishima-Numazu shock earlier in that year and realized that local residents' movements were gaining in power. In these two cities, the construction plans for new industrial complexes which had been drawn up and supported by MITI were forced to be cancelled due to the strong opposition of local residents' movements. These strong opposition movements were also present in Yokohama and MITI did not want to lose again. Therefore MITI gave its approval and the Yokohama city government and the electric power company conducted negotiations and concluded the first PCA. This PCA obligated the company to take more stringent pollution prevention measures beyond the level prescribed by national laws.<sup>5</sup> After this precedents, it became almost obligatory for electric power companies and other regulated industries (such as the petroleum industry), to conclude PCAs with the relevant local governments before requesting permission from the National Government for the construction of new plants.<sup>6</sup>

After the first PCA agreement in 1964 in Yokohama, Local governments around Japan suffering from industrial pollution began drawing up PCAs with local industries.

In 1968, the Tokyo prefectural government, led again by a newly elected reformist governor, concluded a PCA with an electric power company, which obligated the company to take very stringent pollution prevention measures beyond the level prescribed by the national law. As the negotiation was done in the form of open letters and was widely reported by the press, the phrase *Pollution Control Agreement* became well known and helped the growth of PCAs throughout Japan.

In 1970 the National Government completely changed its attitude toward pollution problems due to the surge of public opinion wanting stricter controls and also possibly a claim from the US government.<sup>7</sup> The National Government, which had been reluctant to take measures against pollution problems, suddenly started enacting an array of environmental laws. Local governments were given

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<sup>3</sup> Here *reformist* means socialist, communist, or those supported by them.

<sup>4</sup> The MITI became the Ministry of Economy, Industry and Trade, incorporating a part of the former Agency of Science and Technology in 2001 government reform.

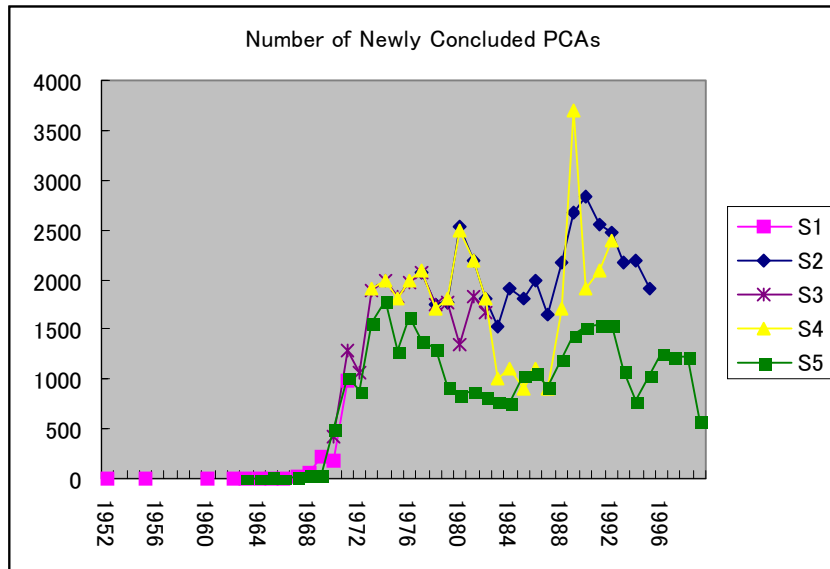
<sup>5</sup> See Saruta(1971, 1981).

<sup>6</sup> See Hashimoto(1988).

<sup>7</sup> See Matsuno(1996).

more power to regulate businesses officially. In a practical sense the National Government have not intervened as long as the regulations were more stringent than those set by the National Government since them.

Figure 1



S1: The number of newly concluded PCAs (Prime Minister's Office (ed) (1971), Environment Agency (ed) (1972))  
 S2: The number of newly concluded PCAs (Environment Agency (ed) (1978-1996))  
 S3: The number of facilities that newly concluded PCAs (Environment Agency) (ed) (1972-1983))  
 S4: The number of newly concluded PCAs minus the number of newly abolished PCAs (EA (1992))  
 S5: Four times the number of currently valid PCAs concluded at each year(Our survey 1999)

Although the figure shows that there were preceding PCAs before Yokohama one, the Yokohama PCA in 1964 is regarded as the first PCA and is the precedents for today's popular PCAs.

Figure 1 shows the number of newly concluded PCAs each year and other related numbers. S1 through S3 are based on the data published in the annual national White Paper on the Environment. S3 is the number of *facilities* that newly concluded PCAs each year and is presented here to make up for the missing data through 1972-76 of S1 and S2. S4 was estimated within the EA internally, correcting some past mistakes. Note that S4 is the net growth of the PCAs, subtracting the number of abolished PCAs. S5 was the result of our survey. Values of S5 are enlarged four times to ease the comparison of shapes with others. S5 indicates when currently valid PCAs were concluded and so the older numbers may shrink more, though the figure contradicts itself. One reason for this is that older PCAs tended to be concluded by larger local governments, which more often answered our survey and another reason is that older PCAs survive in greater numbers because they are the more important PCAs.

Leaving some questions open, by and large we see that the number of PCAs concluded soared around 1970 and decreased somewhere in the 1980s only to increase again and peak around 1990.

### 3, Questionnaire Survey

In regard to why there are so many PCAs in Japan and why local governments continues to use PCAs even after they were allowed to enact ordinances to regulate businesses by themselves, we need to consider several factors.<sup>8</sup> To explain these phenomena, K. Ueta, and the author conducted a survey in 1999. We sent all the local governments in Japan copies of our questionnaire by mail. Table 1 shows the results:

<sup>8</sup> Matsuno(2000) clarified that the National Government has been virtually encouraging the diffusion of PCAs though they deny it.

Table 1

Category of local government		Number of local governments	Number of respondents	Recovery rate (%)
All		3299	1620	49.1
Prefectures		47	25	53.2
Municipalities	Designated cities by cabinet order and core cities	37	29	78.4
	Other cities, towns, and villages	3215	1566	48.7

Japan is divided into 47 prefectures, which are then divided into 3,252 municipalities (as of Dec. 31, 1999). It is mainly the prefectures that are given the power to officially regulate businesses in regard to environmental policy. Among municipalities, those with a population of more than one million are called *designated cities*, and are given powers close to the prefectures; those with a population of more than three hundred thousand are called *core cities* and are given less power. We will use the categories of local government in Table 1 throughout this paper. Designated cities by cabinet order and core cities will be called *designated and core cities* while other cities, towns, and villages will be called *other municipalities*. We asked more questions to prefectures, designated and core cities than to other municipalities for cost effectiveness. So some of the questions asked to prefectures, designated and core cities were not asked to other municipalities but all the questions asked to the latter were asked to the former.

The Recovery results were analysed using the logit model using population, area, product values of agriculture and manufacture, and prefectural dummy (prefecture or not) as independent variables and recovery results (responded or not) as the dependent variable. Analyses were made in regard to prefectures and municipalities both separately and jointly. The result of the analyses showed that in regard to municipalities only population positively effected the recovery rate. Table 2 shows the

Table 2

Population	Responded	Not	Recovery rate (%)
~1000	13	29	31.0
1000~	59	48	55.1
2000~	141	173	44.9
4000~	383	405	48.6
8000~	375	434	46.4
16000~	232	267	46.5
32000~	153	174	46.8
64000~	100	80	55.6
128000~	63	28	69.2
256000~	52	17	75.4
512000~	20	6	76.9

recovery rates of municipalities with different scales of population. It shows that the recovery rate changes over the range of population between 64,000 and 256,000, which fall in category of *other municipalities*. Thus aggregate values of our survey results for this category are biased representing responses of municipalities with more population within this category. But the number of those municipalities with population between 64,000 and 256,000 is relatively small compared with that of all *other municipalities* and as the bias is not large it is not corrected in this paper.

### 3-1, Basic Facts

Table 3 shows the number of local governments that have valid PCAs with businesses. Half of the local governments in Japan have PCAs with businesses. About ninety percent of prefectures,

designated and core cities have PCAs. These are new findings. We knew that more than thirty thousand valid PCAs existed according to the EA, but their surveys have been done indirectly through prefectures, and the number of local governments which use PCAs has not been investigated for at least twenty years.

Table 3

Category of local government	N*	Answer(%)			yes/(yes+no)(%)
		Yes	No	N/A*	
Total	1620	51.5	47.2	1.3	52.2
Prefectures	25	84.0	8.0	8.0	91.3
Designated and core cities	29	93.1	6.9	0.0	93.1
Other municipalities	1566	50.2	48.6	1.2	50.8

\*Number of local governments.

\*\*No answer.

Next we asked for the number of PCAs that each local government has signed. Table 4 shows the result. Taking into account that the recovery rate of our survey is 49.1% and that the product of response rates of questions concerning Table 3 and 4 is 93.9% and that the total number of PCAs given to us is 13,950, the number of PCAs in Japan can be roughly estimated to be 30,257(=13,950 x (1/0.491) x (1/0.939)). This number is very close to the number of PCAs investigated by the EA, (31,770 as of March 1997). This coincidence heightens the credibility of both surveys. The results of the two surveys coincide well with each other concerning the proportion of PCAs concluded with businesses of different types of industry as well.

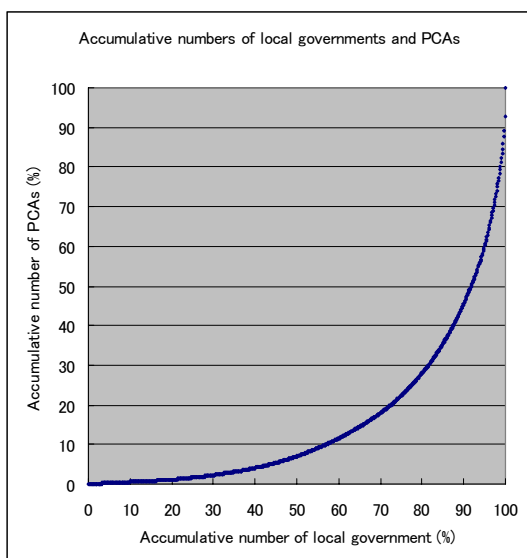
Table 4

Category of local government	N*	Number of PCAs					
		Total	Average	Median	Mode	Max	Min
Total	766	13950	18.2	7	1	1020	1
Prefectures	18	166	9.2	5.5	1	65	1
Designated and core cities	25	573	22.9	10	5	108	1
Other municipalities	723	13211	18.3	7	1	1020	1

\*Number of local governments which have PCAs and which gave us the number of PCAs they had signed.

The average number of PCAs per one local government is smaller than the median in each category of local government. This implies that a small number of local governments contribute greatly to the

Figure 2



total number of PCAs. Figure 2, which incrementally adds the numbers of PCAs of local governments from smaller to larger, shows this more clearly. The figure shows that only eight percent of local governments have fifty percent of total PCAs and that fifty percent of local governments have only seven percent of total PCAs. Local governments with only one PCA make up 19.6% of all the local governments that answered this question, which causes a deviation in the curve of figure 2 from an exponential one. Most local governments have only a few PCAs.

These facts suggest that the transaction cost of

negotiating with businesses to conclude PCAs is not too large for most local governments. As indicated in Table 2, 78.7% of municipalities in Japan have a population of less than sixteen thousand, so there may be only a few pollution sources creating environmental problems for most municipalities. If so, it is rational or cost-saving for the administration body of local governments to conclude PCAs with a small number of specific sources, instead of making some rules applicable to many unspecified sources, setting aside the question of whether this is desirable conduct for a public entity.

We asked local governments which had valid PCAs to give us the following data for each of their PCAs; the business's name, type of industry, number of workers working at the site, year of PCA conclusion, last renewal, other entities participating in the PCA, whether the content of the PCA was disclosed to the general public, and whether the PCA included the following clauses: additional regulation clause, obligation of effort clause, environmental care clause, sanction clause, on-site inspection clause, and residents' participation clause. 622 local governments (eighteen prefectures, twenty four designated and core cities, and 580 other municipalities) gave us some or all of the data above related to 8,964 PCAs, of which 156 are prefectures', 617 designated and core cities', and 8,191 other municipalities'.

Table 5

Types of industry	Number of PCAs *****	Proportion of PCAs with businesses of different types of industry (%)			Periods of conclusion (%)				Number of workers at the site of concerned PCAs (%)****			
		Prefectures	Designated and Core cities	Other municipalities	1960s	1970s	1980s	1990s	-30	-300	-3000	3001-
Agriculture	267	0.0	0.0	4.1	0.0	34.2	37.0	28.8	86.9	11.9	1.2	0.0
Fishery	25	0.0	0.0	0.4	0.0	16.0	8.0	76.0	90.0	10.0	0.0	0.0
Mining	124	1.9	2.6	1.6	1.8	47.7	20.7	29.7	64.0	30.0	6.0	0.0
Construction	279	0.6	0.5	4.2	0.0	25.5	25.8	48.7	61.2	35.3	3.5	0.0
Manufacturing 2**	3020	14.9	34.3	42.8	0.1	37.7	32.4	29.8	35.0	51.4	13.2	0.4
Manufacturing 1*	1652	56.5	22.8	21.9	0.6	52.5	24.0	22.8	38.1	44.8	16.8	0.4
Electric power and others***	145	17.5	3.8	1.5	2.9	52.9	25.0	19.3	19.2	59.6	11.5	9.6
Transportation	387	4.5	25.7	3.5	0.0	22.1	40.6	37.3	41.9	48.6	9.5	0.0
Golf courses	314	0.0	4.0	4.4	0.0	3.9	13.1	83.0	19.6	80.4	0.0	0.0
Industrial waste management	340	1.3	0.7	5.1	0.0	6.9	17.2	75.9	75.4	24.6	0.0	0.0
Research institute	47	0.6	0.7	0.6	0.0	15.6	42.2	42.2	31.6	52.6	15.8	0.0
Others	678	1.9	5.0	9.9	0.3	30.3	28.2	41.2	60.7	31.3	7.5	0.5
Number of PCAs	7278	154	580	6544								

\*Manufacturing 1 includes paper and pulp, chemical, petroleum and coal products, ceramic, stone and clay products, iron and steel, and nonferrous metals industries.

\*\*Manufacturing 2 includes food products, beverage, tobacco, and feed, textile products, timber and wooden products, publishing and printing, plastic products, rubber and leather products, metal products, general machinery, electric machinery, transport machinery, and precision machinery industries.

\*\*\*Electric power and others includes electric power, gas, and thermo-supplying industries.

\*\*\*\*Number of workers of the site seems a difficult question to answer. This attribute was given only to 3,027 PCAs concerning types of industry above. So the data set to base values of these columns is smaller than those of other columns.

\*\*\*\*\*For Periods of conclusion.

Table 5 indicates types of industries the businesses concluding the PCAs belong to, the periods of their conclusion, and the number of workers. PCAs with manufacturing businesses occupy more than half of the total PCAs. This is true for prefectures, designated and core cities, and other municipalities. But prefectures conclude PCAs more often with businesses of industries falling into the categories of Manufacturing 1 and Electric power and others. The facilities of these industries are large and were the main sources of conventional pollution problems in the 1960s and 70s. PCAs with these industries were concluded in the earlier periods. The PCAs of other municipalities are more often those with industries of Manufacturing 2 category. The facilities of these industries are as large as those of the industries in the Manufacturing 1 category in terms of the number of workers, but they are usually less polluting. Golf courses and industrial waste management sites are the more recent concerns. They conclude PCAs mainly with other municipalities. High-tech pollution problems were dominant in the second half of the 1980s and the first half of the 1990s in Japan and PCAs with businesses of electric machinery and precision machinery associated with these phenomena increased during these periods, contributing to a higher conclusion rate of Manufacturing 2 during these periods.

These data collectively show the following points; 1) prefectures tend to conclude PCAs only with very important sources earlier while other municipalities conclude PCAs with more diverse sources later and designated and core cities are in between; 2) PCAs are used to cope with current environmental problems; 3) The PCA has taken roots in Japanese local environmental policy and is

Table 6

	Proportion of local governments which concluded their first PCA at each period. (%)			
	All	Prefectures	Designated and Core cities	Other municipalities
N*	599	18	24	557
1963-69	3.3	11.1	20.8	2.3
1970-74	39.4	55.6	54.2	38.2
1975-79	16.5	33.3	8.3	16.3
1980-84	6.3	0.0	4.2	6.6
1985-89	11.2	0.0	8.3	11.7
1990-94	13.2	0.0	0.0	14.2
1995-99	10.0	0.0	4.2	10.6

\*Number of local governments.

very common. Table 6 shows when local governments concluded their first PCA and reconfirms the fact that prefectures, designated and core cities started using PCAs earlier than other municipalities. This is probably partly because of relocation and new location of industrial facilities and environmental problems caused by them over the course of time and partly because of diffusion of PCAs as an instrument of environmental policy from larger to smaller local governments.

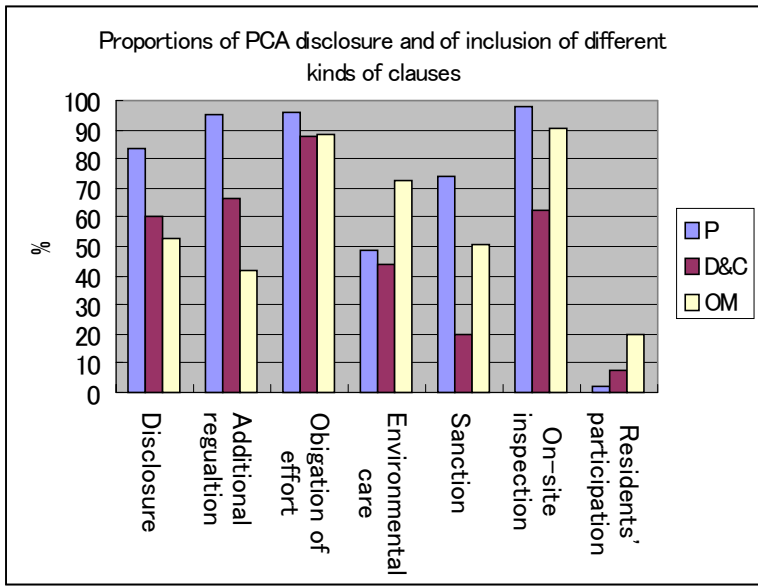


Figure 3  
P: Prefectures, D&C: Designated and core cities, OM: Other municipalities.  
Numbers of PCAs for each item from left to right are, for P, 155, 151, 156, 156, 156, 156, 155, for D&C, 351, 470, 602, 607, 607, 607, 607, 554, for OM, 5684, 6055, 5957, 6350, 6261, 6558, 5544.

Figure 3 shows how often the contents of PCAs are disclosed to the general public and how often each kind of clause is included in PCAs.

As for disclosure of PCAs, the PCAs of prefectures are more often disclosed than those of designated and core cities and other municipalities. When a PCA which is very lenient on a business is opened, the local government and the business will be criticised by residents for concluding a sham PCA. The local government can also receive complaints from other businesses abiding by more stringent PCAs. A prefecture that actively uses PCAs says that this is why they don't disclose their PCAs to the public and to other businesses. Conversely, if a PCA is very stringent, the business can be flooded with claims from other local governments for PCAs as stringent as the one made public. This happened in 1968 when the electric power company concluded a PCA with the Tokyo prefectural government. Prefectures next to Tokyo immediately required the company to conclude PCAs of the same level of stringency for power plants located in their prefectures. The ripple effect extended to other electric power companies and businesses of other industries. So the first business which concludes a stringent PCA may be criticised by other businesses. Our data here shows that PCAs of prefectures, which more often stipulate additional regulation, are more frequently disclosed. Thus the former explanation, that is, lenient PCAs are not disclosed, more frequently conforms to the real situation.

An additional regulation clause is defined as a clause that requires the counterpart business to take pollution prevention measures beyond the level prescribed by laws and ordinances. Literature on PCAs in Japan has usually described PCAs as very stringent for businesses. Using examples like the Yokohama PCA of 1964 or the Tokyo PCA of 1968. But our survey revealed that more than half of the PCAs don't include an additional regulation clause, mainly because this is true for PCAs of other municipalities. This kind of PCA has not been well studied so far but most likely they are concluded to prevent conflicts between businesses and residents as well as to lubricate the relationship between local governments and businesses. Conflict prevention or risk communication can be made possible by stipulating other kinds of clauses, such as on-site inspection, sanction, residents' participation, environmental care, and efforts clauses.

An efforts clause is included in more than ninety percent of the PCAs for each category of local



governments. This is the most basic clause of a PCA. But a PCA only with this clause will be criticised for being a nominal PCA which stipulates no concrete details.

An environmental care clause is included more often in PCAs of other municipalities. This kind of clause started being included in PCAs in the 1980s and 90s, when the scope of environmental policies expanded from pollution prevention to wider environmental preservation and also from going from a passive approach to a more active one. Tree planting around the business facility by the company is frequently stipulated in this kind of clause. More frequent inclusion of this clause in PCAs of other municipalities is a sign that they have been more recently concluded.

A sanction clause is included most frequently in the PCAs of prefectures and most infrequently in those of designated and core cities. The contents of sanction clauses can allow for suspension of operation in case of violation, (often strict) liability in case of damage and/or others. As for very low inclusion rate for designated and core cities, no plausible explanation can be found at present. 142 (21%) of the PCAs out of a total of 671 PCAs of these cities are PCAs concluded between a city and forwarding agents, which the city government calls exceptional ones.<sup>9</sup> The city answered “Yes” in regard to obligation of efforts and “No” in regard to environmental care, sanction, on-site inspection, and residents’ participation and gave no answer in regard to disclosure and additional regulation concerning all these PCAs. So excluding these PCAs increases the inclusion percentages of environmental care, sanction, on-site inspection, and residents’ participation clauses by 1.3 times while keeping that of obligation of efforts clause almost unchanged, and that of additional regulation and disclosure rate totally unchanged. This manipulation makes Figure 3 look more natural for the percentages of designated and core cities located between those of prefectures and other municipalities, except for the still low percentage of sanction clause inclusion in PCAs.

An on-site inspection clause is included as frequently as an effort clause in PCAs of every category of local governments, taking into account the manipulation above. Obligation of effort and on-site inspection clauses should be mandatory for PCAs. The right of on-site inspection is given to prefectural governments by several environmental laws. Prefectural governments may need this clause because they require businesses to take additional measures beyond what the laws require businesses to do or because governments want more freedom to inspect on-site, or because the PCAs were concluded before laws gave prefectures the power to do so. It is natural that municipal governments seek to obtain the clause, as they aren’t given it under normal laws.

A residents’ participation clause is included most frequently in PCAs of other municipalities.<sup>10</sup> This is probably because smaller local governments are closer to their residents. That PCAs of other municipalities are relatively newer than others may also affect the results. Residents will feel more secure when a residents’ participation clause is added to a PCA, so the decisions are not made behind closed doors.

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<sup>9</sup> We should also be careful about the fact that 65 out of 156 PCAs of prefectures are those of one prefecture’s.

<sup>10</sup> We counted PCAs which residents participate in as parties to, along with governments or witnesses of as PCAs including residents’ participation clause. Because all of them are PCAs participated in by residents along with governments. But PCAs concluded directly between residents and businesses are not counted here. We investigated three types of PCAs in our survey, namely PCAs between local governments and businesses, PCAs between residents and businesses, and PCAs between residents and local governments as polluters. In this paper we discuss mainly about the first category of PCAs to concentrate on the specified topic.

On the whole, PCAs of prefectures are more authoritarian, stipulating additional regulation, on-site inspection, and sanction more frequently. PCAs of other municipalities are oriented to avoid or solve conflicts, making up for less frequency of inclusion of additional regulation clause with more frequency of inclusion of residents' participation and environmental care clauses. The PCAs of designated and core cities are between these extremes.

### 3-2, Subjective Evaluation

#### 3-2-1, OPPORTUNITIES AND PURPOSES OF CONCLUSION

In our survey, we asked local governments many questions which they had to answer subjectively, although they were based on objective facts. In these questions, we showed them the questions together with possible answers and asked them to evaluate the plausibility of each possible answer by four steps, namely strongly positive, weakly positive, weakly negative, and strongly negative.<sup>11</sup>

Figure 4 represents the opportunity of a PCA agreement asked in this way. In other words, we asked

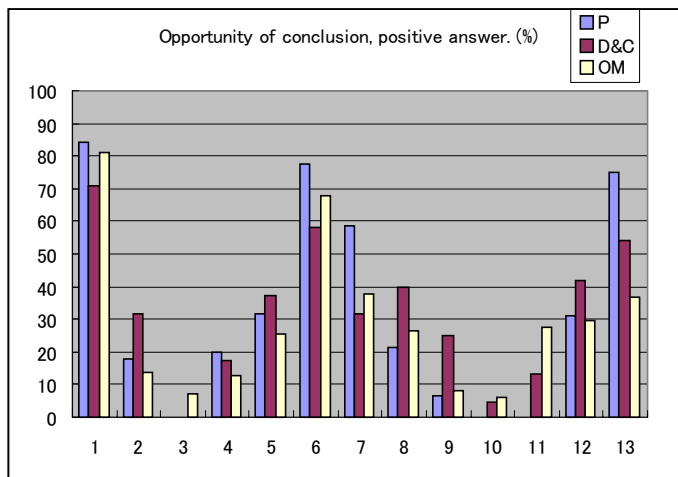


Figure 4

Facing at ...

- 1) new construction or expansion of the relevant businesses' facilities.
- 2) the national environmental ambient standards being not attained.
- 3) your own environmental ambient standards being not attained.
- 4) the advance of scientific knowledge.
- 5) damage occurred.
- 6) possible occurrence of damage.
- 7) residents', NGOs' or victims' groups' demand.
- 8) the local assembly's calling for it.
- 9) the press covering something concerned with it.
- 10) the National Government's advise.
- 11) the prefectural government's advise.(only for municipal governments)

12) other local governments' conclusion.

13) insufficiency of national laws or prefectural ordinances. Numbers of local governments for each item from left to right are, for P(refectures), 19, 17, 17, 15, 19, 18, 17, 14, 15, 12, 0, 16, 16, for D(esignated) & C(ore) cities, 24, 22, 22, 23, 24, 24, 22, 20, 20, 23, 23, 24,24, for (O)ther (M)unicipalities, 669, 612, 613, 550, 622, 661, 639, 600, 593, 592, 603, 600, 618.

local governments which had PCAs how much each item affected the conclusion of PCAs. Percentages here are calculated as sum of strongly and weakly positive answers divided by the sum of all these strong/negative positive/negative answers. The result shows that most PCAs were concluded at the time of new construction or expansion of business facilities (1) for fear of possible damage occurrence (6). Insufficiency of national laws (and of prefectural ordinances for municipalities) (13) is evaluated more highly by bigger governments. And residents', NGOs' or victims' groups' demand (7) and other local governments' agreements (12) affected to some extent.

Next, we asked local governments which had PCAs what were the purposes of PCA agreements.

<sup>11</sup> Actual expressions of these four steps are modified according to context.

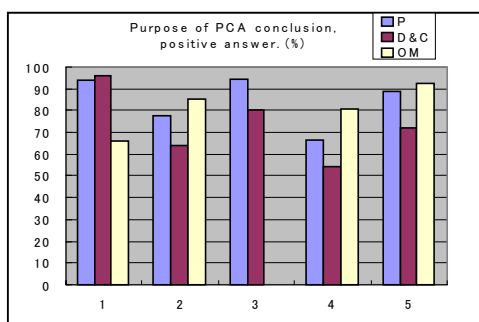


Figure 5

- 1) To require the business to take additional pollution prevention measures beyond what laws and ordinances require them to.
- 2) To obtain right of on-site inspection.
- 3) To establish the watching system of the business's pollutants emissions(e.g. remote monitoring equipment at the facility, self-report by the business, and etc.)
- 4) To solve compensation problems in case of damage occurrence more easily.
- 5) To gain residents' understanding for the business's operation.

Numbers of local governments for each item from left to right are, for P(refectures), 17,18, 18, 18, 18, for D(esigned) & C(ore) cities, 25, 25, 25, 24, 25, for (O)ther (M)unicipalities, 689, 715, 0, 687, 711. "3)" above didn't exist in the questionnaire for other municipalities because of our negligence.

What we should note here is that other municipalities evaluate solving compensation problems easily (4) more than requiring businesses to take additional measures (1) but to the contrary, prefectures, designated and core cities do evaluate this less. This result is consistent with our argument that PCAs of other municipalities are more conflict-solving oriented and those of prefectures are more authoritative.

As is given as the possible answer 13 concerning figure 4, pollution regulations set by national laws are often insufficient but this is systematically true to some extent. That is, national emission standards are set as a *national minimum* so as not to impose an excessive burden upon the economy of the country, admittedly being insufficient in places where industrial facilities are densely located. And it takes a long time to make new laws to take measures against new concerns such as newly recognised pollutants. So there is indeed much work for local governments to do.

### 3-2-2, COMPARISON WITH OTHER INSTRUMENTS

When local governments want to improve the environment, there are mainly three *administrative instruments* to do so: ordinances, guidelines (*yoko* in Japanese), and PCAs. This classification is relevant to the way they are introduced and thus to the legal effect of each administrative instrument. An ordinance has to be approved by the local assembly and so binds all the entities in the area. A guideline can be set within the administrative body of the local government and so is nominally not binding. But it is often observed the same as binding, because businesses will observe the guidelines for fear of local governments' retribution in case of non-observance. Local governments have often been criticised for enjoying too much discretionary power in applying guidelines. A PCA has to be negotiated and concluded with the counterpart business and binds the business once it is concluded because it is a contract. This interpretation of the PCA's legal status is supported by the majority of law scholars and judicial precedents in Japan.<sup>12</sup> Classifying these instruments in terms of environmental *policy instruments*, based on practices, ordinance and guideline are command-and-control instruments, and a PCA is a voluntary agreement. But terms "command-and-control" and "voluntary agreement" do not express their contents but express the procedures of their introduction, which we already referred

<sup>12</sup> See MHA, EA(1971), Kitamura(1997), Harada(1994), Abe(1995).

to above. The contents of all these instruments are emission standards or technology designation with miscellaneous additional clauses.<sup>13</sup> What differentiates PCAs from ordinances and guidelines is that a PCA is usually applied for a specified individual business while ordinances and guidelines are applied uniformly for many anonymous businesses, including latent ones.<sup>14</sup>

Let's look at how local governments use these instruments. Table 7 shows the proportion of local governments which use each instrument in the field of environmental policy. Other municipalities

Table 7

	Use of instruments in environmental policy. (%)		
	ordinance	guideline	PCA
P	100	78.3	91.3
D&C	87.5	68.2	93.1
OM	N/A	N/A	50.8

Number of local governments are from left to right for P(refectures), 23, 23, 23, for D(esignated) and C(ore) cities, 24, 23, 29, for O(ther) M(unicipalities), 1547.  
N/A: Not available.

were asked only about the PCA and this is a weak point in our survey. We can see that guidelines are a little less frequently used and that all the prefectures use ordinances.

Next, to know the relative advantage of the PCA and other instruments against each other, we asked local governments to evaluate each instrument using eighteen features. Those questions concerning all the listed instruments were asked only to prefectures and designated and core cities. Other municipalities were asked only to evaluate PCAs. So our analysis here is based only on data of prefectures, designated and core cities.<sup>15</sup>

Local governments evaluated each instrument with each feature by the four steps explained above. We gave strongly positive, weakly positive, weakly negative, and strongly negative answers marks 1, 2, 3, and 4 respectively. As the evaluation local governments made was qualitative it is not appropriate to treat these marks as cardinal numbers, for example, the difference between 1 and 3 is twice as large as the difference between 1 and 2. But because regarding them as cardinal is a very convenient way to take into analysis the degree of difference between evaluations of different instruments, being as careful as we could about the interpretation of the result, we adopted this method.<sup>16</sup> Specifically, we tested if  $E_{ix} - E_{iy}$  is different from zero significantly,  $E_{ix}$  and  $E_{iy}$  being marks given to instruments  $x$  and  $y$  concerning feature  $i$  respectively. The model is

$$E_{ix} - E_{iy} = b + \text{disturbance.}$$

$i$  = feature 1 –18 in Table 8,  $(x, y) = (\text{ordinance, PCA}), (\text{ordinance, guideline}), (\text{PCA, guideline}).$

<sup>13</sup> In this sense, PCAs without additional regulation clauses consist only of miscellaneous clauses. Economic instruments haven't been allowed to be introduced by local ordinances until only recently. These instruments have not been introduced by guidelines or PCAs to control industrial pollution, as well.

<sup>14</sup> So a Japanese PCA is usually free from free-riding problem.

<sup>15</sup> Evaluations of other municipalities will be more similar to those of designated and core cities rather than to those of prefectures. The author is planning the additional survey to ask other municipalities their evaluations of instruments and other questions.

<sup>16</sup> We made sure that the result gained by this method was consistent to the result gained alternatively by the method not assuming the cardinality of marks. Specifically, we used logit model whose dependent variable is  $Y$  ( $Y=1$ , if  $E_{ix} - E_{iy} < 0$ ,  $Y=0$ , otherwise) and independent variable is  $d$ (constant). We diagnosed  $x$  was superior to  $y$  if estimated  $d$  was not significantly positive(risk level=10%). As this model is asymmetric concerning  $x$  and  $y$ , we did the same for both combination  $(x, y)$  and  $(y, x)$  and combined the results. Finally, this model diagnosed the difference among three instruments more modestly than the model assuming cardinality of marks. Almost all the differences diagnosed by this modest model were also diagnosed so by the model assuming cardinality. But the reverse is not true. Though there were two exceptions, these can be overcome only by loosening the risk level from 5% to 8% in the model assuming cardinality. After all, our model is consistent to the model assuming the ordinality of marks and is also successful in reflecting degrees of differences among evaluations.

Table 8

Features	Dimension of feature	Ranking			Comparison of instruments		
		ordinance	guideline	PCA	ord-PCA	ord-gdl	PCA-gdl
1) It has binding force.	p (effect)	1	3	2	ord**(pc)	ord**(pc)	PCA**(pc)
2) It is based on democratic procedure.	p (lgt)	1	3	2	ord**(pc)	ord**(pc)	PCA**(pc)
3) There is not inequity among regulated businesses.	i-u	1	2	3	ord**(pc)	ord*(p)	gdl*(c)
4) Their setting process is transparent.	p (lgt)	1	2	2	ord**(pc)	ord**(pc)	-(PCA(p))
5) You don't have to negotiate with businesses.	p (cost)	1	1	2	ord**(pc)	-	gdl**(pc)
6) It promotes environmental consciousness of regulated businesses.	p(effect)	1	2	1	-	ord**(p)	PCA**(pc)
7) It makes it easy to gain residents' understanding for new construction or for expansion of business facilities.	i-u	2	2	1	PCA*(c)	-	PCA**(pc)
8) You can collect information about pollution control technology with it.	p(effect)	2	2	1	PCA*(c)	-	PCA**(c)
9) Experiments of new type regulations can be made with it.	p (effect)#	2	1	2	-	gdl**(c)	gdl*(p)
10) It inspires innovation of pollution control/environmental preservation technologies.	\$	1	1	1	-	-	-(PCA(c))
11) You don't need a long time from proposal to implementation.	p(cost)	3	1	2	PCA**(pc)	gdl**(pc)	gdl**(c)
12) It doesn't have to be approved by the local assembly.	p(cost)	2	1	1	PCA**(p)	gdl**(pc)	-(PCA(p))
13) You don't have to consult with the National Government about introducing it.	p(cost)	3	2	1	PCA**(p)	gdl*(p)	PCA**(p)
14) It easily gains the cooperation of regulated businesses.	p(effect)	1	2	1	-	ord*(p)	PCA**(pc)
15) It makes it easy to adapt regulation to the financial condition of each business.	i-u	3	2	1	PCA**(pc)	gdl**(pc)	PCA**(p)
16) It makes it possible to introduce needed regulation when the national laws are deficient.	p (effect)###	1	2	1	-	ord*(p)	PCA*(-)
17) It makes it easy to adapt regulation to the economic situation in the area.	i-u	2	2	1	PCA**(pc)	-	PCA**(-)
18) It makes it easy to adapt regulation to the topographical, geographical and meteorological situations in the area.	i-u	2	2	1	PCA**(pc)	-	PCA**(p)

i-u: whether applied individually or uniformly, p (effect): effect of procedure, p (lgt): legitimacy of procedure, p (cost): cost of procedure. #: through lack of binding force, ###: through having binding force, \$: stringency of requirement and continuity of incentive.

ord: ordinance. gdl: guideline. p: prefectures. c: designated and core cities. \*: 95%. \*\*: 99%.

Number of prefectures are from top to bottom,

for "ord-PCA", 22, 21, 21, 20, 19, 20, 19, 16, 12, 15, 16, 20, 19, 21, 18, 20, 16, 18,

for "ord-gdl", 23, 21, 22, 21, 19, 21, 19, 16, 17, 18, 19, 22, 21, 21, 18, 22, 16, 19,

for "PCA-gdl", 22, 20, 21, 19, 18, 21, 20, 16, 12, 16, 19, 20, 18, 21, 17, 20, 16, 17.

Number of designated and core cities are from top to bottom,

for "ord-PCA", 26, 26, 25, 26, 23, 25, 23, 23, 23, 24, 22, 24, 24, 25, 25, 24, 25, 25,

for "ord-gdl", 26, 26, 25, 26, 25, 25, 24, 23, 25, 24, 23, 24, 24, 26, 25, 26, 26, 26,

for "PCA-gdl", 26, 26, 24, 26, 23, 25, 24, 25, 23, 26, 24, 24, 24, 25, 24, 24, 25, 25.

The main calculations are made using data of prefectures and of designated and core cities jointly.

We estimated b and tested using t-test if b is significantly different from zero.<sup>17</sup> If b is positive/negative and significantly different from zero, instrument x is inferior/superior to instrument y. Note that all of eighteen features are good for the administrative bodies of local governments. The result is shown in the three columns to the right in Table 8. The instrument which is diagnosed to be

<sup>17</sup> After all, it is equivalent to test if the mean of the distribution of the difference is different from zero.

superior to the counterpart is indicated in each cell with its significance level. One asterisk means a significance level of 95 percent and two asterisks 99 percent. In parenthesis are the results when data of prefectures and of designated and core cities are separately used. If the superiority is diagnosed at the significance level of 95 percent with prefectures, designated and core cities, both of them, and none, “p”, “c”, “pc”, and “-” are indicated. So “ord\*(p)” means that ordinance is diagnosed to be superior mainly because of prefectures’ support for ordinance in the comparison. When the superiority is not diagnosed to be significant using all the data available but is true with prefectures or cities, it is also indicated in parenthesis like “- (PCA(c))”. This indicates that designated and core cities evaluate PCA as superior to the counterpart instrument significantly but when the calculation is made using data of the cities and of prefectures jointly, the superiority is not significant.

Based on the comparison of each pair of three instruments, we made the ranking of instruments in regard to each feature. They are also shown in Table 8. A smaller digit represents the instrument evaluated more highly than others with larger digits. If plural instruments are given the same digit, then they tie. When an instrument is ranked by itself as better or worse than others, the cell is shaded. In regard to the features whose digits are shaded, the instrument is good or bad but doesn’t tie with others, and the features characterise the instrument well.

Ordinances are better than others in regard to 1)binding force, 2)democratic procedure, 3)equity among regulatees, and 4)transparency of setting process and are worse than others in regard to 11)length of time to introduce them, 12)need of local assembly’s approval for introduction, 13)need of consultation with the National Government for introduction, and 15)inflexibility of regulation for each business’s financial condition.

Guidelines are better than others in regard to 9)ability to try new type regulations, and 11)quick introduction, and are worse than others in regard to 1)non-biding force, 2)non-democratic procedure, 6)inability to promote environmental consciousness of regulatees, 14)difficulty to gain regulatees’ cooperation, and 16) inability to make up for deficient national laws.

Finally, PCAs are better than others in regard to 7)ability to gain residents’ understanding for businesses’ operation, 8)ability to collect information, 13)non-need of consultation with the National Government for introduction, and 15,17,18)flexibilities of regulation for each business’s financial condition, for the local economic situation, and for the local natural situation and are worse than others in regard to 3)inequity among regulatees, and 5)need for negotiation with businesses.

It is often said that PCAs contributed to the innovation of pollution prevention technology because of their extraordinarily stringent requirements for businesses, especially at the end of the 1960s and in the beginning of the 1970s. But our analysis here shows that currently local governments don’t see any difference among these instruments in regard to their ability to inspire innovation.

It is mentioned above that ordinance, guideline, and PCA differ from each other in the procedure of their introduction and in whether they are applied uniformly to many anonymous businesses or individually to a specified business. Features 1, 2, 4, 5, 11, 12, and 13 apparently relate to the introduction process of instruments. Feature 8 also probably relates to the introduction process since local governments said that the counterpart business was one of the most important sources of useful

information necessary to conclude a PCA, according to our survey.<sup>18</sup> Feature 6 and 14 also seem to relate to the introduction process. Because ordinances have the approval of the local assembly and PCAs have the approval of the counterpart business but guidelines are decided arbitrarily within administrative bodies of local governments, guidelines are evaluated lower for ability to 6)promote environmental consciousness and 14)gain cooperation of businesses. Features 3, 15, 17, and 18 apparently relate to whether instruments are applied uniformly or individually. Feature 7 also relates to this because concluding a PCA with a specified business makes it easier to 7)gain residents' understanding for the business's operation and that is probably why PCAs are evaluated higher for this feature. Ability to make experiments(feature 9) relates to lack of binding force because experiments are not forced on someone and that is why guidelines are evaluated higher for this. To the contrary, Ability to complement deficient laws(feature 16) relates to having binding force because if national laws and local instruments are both non-binding, the environment will be at peril and that is why guidelines are evaluated lower for this. Because the degree of binding force relates to the introduction procedure of each instrument, features 9 and 16 also indirectly relate to the introduction procedure. Ability to inspire innovation(feature 10) should relate to the stringency of requirement and to continuous incentive and these don't relate to introduction procedure or individual(or uniform) application, and that is probably why local governments don't see the difference for this feature among instruments under consideration here.

In regard to the dimension of whether the instrument is applied uniformly or individually, PCAs are better than others because they are applied individually and so are flexible to a businesses' financial condition and to local economic and natural conditions. But at the same time, because they are applied individually, they invite inequity among regulatees.<sup>19</sup>

Features judged to relate to introduction procedure can be further divided into three classes. Features 1, 6, 8, 9, 14, and 16 relate to effect of procedure while features 2 and 4 to legitimacy of procedure and features 5, 11, 12, and 13 to cost of procedure.

Feature 11, quickness of introduction, directly represents the cost. Based on practice, local governments judged guidelines as least costly to introduce, PCAs next, and ordinances the last. A PCA doesn't have to be approved by a local assembly or the National Government but has to be negotiated with and agreed to by the counterpart business. The cost of a PCA agreement increases as the number of counterpart businesses increase while the cost of introduction of ordinances or guidelines doesn't. As mentioned, the number of PCAs which a local government has is usually small and this is rational. The least costly guideline is in return inferior to others in regard to effects and legitimacy of procedure except for the ease of making experiments, which originates in lack of binding force. And the most costly ordinance is not inferior to others in most effects and legitimacy of procedure. Ease to collect information is gained by negotiations with businesses which costs local governments. We see that the cost of procedure and effects and legitimacy of procedure are a trade-off.

But flexibilities and ease to gain residents' understanding given to PCAs can not be assumed by

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<sup>18</sup> Other important sources are other local governments.

<sup>19</sup> As guidelines are evaluated between PCAs and ordinances concerning features 3 and 15, their application may be different from total uniformity. As they have weak binding force, it may be that some businesses do not observe guidelines, which conflicts a little with the author's belief beforehand.

ordinances or by guidelines even with more cost because they originate in individual application. Therefore, flexibilities and ease to gain residents' understanding through individual application make the core of a PCA's advantage and induces local governments to continue to use them even after they were given certain power to regulate businesses with ordinances.<sup>20</sup> As negotiations with businesses are sometimes seen to introduce instruments other than PCAs, ease to collect information can be regarded as a side-effect of PCA negotiations. Of course, the relative advantage of each instrument is more complicated as shown in Table 8 and it changes according to conditions given to the local government at a given time. Cost of introduction may constitute a main factor of relative advantage. But individual application, which is diagnosed to be the origin of a PCA's advantage, is a very convenient thing. It can give large discretionary power to local governments, and so is worth being emphasized. In Japan, PCAs have been accepted positively by the general public and academia as they contribute to the improvement of the environment. And the negative aspect of PCAs, such as too much discretionary power given to local governments has not been studied well. That is a subject for future study.

### 3-2-3, REASON WHY BUSINESSES AGREE TO CONCLUDE PCAS

So far, we have been looking at problems only from the governments' side. Now, we are going to consider why businesses agree to conclude PCAs. A PCA is an agreement or a contract. Each party agrees to it, because the benefit of the agreement exceeds the cost, according to economic theory. The benefits and costs of a PCA agreement for both local governments and for

Table 9

	Benefit	Cost
Local government	--Improvement of the environment. --Relative merits of PCA against other instruments.	--Increase of risk of the business' financial condition becoming worse and of business' run-away, and of prevention of latent businesses' coming in. --Relative shortcomings of PCA against other instruments.
Business	--Stable operation(understanding of residents' understanding for their location and operation)	--Costs to take pollution prevention measures.

businesses are given in Table 9. We have so far concentrated on the relative merits and shortcomings of a PCA against other instruments for local governments.<sup>21</sup> Other than these, the benefit enjoyed by a local government is the improvement of the environment and the cost incurred by it is the possible bad effect upon the local economy. The cost incurred by a business is clearer than the benefit it enjoys. It is costly to take pollution prevention measures. The benefit is believed to be in gaining residents' understanding for their location and operation.

In regard to costs, with PCAs businesses have discretion regarding how to attain a certain environmental target and can minimise their costs. So, a PCA is better than other instruments for businesses in this regard. But usually this aspect is not appreciated by businesses because local

<sup>20</sup> Ease to facilitate residents' participation could be a merit of PCA. A PCA can include clauses which local governments officials hesitate to include in a ordinance for fear they conflict with the system of laws. This relates to cost of introduction procedure.

<sup>21</sup> Local governments often use ordinances, guidelines, and PCAs complementarily with each other. But sources or pollutants targeted by each instrument don't overlap each other. Therefore relative merits and demerits of each instrument survive.



governments often require businesses to take stringent measures under PCAs which governments wouldn't require with other instruments. Local governments take advantage of PCAs' good performance concerning feature 15 in Table 8. They require only those businesses to take measures which afford them and minimize the total negative effect of environmental improvement upon the local economy. This practice contradicts what environmental economics usually recommends, that is, businesses which can not afford needed pollution preservation measures should withdraw from the market for the efficiency of the economy. Economic *stability* is balanced by efficiency.

In regard to benefits, as we have seen above, PCAs can more easily gain residents' understanding for businesses' location and operation. If any instrument requires the business to take more stringent measures, it will be easier to persuade residents. But if the measures are taken by a specified business, the business gains residents' understanding more as it does something special beyond what officially is needed by laws or ordinance, which appeals to the emotions of the Japanese. Large businesses were labelled as cold-blooded profit maximisers in the 1960s and '70s. And that image has not totally been overcome even now, so large businesses have to pay more to recover their reputation. As for smaller businesses, they have been regarded by the public as entities to be protected by governments. That is probably the reason why PCAs which are applied to smaller businesses tend to lack an additional regulation clause, though the main reason is probably that they simply lack enough funds to take such measures.

Even without an additional regulation clause to require additional pollution prevention measures, a PCA can include clauses of on-site inspection, sanction(including compensation), residents' participation, and thus can make the residents feel more at ease.

Gaining residents' understanding for business operation is not important only for businesses but also for local governments because governors, mayors, and members of local assemblies are elected by residents to keep their seats in office every four years. An environmental problem often becomes the main issue in a local election, though it does rarely so in a national election.

### 3-2-4, SPONTANEITY OF CONCLUSION

The benefit-cost analysis above assumes that businesses voluntarily or spontaneously agree to conclude PCAs. This assumption is critical to the interpretation of PCA as a contract supported by the majority of law scholars and judicial precedents. But this assumption is open to question. Table 10 shows if local governments have ordinances to base a PCA conclusion. About twenty percent of local governments do. It is not clear if the ordinances oblige businesses to conclude PCAs with local governments. But if so, the assumption has to be forgone in regard to local governments that have this kind of ordinance. Table 11 shows if local governments' proposals of PCA conclusion have ever been rejected by the counterpart businesses. Only three percent of local

Category of local government	N*	Answer(%)			yes/(yes+no) (%)
		Yes	No	N/A*	
Total	1620	18.3	78.2	3.5	19.0
Prefectures	25	36.0	56.0	8.0	39.1
Designated and core cities	29	65.5	34.5	0.0	65.5
Other municipalities	1566	17.2	79.4	3.4	17.8

\*Number of local governments. \*\*No answer.

governments do. It is not clear if the ordinances oblige businesses to conclude PCAs with local governments. But if so, the assumption has to be forgone in regard to

local governments that have this kind of ordinance. Table 11 shows if local governments' proposals of PCA conclusion have ever been rejected by the counterpart businesses. Only three percent of local

Table 11

Category of local government	N*	Answer (%)					yes/(yes+no)(%)
		Yes	No	Never proposed	Don't know	N/A*	
Total	1620	1.3	38.0	37.7	17.2	5.7	3.3
Prefectures	25	0.0	64.0	8.0	20.0	8.0	0.0
Designated and core cities	29	6.9	65.5	17.2	10.3	0.0	9.5
Other municipalities	1566	1.2	37.1	38.6	17.2	5.7	3.2

\*Number of local governments. \*\*No answer.

conclusions. Local governments which experienced a rejection say that a PCA is a voluntary agreement and they cannot force businesses to conclude one. Table 12 shows if local governments

Table 12

Category of local government	N*	Answer (%)					yes/(yes+no)(%)
		Yes	No	Never negotiated***	Don't know	N/A*	
Total	834	12.4	40.5	11.9	27.8	7.3	23.4
Prefectures	21	33.3	23.8	0.0	28.6	14.3	58.3
Designated and core cities	27	33.3	37.0	3.7	14.8	11.1	47.4
Other municipalities	786	11.1	41.1	12.5	28.2	7.0	21.2

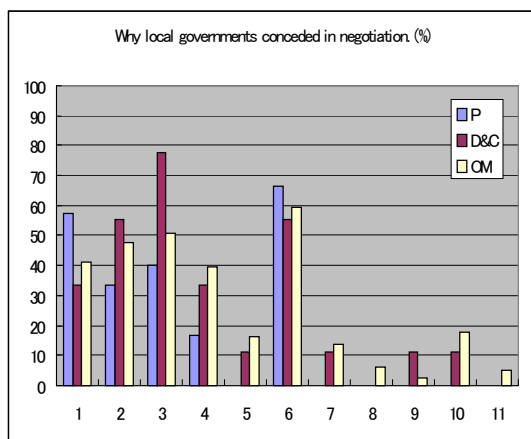
\*Number of local governments. \*\*No answer.

\*\*\*More than ten percent of local governments which have PCAs answered that they had never negotiated with businesses. This is something to be explained with additional study.

higher rate. This can be interpreted to mean that local governments with more stringent requirements for businesses concede. If the first proposal is too lenient, there will be no room for concession.

Figure 6 shows why local governments conceded in the negotiations. The figure shows the percentage of positive answers against total valid answers as in Figures 4 and 5. The main reason for concession is that the additional costs incurred by businesses to comply with the governments' original proposals were too large. Other major reasons are the balance with PCAs of other local governments and with laws and prefectural ordinances. This result is consistent with the higher evaluation of PCAs in regard to feature 15 in Table 8.

Figure 6



municipalities)

- 1) The original proposal didn't have scientific rationale.
- 2) The original proposal was strict compared with those agreements concluded by other local governments.
- 3) The original proposal was strict compared with regulations based on national laws and prefectural ordinances.
- 4) The counterpart businesses don't have enough fund to take measures.
- 5) There have not been sufficient public financial aid systems to help counterpart businesses to take measures.
- 6) Additional costs incurred by counterpart businesses to comply with the original proposal have been large.
- 7) The pressure of residents' movement, NGOs or victims' groups has been small.
- 8) The pressure of the local assembly to call for the administration body's concession has been large.
- 9) The press covered the matter little.
- 10) The prefectural government guided us.(for

governments have faced a rejection from a business. But at the same time, the fact that some businesses did reject governments' proposals is positive evidence for voluntary

with valid PCAs have ever conceded in negotiation to conclude or renew PCAs with businesses. Twenty three percent of local governments have. Especially prefectures, designated and core cities show a

11) The National Government guided us.

Number of governments for 1) to 9) are for P(refectures), 7, 6, 5, 6, 6, 6, 5, 6, 0, 6, for D(esignated) and C(ore) cities 9, 9, 9, 9, 9, 9, 8, 9, 9, 9, and for O(ther) M(unicipalities) 83, 80, 85, 81, 80, 81, 81, 79, 79, 79, 79.

After all, the spontaneity of businesses' PCA agreements is not free of question but there is also some evidence for spontaneity. Setting aside the agreement itself, the contents of PCAs are sometimes at least partly influenced by businesses. How much a businesses' demands are reflected in a PCA can not be answered simply and should be judged case by case.

#### 4, Conclusion

The main conclusion of this paper is that advantages of Pollution Control Agreements in Japan against other instruments originate in *individual agreements* with specific businesses. Individual agreements enables a PCA to be flexible and take into account the financial condition of each business and of local economic and natural conditions, and to gain residents' understanding for the location and operation of counterpart businesses relatively easily, though it invites inequity among regulated businesses. Other relative merits can be realised by ordinances or guidelines at some cost.

PCA agreements are beneficial for businesses too. But to what extent agreements or really voluntary is open to question. Businesses may be forced to conclude PCAs by ordinances or by the fear of ill treatment by local governments. The reason why PCAs are widely used in Japan is that businesses tend to avoid conflicts with governments rather than to raise objections to governments even when needed, and that administrative bodies of governments are considerably superior to assemblies. In other words, the political culture that allows administrative bodies large discretionary power.

#### References

- Abe, Y. (1995), 'Kankyo hozon no shuho' ['Method of Environment Preservation'], in Abe, Y. and Awaji, T. (eds), *Kankyo ho [Environmental Laws]*, 45-58.
- Environment Agency (ed) (1972-1996), *Kankyo hakusho [White Paper on Environment]*, Tokyo: Printing Bureau, Ministry of Finance (in Japanese).
- Environment Agency (ed) (1990), *Gyoshubetsu kogai boshi kyotei jirei shu [Pollution Control Agreement Collection of Different Industries]*, Tokyo: Gyosei (in Japanese).
- Environment Agency (1992), *Chiho kokyo dantai no kankyo hozon taisaku chosa [ Investigation of Environment Preservation Measures by Local Governments]*(in Japanese).
- Harada, N. (1994), *Kankyo ho (hosei ban) [Environmental Laws (revised version)]*, Tokyo: Kobundo (in Japanese).
- Kitamura, Y. (1997), *Jichitai kankyo gyosei ho [Local Environmental Administrative Laws]*, Tokyo: Ryosho-Fukyukai (in Japanese).
- Matsuno, Y. (1996), 'Kogai kenko higai hoshō seido seiritsu katei no seiji keizai bunseki' ['Political Economic Analysis of the Process of Establishment of the Japanese Compensation System of Pollution-Related Health Damage'], *Keizai-Ronso [The Economic Review]*157(5,6), 51-70(in Japanese).

- Matsuno, Y. (1997a,b), 'Tekko-gyo ni okeru iou sankabutsu haishutsu sakugen he no kakushu kankyo seisaku shudan no kiyo (1) (2)' ['How Much Were Policy Instruments Effective in Reducing Sulfur Oxides Emission by Steel Mills in Japan (1) (2)'], *Keizai-Ronso [The Economic Review]* 159 (5,6), 100-120, 160 (3), 19-38 (in Japanese).
- Matsuno, Y. (2000), 'Kuni no kogai boshi kyotei ni taisuru taido' ['The Attitude of the National Government toward Pollution Control Agreement in Japan'] *Keiei-Ronshu [Meiji Business Review]* 47(4), 75-87 (in Japanese).
- Matsuno, Y. and Ueta, K. (2000), 'A Socio-Economic Evaluation of the SO<sub>x</sub>-charge in Japan' in Andersen, M. and Sprenger, R. U. (eds), *Market-Based Instruments in Environmental Management*, London: Edward Elgar.
- Hashimoto, M. (1988), *Shishi kankyo-gyosei [Personal History of Environmental Policy]*, Tokyo: Asahi-Shimbunsha (in Japanese).
- Ministry of Home Affairs and Environment Agency (eds) (1971), *Kogai boshi jorei kyotei shu [Collection of Pollution Control Ordinances and Agreements]*, Tokyo: Daiichi Hoki (in Japanese) (Content is being added continuously).
- Prime Minister's Office (ed) (1971), *Kogai hakusho [White Paper on Pollution]*, Tokyo: Printing Bureau, Ministry of Finance (in Japanese).
- Saruta, K. (1971), 'Chiho jichitai no kogai taisaku' ['Pollution Prevention Measures by Local Governments'], Shimizu, Y., Saruta, K., and Toyama, K., *Keihin kogyo chitai [Keihin industrial area]*, Shin-hyoron, 96-163(in Japanese).
- Saruta, K., (1981), 'Kogai boshi kyotei no enkaku to yokohama hoshiki ni tsuite' ['History of Pollution Control Agreement and Yokohama Style'], Ningen kankyo mondai kenkyukai (ed.), *Kogai kankyo ni kakawaru kyotei to no hogaku teki kenkyu [Law Study on Pollution and Environment]*, Yuhikaku, 241-272(in Japanese).