PKI-2 Promotion of Heat Utilization Industries (KI-8, KI-9, KI-10)

1 Rationale of the Proposed Project

1.1 Konin's Advantages in Utilizing Energy

The Konin Province has one of the major power plants in Poland and electricity can be utilized in abundance. Furthermore, there is abundant clean heat to be utilized. That is to say:

(1) By increasing electricity-heat cogeneration at the power stations, it is possible to increase the heat supply to the regional industries. By such heat supply :

1) Heat utilization efficiency in the power stations can be significantly improved. Some portions of heat now dispersed to the lakes or air can be recovered and utilized efficiently.

2) Compared with the case where heat is generated individually at each factory, heat can be utilized without increasing the amount of pollutant disposal such as SOx, NOx, CO2.

(2) Waste heat from the power stations such as outlet cooling water of the surface condensers may be utilized.

There are many industries which use heat. New construction of such factories is becoming more and more difficult due to the increasingly stringent environmental regulations. However, the advantages outlined above are valuable factors in the promotion of these industries.

1.2 Heat Supply System of the Power Stations

The Konin and Adamow Power Stations produce thermal heat as follows:

- Adamow Power Station; 93 MWt (335GJ/h)
- Konin Power Station; 515 MWt (1,854GJ/h)
- Total; 608 MWt (2,189GJ/h)

These power stations supply hot water and steam for district heat and industrial purposes in Konin and Turek.

1.3 Present Situation and Future Prospects on Demand of Heat

The Konin Power Station of ZE PAK SA supplies heat to Energogaz, a heat distribution company, and Energogaz supplies heat to the consumers through the heat distribution network. Konin Power Station also directly supplies steam to Huta Aluminum Konin and heat to a greenhouse company.

In 1996, the Konin Power Station generated heat energy of about 2,700 TJ including direct supply from the power station. If the power station generates heat at 100% heat generation capacity of 515 MW during a whole year, total generated heat is 16,240TJ. Therefore, the percentage of heat capacity used in 1996 was 16.6%.

The seasonal fluctuation of heat consumption shows that maximum consumption occurs in December and January, corresponding to about 25% of heat generation capacity of the power plant on an average hourly basis in peak months. In summer, especially in June and July, consumption decreases to less than one twentieth of peak consumption.

The Adamow Power Station of ZE PAK SA supplies heat of about 340TJ to Communal Housing Economy Company, and the company supplies heat to 60% of Turek city through the heat distribution network. Adamow Power Station also directly supplies steam to Miranda, a textile company, and heat to several users. In Turek, the heating consumers are mainly private household. Based on the same calculation as Konin, percentage of heat capacity usage is 11.6 %. In peak months it is about 20%.

As mentioned above, the demand for heat is far less than the supply capacity and a further increase in demand is unlikely unless special action is taken.

1.4 Necessity of Improvement of Heat Utilization and Potential Projects

Development of Konin Province has relied on the three key industries. However, the Province is intending to diversify its industrial structure. A significant number of new industries must be constructed in line with the development plans. Such new industries require more or less heat. If those industries generate heat individually by burning fossil fuel, then total pollutant

emissions will be increased inevitably and/or the investors will suffer from an extra heavy burden of costs towards environmental protection.

The power stations are modernizing their facilities mainly in aspects of pollution protection and will finish modernization by 2007. Furthermore, if the heat utilization efficiency at the power stations is improved by increasing electricity-heat cogeneration, the power stations will be able to supply heat without increasing pollution emission. Thus, the environment of Konin Province will not be threatened by the development of new industries.

On the above-mentioned grounds, the following projects are proposed:

(1) KI-9 Preparation of a " Heat Industrial Park"

In order to improve the efficiency of heat utilization, the project aims at making systems to gather heat consuming industries in a so-called industrial park which is located adjacent to the power stations and to supply heat from the power stations.

(2) KI-10 Construction of a " Greenhouse Park"

The project aims at constructing a 'horticultural park' where greenhouses are gathered and located adjacent to the power stations and heat from them is utilized fully. It may be feasible to install heat pumps to utilize waste heat from the power station condensers, otherwise disposed to the lake.

In Konin Province, there are 16.8 ha of greenhouse area, of which 672 m2 are for vegetable farming such as tomatoes, cucumbers, etc. In Poland there are 1,159 ha of greenhouse area, 17.6 ha of which are for vegetables. Konin's percentages, compared with the whole of Poland, total 1.45% for greenhouse area and 0.4% for vegetable area. As mentioned heretofore, greenhouse farming should be more active, using heat from the power stations, than in any other province in Poland. In Konin Province, most greenhouses burn coal or saw dust without pollution protection facilities. The cost of the energy amounts to 60% of total costs.

An example of a greenhouse in Kalisz is as follows:

- greenhouse area ; 2 ha
- products ; vegetables (mainly tomatoes)-1/3, flowers-2/3
- fuel ; 600 to 1,000 ton of coal (12 to 20 TJ/year, boiler efficiency 65%)

- energy cost ; coal-dust ----108,000 PLN
  (energy cost ; in case of coal-nut ----157,000 PLN)
  (energy cost ; in case of heat ----165,000 PLN)
  (energy cost ; in case of heat in the greenhouse park----129,000 PLN
  Refer to Section 7.1.3 hereof.)
  Refer to Table PKI-2-1.

Table PKI-2-1 FUEL COSTS FOR GREENHOUSE

	Greehouse area	Coal consumed	heat value	Gross heat	Boiler efficienct	Net heat	Net heat/Area	Coal price	Heat price	Total cost
Unit	ha	ton/250 days	GJ/t	GJ/ 250days	%	GJ	GJ/ha/y	PLN/t	PLN/GJ	kPLN
Fuel-coal dust	2.00	600	20	12,000	65	7,800	3,900	180		108,000
Fuel-coal nut	2.00	522	23	12,000	65	7,800	3,900	300		156,522
Heat	2.00					7,800	3,900		21.2	165,360
Heat in the park	2.00					7,801	3,901		16.51	128,795

As calculated above, heat is expensive compared with the lowest-quality coal which is thought to be used mainly in greenhouses in Poland. However, considering environmental protection, coal burning without pollution control equipment will not be allowed any more. Therefore, greenhouses should be gathered on one site and, by direct contract with the power stations or with the distribution companies, heat will be supplied at more favorable conditions.

Another heat source possibility will be the condenser outlet water from the power stations. As described in PKI-3 Section 1.4.3 for heat utilization of well water from the mines, it is possible to get 45 to 50-degree centigrade water by using heat pump competitively with coal burning. Minimizing heat loss and using effective radiators, it will be possible to utilize such warm water for greenhouses at lower cost.

(3) KI-8 Construction of Cold Warehouses for Agricultural Products

It may be feasible to install cooled warehouses utilizing absorption type refrigerators and hot water as a driving heat for the purpose of storing agricultural products. This is aimed at controlling delivery timing by storing fruit and vegetables in the warehouses for a certain period.

Apart from such purpose, the following technology is applied in various countries. The technology of cooling fruit and vegetables as quickly as possible after harvest is now applied in many countries to maintain quality during distribution. For such purposes, there are several methods as follows:

- chilled air cooling: Applicable to all products such as lettuce, cabbage, sweet corn, etc. Required time is one day to cool the products from room temperature to about 5 degree centigrade. Cut flowers are cooled down to 5 degrees or 7 to 8 degrees for flowers especially sensitive to low temperatures.
- chilled water cooling: Showering chilled water on the products or to 'bathing' them in chilled water---applicable to products unaffected by water such as carrot, radish, spinach, etc.

The above mentioned technology can be applied in Konin. It may be feasible to build a warehouse with functions for sizing products and with cooling facilities utilizing heat from the power stations as an energy-source for absorption type refrigerators.

2 Project Purpose

To improve efficiency of energy utilization and environmental protection.

3 Output of the Project

(1) Heat industrial park is constructed.

(2) Industries set up in the park.

(3) Greenhouse park is constructed.

(4) Greenhouse companies set up.

(5) Cold warehouse is constructed.

(6) Heat efficiency is improved in the power stations and Konin Province as a whole.

4 Project Description

4.1 Design Basis of the Project

4.1.1 Design Basis

(1) Heat Industrial Park

Heat industrial park is to be constructed adjacent to the power station. In the report the location is thought to be adjacent to the Konin Power Station. The location adjacent to the Adamow Power Station will also be candidate for the heat industrial park. Here, the case of the Konin Power Station is analyzed. Extracted steam from the steam turbines is supplied to the park. It is difficult at this stage to determine the specific industries to be located in the park. Selecting some suitable industries in Konin Province allows the magnitude of the park to be estimated. Apart from the industrial park, the sugar company (Cukrownia Goslawic SA) is generating steam and electricity for 3 months a year. It might be feasible to supply steam from the power plant to the company, taking into consideration the environmental protection and rationalization of the company. The figures of estimated heat consumption include such possibility of energy rationalization of existing factories..

1) Estimated magnitude of the park

Total Area : 50 ha

Total located factories : 10 to 15

2) Utilities and services to be provided by the company

- Land : 50 ha ; to be purchased and site-prepared by the company and to be sold to the companies in the park.

- Road and sewage system : to be prepared by the company and fees to be charged to the companies in the park.
- Steam : 200 t/h ; to be purchased from ZE PAK and to be sold to the companies in the park.
- Steam condensate : to be recovered from the factories and be sent back to ZE PAK
- Industrial water : to be purchased from ZE PAK and to be sold to the companies in the park.
- Waste water final treatment : to be treated in each factory and to be gathered and finally checked in central waste water treatment facilities.
- Electricity : to be received at a central substation and to be sold to the companies in the park.

(2) Greenhouse Park

Greenhouse park is to be located adjacent to the power station of Konin. The location adjacent to the Adamow Power Station will also be a candidate for the green house park. Here, the case of the Konin Power Station is analyzed. The power station will supply hot water to the park.

1) Estimated magnitude of the park

Total Area : 50 ha for Konin
Total located greenhouse company : 10

2) Utilities and services to be provided by the company

- Land : 50 ha ; to be purchased and site-prepared by the company and to be sold to the companies or farmers in the park.
- Road and sewage system : to be prepared by the company and fees to be charged to the companies in the park.
- Hot water : 50 GJ/h ; to be purchased from ZE PAK and to be sold to the companies in the park.
- Irrigation water : to be prepared by the company and fees to be charged to the companies in the park.

(3) Cold Warehouse

Cold warehouse is to be located adjacent to the hot water lines of Energogaz who supply heat to the warehouse. The location adjacent to the Adamow

Power Station will also be a candidate for the cold warehouse. Here, the case of the Konin Power Station is analyzed.

1) Estimated size of the warehouse

Total Area : 1200 m2 for Konin

2) Refrigerator

Rated capacity: 100 USRT (1.26GJ/h) for 1200m2
Chilled water temperature: outlet 5 degrees centigrade
Heat consumption: 1.78GJ/h
Estimated storage capacity: 2,000 tons as potatoes

In the case of the centrifugal refrigerator being driven by an electric motor, specifications of the same capacity equipment will be as follows:
Motor power ; 100kW
Therefore, if the present market price for heat is applied to the system, this electricity driven type will be much cheaper than absorption type refrigerator. However, if a special price can be set for months where heat will be low demand, , then the absorption type refrigerator will become feasible.

4.1.2 Estimated Heat Load

Table PKI-2-2 shows a range of likely participating industries in the heat park and each's heat load. It also shows the heat load for the greenhouse park and cold warehouse in overall terms.

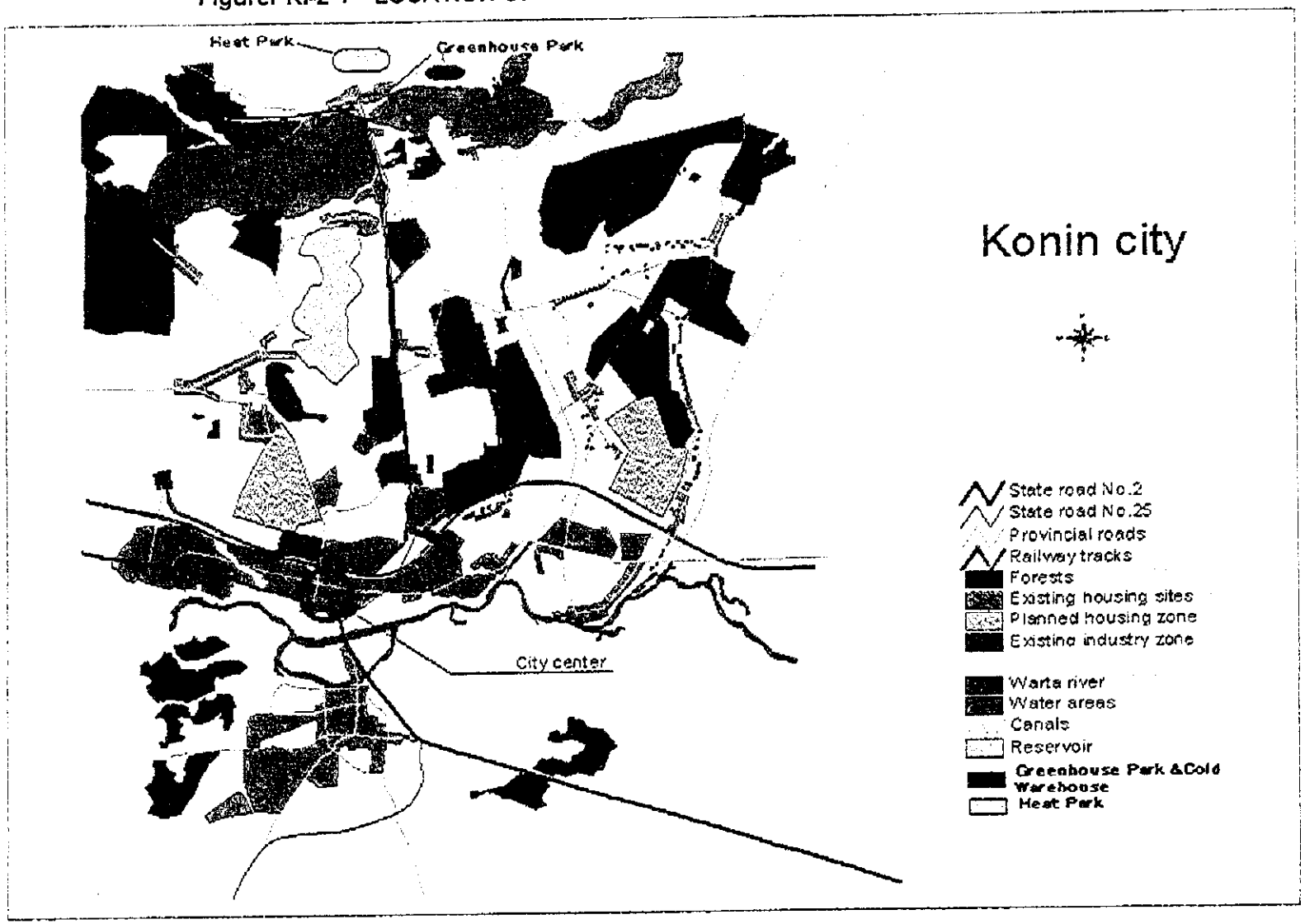
Table PKI-2-2 HEAT INDUSTRIES USERS

Factories		Capacity	Specific Heat req.	Yearly Heat Consumpt.	Hourly Heat Consumpt.	Equival. Steam Consumpt.
Unit		t/y	GJ/T	TJ/y	GJ/h	Steam t/h
1	Factory of Composite Feed	30,000	16.00	480.0	60.0	28.6
2	Factory of Milk	32,000	1.50	48.0	6.0	2.9
3	Factory of Skim Milk	5,000	100.00	500.0	62.5	29.8
4	Factory of Grain Milling and Cereal	10,000	0.30	3.0	0.4	0.2
5	Factory of Soft Drinks	20,000	0.60	12.0	1.5	0.7
6	Woodworking	1,000	0.05	0.1	0.0	0.0
7	Aluminum Coating	30,000	0.38	11.3	1.4	0.7
8	Aluminum Radiator	10,000	0.38	3.8	0.5	0.2
9	Condensed Apple Juice	10,000	9.45	94.5	11.8	5.6
10	Other Plants			226.8	105	50.0
11	Total			1,379.5	249.1	118.6
		Req. area ha	Heat load GJ/y/ha	Yearly consumpt.	Hourly consumpt.	Eq. steam consumpt.
	Greenhouse	50	3,900	195.0	32.5	15.5
	Cold Warehouse	0.12	32	3.8	1.78	0.8
	Total			198.8	34.3	16.3
	Grand Total			1,578.3	283.4	134.9

4.2 Project Location and Layout

The locations of the proposed sites are shown in Figure PKI-2-1. The altenative location is a adjacent place to the Adamow Power Station.

FigurePKI-2-1 LOCATION OF HEAT PARK AND GREENHOUSE (incl. Cold Warehouse)



4.3 Organization and Required Manpower

Employee numbers required for the normal operation of the projects are estimated as shown in Table PKI-2-3. These figures do not include the employees of the specific industries that will set up in the parks.

Table PKI-2-3 MANPOWER FOR PROMOTION OF HEAT UTILIZATION INDUSTRIES

	Project No.	KI-9	KI-10	KI-8
	Project	Heat industrial park	Greenhouse park	Cold warehouse
A	Direct workers	15	5	15
B	Indirect workers	5	2	5
C	Total	20	7	20

4.4 Project Costs

Project costs are estimated as shown in Table PKI-2-4. These figures do not include the investment costs for the industries in the parks.

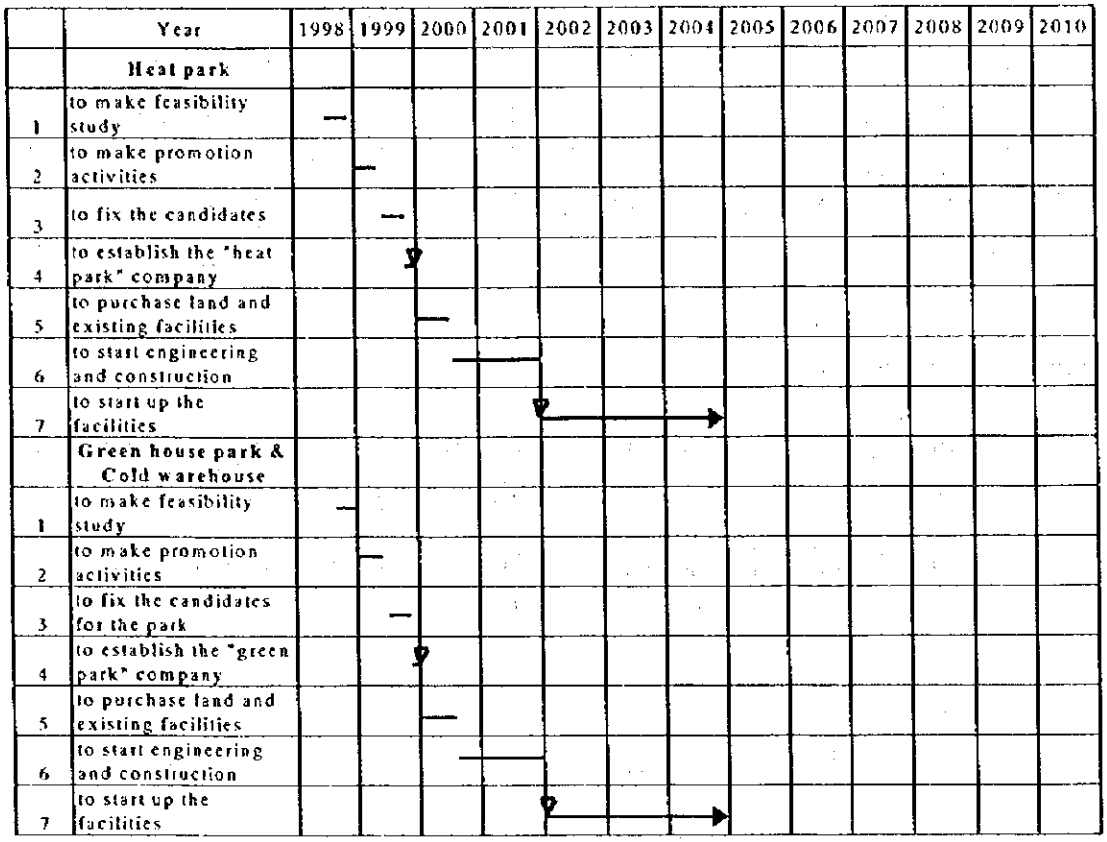
Table PKI-2-4 CAPITAL REQUIREMENT FOR PROMOTION OF HEAT UTILIZATION INDUSTRIES

Project No.	KI-9	KI-10	KI-8
Project	Heat industrial park	Greenhouse park	Cold warehouse
Unit	thousand USD	thousand USD	thousand USD
Land cost & site preparation	2,200	1,500	10
Piping lines	4,700	900	
high voltage substation	2,400		
Auxiliary facilities	1,700		500
Buildings	200		700
Project cost	11,200	2,400	1,210

4.5 Schedules

The schedules for the projects are estimated as shown in Figure PKI-2-2.

Figure PKI-2-2 SCHEDULE OF PROMOTION OF HEAT UTILIZATION INDUSTRIES



5 Implementation Body and Financing Source

5.1 Implementation Body

- The local government, ZE PAK and, it is expected the other three key industries shall form a joint venture company for the preparation of the industrial park. The enterprises who set up in the heat park will share the stock of the company.
- The local government and ZE PAK and the heat distribution companies shall form a joint venture and prepare a greenhouse park and the individual greenhouses in the park will be operated by the private sector.

- The farmers' union or distribution company shall form a company and prepare a cold warehouse

5.2 Financing Source

(1) Capital from each shareholder

(2) Loans and credits

(3) Provincial and National Environmental Protection & Water Economy Fund

6 Activities

The required activities for the heat park are enumerated as follows:

(1) to order a feasibility study conducted by the local government and ZE PAK
(2) to make a detailed plan for the heat park concerning the proposed land, infrastructure, utilities supply conditions and labor conditions, etc.
(3) to propose institutional incentives
(4) to carry out promotion activities to attract the candidates to the park
(5) to fix the candidates for the park
(6) to establish the "heat park" company and to conclude the necessary contracts
(7) to purchase land and existing facilities if required
(8) to conclude a construction contract with the successful contractor
(9) to start engineering and construction of the facilities
(10) to hire employees and to carry out training
(11) to support construction of the companies to be built in the park
(12) to start up the facilities and to start the company operation

The required activities for the greenhouse park are enumerated as follows:

(1) to order a feasibility study conducted by the local government and ZE PAK
(2) to make a detailed plan for the greenhouse park concerning the proposed land, infrastructure, utilities supply conditions and labor conditions, etc.
(3) to propose institutional incentives
(4) to carry out promotion activities to attract the candidates to the park
(5) to fix the candidates for the park
(6) to establish the "greenhouse park" company and to conclude the necessary contracts
(7) to purchase land and existing facilities if required

(8) to conclude construction contract with the successful contractor
(9) to start engineering and construction of the facilities
(10) to support the companies to be built in the park
(11) to start up the facilities and to start the company operation

The required activities for the cold warehouse are enumerated as follows:

(1) to order a feasibility study conducted by the local government and candidates of the farmers' union or a distribution company
(2) to make a detailed plan for the cold warehouse
(3) to carry out promotion activities to invite the candidates to the warehouse
(4) to fix the candidates
(5) to establish the cold warehouse company and to conclude the necessary contracts
(6) to purchase land and existing facilities if required
(7) to conclude a construction contract with the successful contractor
(8) to start engineering and construction of the facilities
(9) to start up the facilities and to start the company operation

7 Expected Benefit

7.1 Direct Benefit

7.1.1 Improvement on Heat Efficiency

Premises : In order to make comparisons simple, the fuel consumption is kept unchanged for the case studies. Inevitably by increasing cogeneration, power generation decreases. In practice according to the market situation, increase of boiler loads or operation of steam extraction will be optimized. Furthermore, it is understood that ZE PAK are prepared to supply 515 MW of heat at Konin Power Station, regardless of the amount of electricity generation.

The performance of the Konin Power Station was estimated in the case of increased heat-power cogeneration from the recent operation conditions described in the ZE PAK annual reports.

The performance of a single steam turbine was estimated in full condensing mode and in partial extraction and partial condensing mode as shown in Table PKI-2-6. According to the rough calculation, when steam of 160 tons/h at

8MPa, 500 degrees centigrade (equivalent to 159 MWt), which is supposed to be similar conditions in the power station, is fed into a turbine, 45MW of power will be generated in condensing mode and 31.5MW of power and 65MWt of heat will be generated in cogeneration mode. It means that generation of power in cogeneration mode decreases by 13.5MW, but 65 MWt of heat can be generated and therefore, 51.5 MWt of heat can be recovered , otherwise it would be lost into the lake.

For the purpose of economic comparison, electricity and heat prices from various sources are shown in Table PKI-2-5. ZE PAK's selling prices in 1994 and 1995 are estimated as described in Section 2.5 of Sector Report and escalated into 1996 at the same rate of escalation of data from Energy Information Center. Two cases are compared: one is based on ZE PAK's selling price and the other on market price. The market price basis was 99 PLN/MWh for electricity (for high voltage consumers; price from EIC) and 65 PLN/MWh for heat (price from Konin market price) in 1996. For the purpose of comparison, a case of an exclusive heat generation is also calculated. The results are shown in Table PKI-2-6. A significant increase of sales can be expected on both price bases by cogeneration, but the maximum increase will occur in case of the exclusive heat generation. Such a phenomenon will be due to contradictions of pricing for heat and electricity.

Table PKI-2-5 ELECTRICITY AND HEAT PRICES

	Item	Unit	rices by Energy I. C		Estim.sales prices (ZE PAK)			Prices of Energogaz	
			1995	1996	1994	1995	1996	1996	1997
A	Electricity								
	high-volt. consumers	PLN/ MWh	86	99	50	57	66		
	medium-v. consumers	PLN/ MWh	109	120					
	low-volt. consumer	PLN/ MWh	150	168				160	180
B	Heat								
	Produced by pub. CHP plant	PLN/ MWh	41.3	44.2	33.1	37.4	40	65.0	76.0
	Produced by pub. heat plant	PLN/ MWh	45.4	48.7					
	Produced by municipal heat plant	PLN/ MWh	60.5	65.8					

(Sources: Energy Information Center, Energogaz)

Table PKI-2-6 CASE STUDY ON HEAT-POWER COGENERATION

	Note	Unit	Condensing mode	Cogeneration mode	Exclusive heat generation mode
1	**Assumption**		A	B	C
1)	Boiler, 8Pa, 500 deg C	t/h	160	160	160
2)	Turbine extraction, 0.5MPa	t/h	0	105	-
3)	Condensing, 0.01 Mpa		full condensing	partial condensing	-
4)	Boiler efficiency	%	95	95	95
5)	Turbine efficiency incl. other loss	%	80	80	80
2	**Estimated performance**				
1)	Total heat input	MW	150.2	150.2	150.2
2)	Generated power	MW	45	31.5	0
	Efficiency for total heat input	%	30.0	21.0	0.0
3)	Generated heat	MWt	0.0	65.0	135.2
	Efficiency for total heat input	%	0.0	43.3	90.0
4)	Total heat utilized	MWt	45.0	96.5	135.2
	Efficiency for total heat input	%	30.0	64.2	90.0
5)	Heat loss	%	70.0	35.8	10.0
3	**Economic comparison**				
1)	Generated power				
a)	ZE PAK selling price basis (66PLN/MWh)	PLN/h	2,970	2,079	0
b)	Market price basis (99PLN/MWh)	PLN/h	4,455	3,119	0
2)	Generated heat				
a)	ZE PAK selling price basis (40PLN/MWh)	PLN/h	0	2,600	5,407
b)	Market price basis (65PLN/MWh)	PLN/h	0	4,225	8,787
3)	Total generated heat and power				
a)	ZE PAK selling price basis	PLN/h	2,970	4,679	5,407
b)	Market price basis	PLN/h	4,455	7,344	8,787
4)	Difference		Base	B-A	C-A
a)	ZE PAK selling price basis	PLN/h	0	1,709	2,437
b)	Market price basis	PLN/h	0	2,889	4,332

For reference, performance of Siekierki Power Stations where high rate of cogeneration is done for district heating in Warsaw is shown in Table PKI-2-7.

Table PKI-2-7 STEAM TURBINE OPERATION CONDITIONS

No.	Type of turbines	Producer	Inlet parameters		Operating mode				
					Condensation		Heating		
			Pressure	Temp.	Elect. power	Flow rate	Elect. Power	Heat	Flow rate
			Mpa	Deg. C	MW	t/h	MW	MWt	t/h
A	Konin Power Station								
TG-1		SKODA	8	500			28	65	
TG-2		Escher Wyss	8	500			50	84	
TG-4	7CK60		8	500			55	116.5	
TG-5	TK-50		8	500			45	87.5	
		Total					178	353	
		Ratio					1.00	1.98	
B	Adamow Power Station								
		ZAMEK	14	540					380
C	Siekierki Power Station (for reference)								
1	TK50	ZAMEK	9	535	50	210	47	100	231
2	TC30	ZAMEK	9	535	30	148	30	58	177
3	TC30	ZAMEK	9	535	30	148	26	81	183
4	TC30	ZAMEK	9	535	30	148	27	81	185
5	TC30	ZAMEK	9	535	30	152	27	81	185
6	13P110	ZAMEK	13	535	109	430	95	193	430
7	13UK125	ZAMEK	13	535	125	370	75	157	380
8	13P110	ZAMEK	13	535	109	430	95	193	430
9	13P110	ZAMEK	13	535	109	430	95	193	430
		Total			622	2,466	517	1,137	2,631
		Ratio			1.00	1.00	0.83	1.83	1.07
		Ratio					1.00	2.20	

Considering the above mentioned results, the performances of Konin Power Station are estimated with the following conditions:

- Case-A: a present situation estimated from the data in the 1995 ZE PAK annual book
- Case-B: increased cogeneration case described in Section 4.1, plus natural increase of district heating
- Case-C: furthermore increased case for comparison

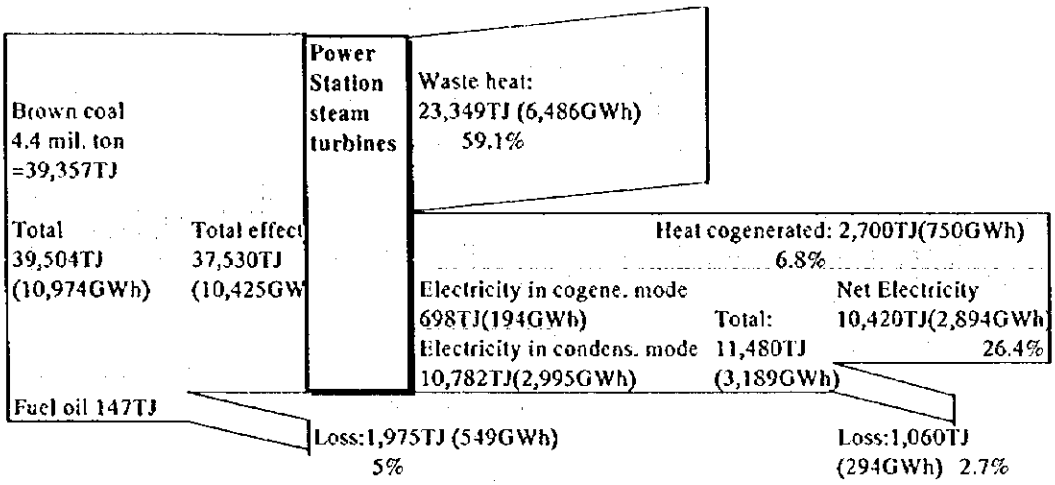
The results are shown in Table PKI-2-8. A similar improvement in heat efficiency can be expected.

Table PKI-2-8 COGENERATION HEAT BALANCE IN KONIN POWER STATION

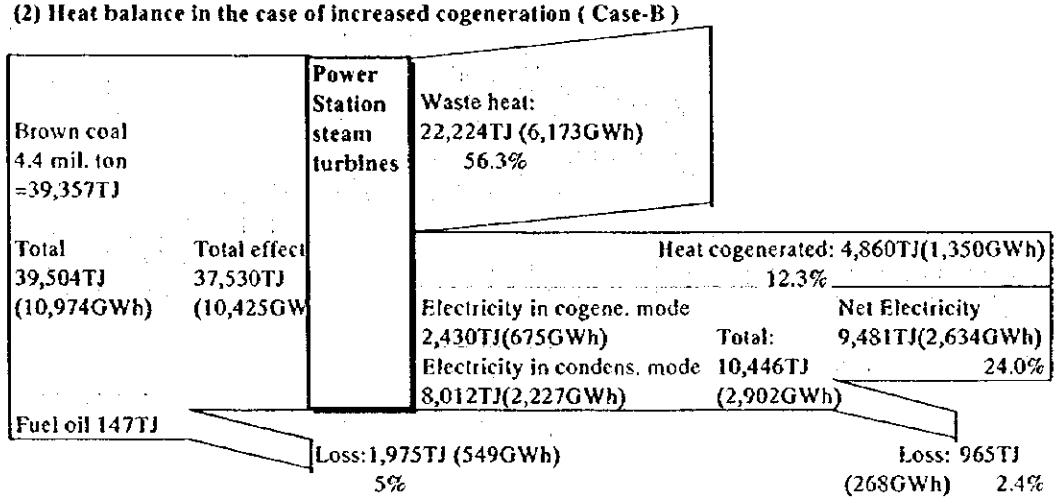
	Items	Unit	Present conditions (1995)	Increased cogeneration	Difference	More increased cogeneration	Difference
1	Heat input into boilers		Case-A	Case-B	B-A	Case-C	C-A
	Brown coal	kt	4,426	4,426	0	4,426	0
	Brown coal calory	TJ	39,358	39,358	0	39,358	0
	Other fuel	TJ	147	147	0	147	0
	Total	TJ	39,505	39,505	0	39,505	0
		GWh	10,974	10,974	0	10,974	0
	Effective heat	TJ	37,530	37,530	0	37,530	0
		GWh	10,425	10,425	0	10,425	0
	Waste heat	TJ	1,975	1,975	0	1,975	0
		GWh	549	549	0	549	0
2	Output						
	Cogenerated heat	TJ	2,700	4,860	2,160	7,000	4,300
		GWh	750	1,350	600	1,944	1,194
	Cogenerated power	TJ	698	2,430	1,732	3,500	2,802
		GWh	194	675	481	972	778
	Cogenerated heat & power	TJ	3,398	7,290	3,891	10,500	7,102
		GWh	944	2,025	1,081	2,917	1,973
	Required heat for	TJ	5,108	13,239	8,131	19,069	13,961
		GWh	1,419	3,677	2,259	5,297	3,878
	Rest heat for condensing mod.	TJ	32,421	24,291	-8,131	18,461	-13,961
		GWh	9,006	6,747	-2,259	5,128	-3,878
	Power generated by	TJ	10,782	8,016	-2,766	6,092	-4,690
		GWh	2,995	2,227	-768	1,692	-1,303
	Total power generated	TJ	11,480	10,446	-1,035	9,592	-1,888
		GWh	3,189	2,902	-287	2,664	-525
3	Output from power station				0		0
	Net electricity output	TJ	10,420	9,481	-939	8,706	-1,714
		GWh	2,894	2,634	-261	2,418	-476
	Loss in the station	TJ	1,061	965	-96	886	-174
		GWh	295	268	-27	246	-48
	Heat output	TJ	2,700	4,860	2,160	7,000	4,300
		GWh	750	1,350	600	1,944	1,194
	Total net heat & power output	TJ	13,120	14,341	1,221	15,706	2,586
		GWh	3,644	3,983	339	4,363	718
	Heat loss in water	TJ	23,349	22,224	-1,125	20,938	-2,412
		GWh	6,486	6,173	-313	5,816	-670
4	Efficency				0		0
	Goss power generation eff.	%	29.1	26.4	-2.6	24.3	-4.8
	Net power generation eff.	%	26.4	24.0	-2.4	22.0	-4.3
	Cogen. power/total gross	%	6.1	23.3	17.2	36.5	30.4
	Cogen. heat/total heat input	%	6.8	12.3	5.5	17.7	10.9
	Total heat efficiency	%	33.2	36.3	3.1	39.8	6.5
	Loss into water	%	59.1	56.3	-2.8	53.0	-6.1

The energy balance diagrams of the three cases are shown in Figure PKI-2-3.

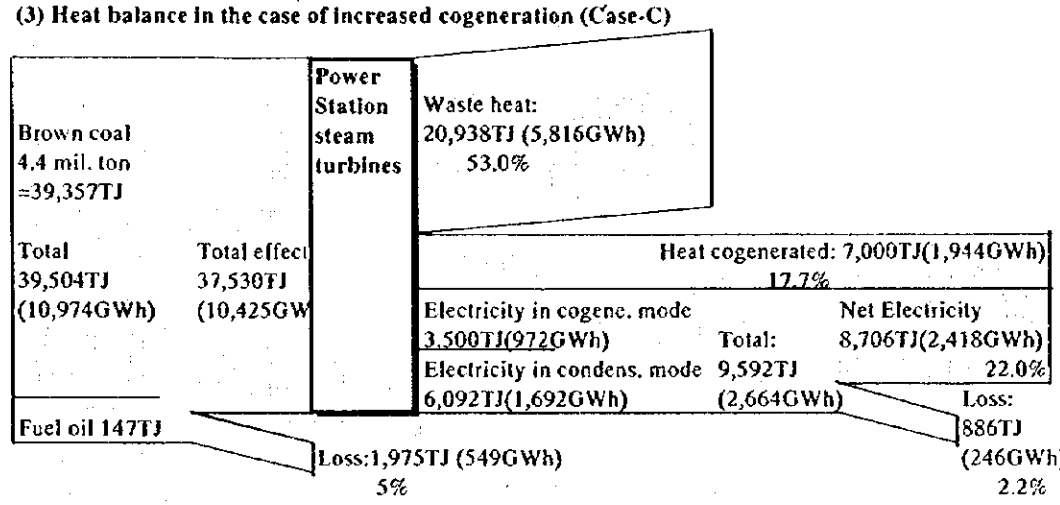
Figure PKI-2-3 KONIN POWER STATION HEAT BALANCE



(2) Heat balance in the case of increased cogeneration (Case-B)



(3) Heat balance in the case of increased cogeneration (Case-C)



The results show that 1,371TJ of heat can be recovered from heat lost into the lakes. The heat corresponds to 154,000 tons of brown coal.

7.1.2 Economic Comparison

(1) Profitability in the Power Station

Comparison is made using estimated ZE PAK selling prices and market prices for heat and power as described in Section 7.1.1 hereof. The results are shown in Table PKI-2-9.

On the estimated ZE PAK selling price basis of 1996, total revenue will increase by 6,840 thousand PLN in the case of cogeneration. Total revenue will increase by 13,260 thousand PLN on the market price basis. Since these calculations were made assuming boilers' loads were unchanged, revenue and profits can be further maximized by finding the optimum economic operation conditions.

Table PKI-2-9 ECONOMIC COMPARISON

	Items	Unit	(A) Present condition	(B) Increased cogeneration	Difference (B)-(A)	(C) Increased cogeneration	Difference (C)-(A)
1)	Generated power	GWh	2894	2634	-260	2418	-476
a)	ZE PAK selling price basis (66PLN/MWh)	kPLN	191,004	173,844	-17,160	159,588	-31,416
b)	Market price basis (99PLN/MWh)	kPLN	286,506	260,766	-25,740	239,382	-47,124
2)	Generated heat	GWh	750	1,350	600	1,944	1,194
a)	ZE PAK selling price basis (40PLN/MWh)	kPLN	30,000	54,000	24,000	77,760	47,760
b)	Market price basis (65PLN/MWh)	kPLN	48,750	87,750	39,000	126,360	77,610
3)	Total generated heat and power						
a)	ZE PAK selling price basis	kPLN	221,004	227,844	6,840	237,348	16,344
b)	Market price basis	kPLN	335,256	348,516	13,260	365,742	30,486

(2) Competition among Other Heat Sources

Comparisons of the market prices of various heat sources with associated efficiency for uses are shown in Table PKI-2-10. Presently heat is the cheapest

except coal which will become increasingly difficult to use as a heat source due to planned environmental protection. Natural gas will be a strong competitor. However, the gas price will increase as the demand increases. Although the electricity price will increase further and heat price will rise accordingly, the prices of heat and electricity will be adjusted on the basis of thermodynamic evaluation.

Table PKI-2-10 COMPARISON OF COST FOR HEATING

Items	Unit	Calorific value	Unit price	Energy price	Efficiency for use	Final heating unit cost
	A	MJ/A	PLN/A	PLN/MWh	%	PLN/MWh
Natural gas high methane	m3	34.4	0.65	68	85	80.1
Propane	m3	46.4	1.36	106	85	124.2
Coal-cobble	kg	23.0	0.30	47	65	72.1
Coal-dust	kg	20.0	0.18	32	65	49.8
Fuel oil	lit.	39.8	0.91	82	85	96.8
Electricity	kWh		0.18	210	98	214.3
Electricity-day tariff	kWh		0.23	230	98	234.7
Electricity-night tariff	kWh		0.11	110	98	112.2
Heat distribution (meter)	GJ		21.20	76	100	76.3

(Source: PGNiG, Kalisz)

7.1.3 Estimated Revenue of the Heat Park and the Greenhouse Park Companies

Estimate revenues and value added are shown in Table PKI-2-11.

Table PKI-2-11 EXPECTED REVENUE FOR THE HEAT PARK AND GREENHOUSE PARK

	Item	Unit	buy kPLN/ unit	sell kPLN/ unit	Heat Park Amount /y	Heat Park Sales kPLN/y	Greenhouse Park Amount TJ/y	Greenhouse Park Sales kPLN/y
A	Heat	TJ	14.36	16.514	1,380	22,781	199	3,283
B	Electricity	GWh	135	155.25	60	9,315	0	0
C	Industrial water	kt	0.1	0.13	2,250	293		
D	Irrigation water	kt	0.1	0.13			1,280	166
E	Waste water	kt		0.3	1,575	473		
F	Total revenue /year	kPLN/y				32,861		3,449
	Total revenue /year	kUSD/y				9,389		986
G	Value-added	kPLN/y				4,726		467
	Value-added	kUSD/y				1,350		133
A	Land	ha	100	300	50	15,000		
B	Greehouseland	ha	50	100			50	5,000
C	Total revenue	kPLN				15,000		5,000
	Total revenue	kUSD				4,286		1,429
D	Value-added	kPLN				10,000		2,500
	Value-added	kUSD				2,857		714

7.1.4 Improvement on Environmental Protection

As the use of heat is characterized as being "pollution free", the heat park will be considered environmentally friendly. This is compared with the emissions in individual heat generation in Table PKI-2-12.

Table PKI-2-12 COMPARISON OF POLLUTANT EMISSION

Items	Unit	Individual heat generation	Cogeneration in Power station
Required heat	TJ/y	2,160	2,160
Brown coal combustion	t/y	242,697	0
SO2 generated	t/y	3,883	0
CO2 generated	t/y	222,674	0

7.2 Indirect Benefit

(1) Development of Supporting Industries

Supporting industries such as maintenance, physical distribution and further-downstream industries will be developed in the district for the industries in the heat park..

(2) Raison d'etre of Brown Coal

Efficiency increase in brown coal burning will support brown coal consumption in the present streams of environmental protection.

8 Weakness of the Project

(1) Necessity of aggressive promotion of implementation body and funds for anticipatory investment

As mentioned in Section 5, it is expected that the local government and ZE PAK will become major promoter. However, ZE PAK is in the midst of privatization and modernization of the company and may not be able to afford such outside investment. Kleszczow gmina in Piotrkow Trybunalski province is the major promoter of the similar project and has been making anticipatory investment for the industrial park. Such aggressive activities are indispensable for the success of the project.

Project Design Matrix (PDM) for PKI-2 PROMOTION OF HEAT UTILIZATION INDUSTRIES

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal New business are developed with maximum utilization of the existing resources that the three key industries own.	Number and sales volume of new business enterprises related to the three key industries	Data at the registration office Data at the statistical office	
Project Purpose Industries and agriculture using heat from the power stations are developed.	Number and sales volume of companies in the heat park and greenhouse park	Data at the registration office Data at the statistical office	
Output 1. A heat industrial park is constructed. 2. Factories are constructed in the park. 3. A greenhouse park is constructed. 4. Greenhouse companies operate greenhouses. 5. A cold warehouse is constructed. 6. Heat efficiency is improved in the power stations and Konin Province as a whole.	Heat park: area, heat supplied, number and revenue of industries Greenhouse park: area, heat supplied, number and revenue of companies Cold warehouse: area, storage capacity, supplied heat Heat efficiency of the power station	Data from Heat park companies Data from Greenhouse companies Data from Cold warehouse companies Data from Power stations	The power stations supply heat and utilities consistently at favorable conditions.
Activities 1. The local self-government and ZE PAK do a feasibility study. 2. Make detailed plan for the park concerning the proposed land, infrastructure, utilities supply conditions and labor conditions, etc. 3. Propose institutional incentives 4. Do promotion activities to invite the candidates 5. Fix the candidates for the park 6. Establish the heat park and greenhouse park companies and conclude the necessary contracts 7. Purchase land and existing facilities if required 8. Conclude contract with the successful contractor 9. Start engineering and construction of the facilities 10. Hire employees and give them training 11. Support construction of the companies in the park 12. Start up the facilities and the company operation	**Input** Manpower For the heat park project: 1) Feasibility study, company establishment 5 people x 12 months 2) Engineering, construction; 5 people x18 months 3) Operation; for all projects a total of 20 employees For each project of greenhouse park and cold warehouse 1) Feasibility study, company establishment 3 people x 12 months 2) Engineering, construction; 3 people x12 months 3) Operation; for all projects a total of 27 employees Fund 1) Heat park: US$ 11,000,000 2) Greenhouse park: US$ 2,400,000 3) Cold warehouse: US$ 1,200,000 Facilities The heat park with auxiliary facilities The greenhouse park with auxiliary facilities The cold warehouse with auxiliary facilities		
			Power stations firing brown coal do not restrict operations even under further stringent environmental protection regulations such as CO2 emission control. There are investors, including foreign investors, in the park.

PKI-3 Master Plan Study for Utilization of Underground Water from Mines (KI-6)

1 Rationale of the Proposed Project

1.1 Status of Utilization of Underground Water from the Open Pits

Operation of open pit mining requires lowering the level of underground water. Once depression of the water level is created, water is no longer a danger for workers and machines. Therefore, a barrier of deep-level wells is created around the open pits and water is pumped out during the whole period of exploitation. After exploitation is finished, pumping is stopped and the water level gets back to what it was previously. The amount of water pumped out is huge.

After sedimentation, the mines pump out water from surface drainage, i.e. rainfall water and some of the underground water which is not drained by wells. This water has at least 2nd purity class and can be utilized as clean water.

The important problem which still needs to be solved is utilization of the water pumped-out from open pits. At the moment most of the water remains unused and goes to rivers and streams except the examples enumerated below. All such water could be used if it was distributed to the users and appropriate funds could be obtained.

In KWB Konin, one well (3.5m3/h) belongs to a mineral water producer and water from drainage is being utilized and will be utilized for the following purposes:

- maintaining the water level in the neighboring lakes.
- ensuring minimum biological flow in surface water canals.
- filling final reservoirs up
  a) Kazimier Poludnie; 2002
  b) Patnow; 2002 to 2022
  c) Kazimier Polnoc; 2013 to 2050
  d) Jozwin IIB; beginning from 2022
- providing water for fish ponds located on Kazimier Poludnie inner damping ground.

- maintaining the level of water in sediment ponds after shutting down the exploitation.

In KWB Adamow the following uses of the water have been made:
In order to reuse water from pits' drainage, there were attempts to store it in artificial reservoirs:

- in 1994, a reservoir was made (10ha and 600 thousand m3) on the territory of a dumping ground in Bogdatow open pit, and supplied with water from Adamow open pit surface drainage.
- since 1995, a water reservoir has been built (205ha, 5.0 mill.m3) on the territory of inside dumping ground in Adamow open pit.
- the company is planning to built a water reservoir (90ha, 9.0 mill.m3) on the territory of inside dumping ground in Wladystawow open pit.

1.2 Underground and Surface Water from KWB Konin and Adamow

1.2.1 Geological Characteristics of the Wells

Many dehydrating wells are operating in the mines, but geographical characteristics are much the same. Making reference to the dehydrating wells of Wladyslawow open pit, geological characteristics of the well are now explained. These are wells with a depth of 60 to 65 meters filtrated in water-bearing marls from the Cretaceous period. Water bearing formations, in this area, are covered with an impermeable stratum of boulder clay with the depth around 15 to 20 meters, and the impermeable formations in the wells account for 80 to 94 %, on average about 85 % of formations occurring over the marls from the Cretaceous period. Therefore, these formations create a natural screen protecting underground water against possible pollution from first water-bearing level of water exposed to the influence of agriculture, sewage-water management etc. Such hydrogeological conditions guarantee purity of water from the Cretaceous formations. Moreover, the wells have an average output of 0.9 m3/minute and have been working since 1988 with no problems. These wells can be still used after the wells are disconnected from the draining system.

1.2.2 Location, Quantities of Water and its' Qualities

Location, quantities of water and its' quality are shown in Figure PKI-3-1 and Table PKI-3-1.

Figure PKI-3-1 LOCATION OF UNDERGROUND WATER FROM THE BROWN COAL MINES

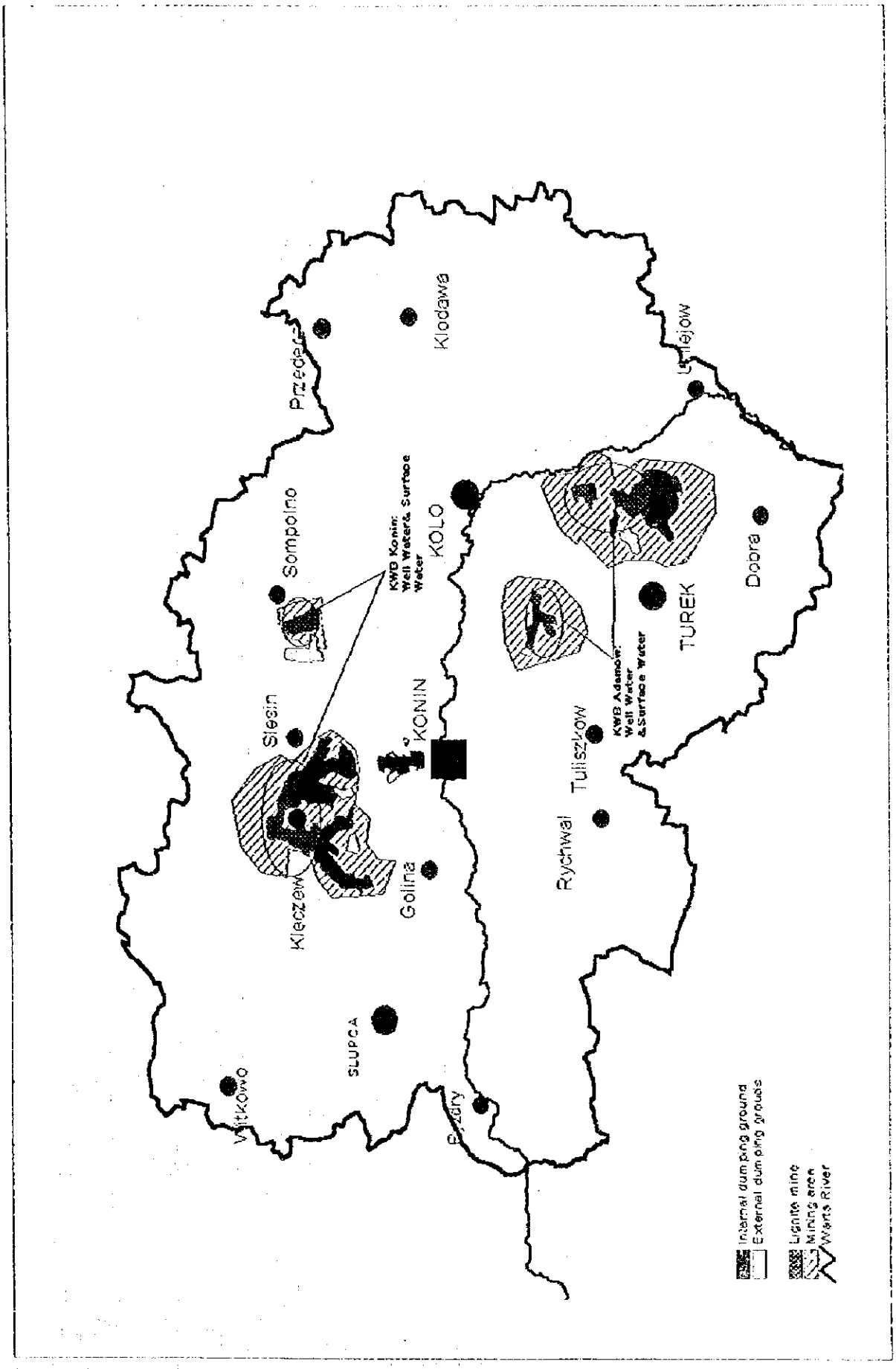


Table PKI-3-1 UNDERGROUND & SURFACE WATER FROM BROWN COAL MINES

Items	Unit	KWB Konin						KWB Adamow			
		Lubstow	Patnow	Kazimierz	Kazimierz	Jozwin IIA	Total	Adamow	Kozmin	Wladslawow	Total
Well water	m3/min.	11.2	14.7		17.1	46.7	89.7	27.2	69.3	22.7	119.2
Surface water	m3/min.	14.5	33.5	15.4	17.6	35.2	116.2	19.5	17.4	17.8	54.7
Total	m3/min.	25.7	48.2	15.4	34.7	81.9	205.9	46.7	86.7	40.5	173.9
		Well water analysis						Well water analysis			
pH		7.9	7.8								
BOD5	mgO2/dm3	1.5	1.8								
Oxygen demand	mgO2/dm3	4.3	3.9								
COD	mgO2/dm3	8.5	10.5								
Ammonia nitrogen	mgNNH4/dm	0.30	0.58								
Sulfates	mgSO4/dm3	15.0	32.0					20.0	50.8	22.6	
Chlorides	mgCl/dm3	44.0	21.0					20.0	16.8	10.6	
Nitrate nitrogen	mgNNO3/dm	0.06	-								
Phosphates	mgPO4/dm3	0.10	0.37								
General suspension	mg/dm3	5.0	4.0								
		Surface water analysis						Surface water analysis			
pH		7.8	7.9	8.0		7.8					
BOD5	mgO2/dm3	2	1.8	2.7		2.8		2.3	1.7	2.3	
Oxygen demand	mgO2/dm3	7.8	5.1	7.4		6.8					
COD	mgO2/dm3	17	14.8	16.4		15.6		26.8	22.4	25.5	
Ammonia nitrogen	mgNNH4/dm	0.26	0.22	0.31		0.47					
Sulfates	mgSO4/dm3	153.0	51.0	99.0		42.0		73.4	115.0	73.7	
Chlorides	mgCl/dm3	22.0	15.0	16.0		15.0		41.6	22.6	15.0	
Nitrate nitrogen	mgNNO3/dm	-	-	0.03		0.05					
Phosphates	mgPO4/dm3	0.12	0.37	0.16		0.41					
General suspension	mg/dm3	5.0	11.0	13.0		7.0		27.0	23.1	15.9	

(Source: KWB Konin & Adamow)

1.4 Necessity of Effective Utilization and Potential Usage of the Water

There are a lot of potentials in utilization of the water as described hereunder. The farmers in the area of the brown coal mines are relatively poor and development of the region is eagerly waited. For this purpose, the most effective utilization of the water will be one of the urgent matters to study.

1.4.1 Irrigation

At the moment a few farmers are using water from surface drainage in the area of reclaimed inner damping ground, where they have started cattle breeding. They use a portion of the water coming out of a sediment pond for irrigation and as drinking water for cattle. However, this is an extraordinary case, because location and favorable land configuration make installation of a water carrying system easy and inexpensive. There is an another case. On farmers' requests, the mine is operating two wells to supply water for upward watering of a few farms. However, the operation is useless for the mine and the mine will stop operation soon. The mine proposes that the farmers take over the well and its operation, but the farmers cannot afford it. These examples show that there is a great need for mining water in agriculture, but the farmers cannot afford to engage their own funds into the establishment of more complex irrigation systems.

Generally it is said that the required volume of water for irrigation is 1.6 m3/h/ha. If half of the water from the mines is used for irrigation, 7,100 ha of farmland will be able to be irrigated. Detailed investigation into irrigation in Konin Province is discussed in the Project AG-3 Establishment of Comprehensive Irrigation Management Systems.

1.4.2 Industrial Water

Plenty of good quality water is a potential supply source to the industries which require such high quality. Presently a small amount of water is used for mineral water and drinking water. Studies should, however, be made into ways of utilizing more of the water for mineral water and municipal drinking water. Furthermore, promotion should be carried out if any industries are interested in using it.

1.4.3 Utilization of Heat

Well water from the mines have almost a constant temperature of around 12 degrees centigrade all through the year. There are possibilities to utilize such heat. For example, it is possible to produce warm water of 45 degrees centigrade, using a heat pump in winter. Greenhouses can be operated by using the warm water. The following Table PKI-3-2 shows a summary of the case study. Using 783 m3/h (13m3/min.) of well water, about 17 ha of green houses can be heated. The electricity cost for a heat pump of 250 days/year operation will be 972 thousand PLN. Comparing a hot water system with a coal fired boiler for the greenhouse, energy cost will be 60% of the cost for coal fired boiler (on a coal-cobble basis). Estimated investment cost of a heat pump is approximately 2 million PLN.

Table PKI-3-2 CASE STUDY OF HEAT PUMP FOR UTILIZATION OF WELL WATER HEAT

Items	Unit	Specifications
Type of heat pump		Motor driven centrifugal blower type
Type of refrigerant		HCFC123
Capacity of Heat Pump	kWt	4,570
	GJ/h	16.5
Electric Motor	kW	900
Hot water temperature	deg C	inlet:40, outlet: 45
Well water temperature	deg C	inlet:12, outlet: 7
Well water required	m3/min.	13.1
Greenhouse area to be heated	ha	17.7
Electricity cost/year	PLN/y	972,000
in case of coal burning	PLN/y	1,606,298

2 Project purpose

Effective use of the water from the mines.

3 Output of the Project

(1) Master plan for utilization of underground water from the mines is established.

(2) Necessary actions are taken for implementation of the master plan.

4 Project Description

4.1 Project Scheme

The project is to establish a master plan for utilization of the water from the mines. Various investigations have been made for this purpose mainly by the mines. However, it is necessary for people in various fields and in the wider area to study this matter and establish a comprehensive master plan. The following procedures will be required :

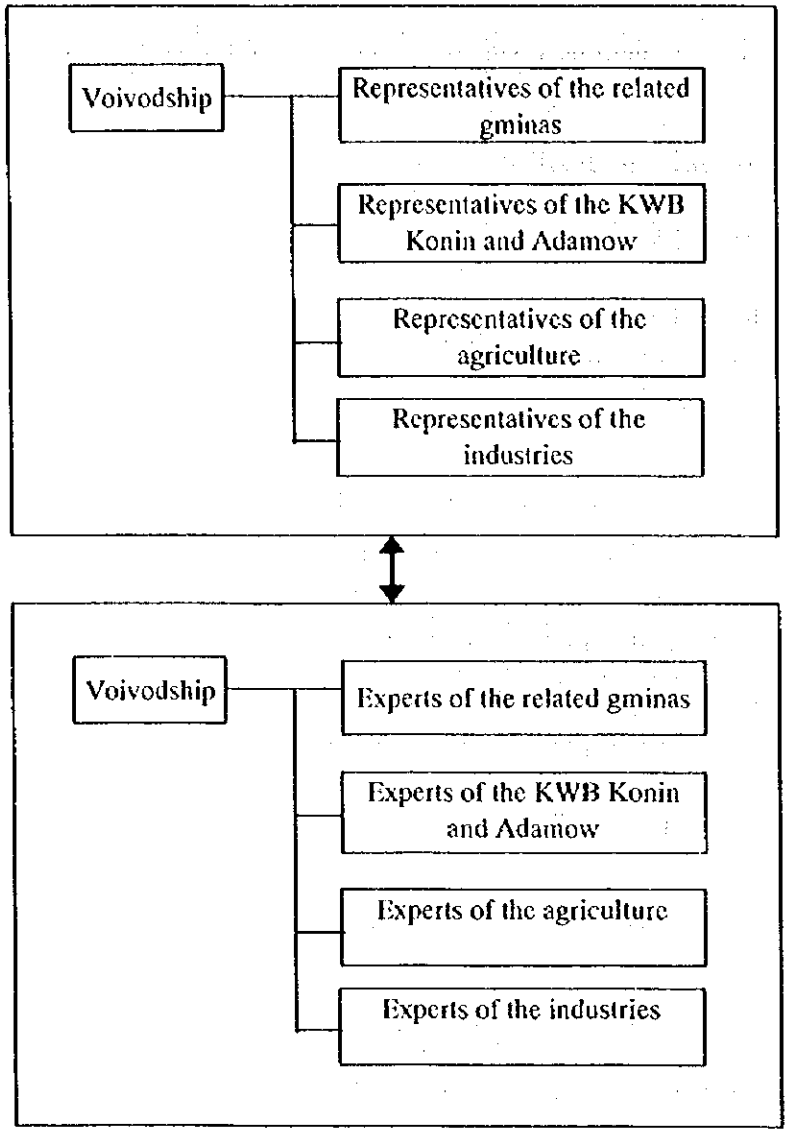
- detailed investigation of the present situation on the subject
- analysis of the present and future problems
- study of various methods of utilization
- detailed study of the prospective methods in view of the effects, investment cost, environmental impact, etc.
- selection of the projects of priority
- establishment of a comprehensive master plan

4.2 Organization and Required Manpower

The team composed of experts from various fields shall make detailed study under supervision of a supervisory committee composed of the representatives of various fields. Refer to Figure PKI-3-2.

Required manpower will be 10 people X 6 months.

Figure PKI-3-2 ORGANIZATION OF THE MASTER PLAN STUDY



4.3 Project Cost

Manpower costs : 120,000 PLN (34,300 USD)
Others : 60,000PLN (17,200 USD)
Total : 180,000PLN (51,500 USD)

4.4 Schedule

Schedule of the projects is estimated as shown in Figure PKI-3-3.

Figure PKI-3-3 SCHEDULE OF MASTER PLAN STUDY FOR UTILIZATION OF GROUND WATER

	Year	1998	1999	2000	2001	2002	2003
1	Detailed investigation of the present situations	—					
2	Analysis of the present and future problems		—				
3	Study of various methods of utilization		—				
4	Detailed study of the prospective methods		——				
5	Selection of the projects of priority		—				
6	Establishment of a master plan		∇				

5 Implementation Body and Financing Source

5.1 Implementation Body

- The Voivodship, Related local governments, KWB Konin and KWB Adamow shall form a joint study team

5.1.1 Financing Source

- The local government
- Voivodship fund for environmental protection and water management

6 Activities

(1) Detailed investigation of the present situation on the subject

(2) Analysis of the present and future problems

(3) Study of various methods of utilization

(4) Detailed study of the prospective methods in view of the effects, investment cost, environmental impact, etc.

(5) Selection of priority projects

(6) Establishment of a comprehensive master plan

7 Expected Benefits

7.1 Direct Benefits

(1) Effective use of natural resources and energy

Valuable high quality water is now not effectively utilized. Effective use of the water is helpful to save natural resources. Heat is also to be used before it is disposed of or utilized for other purpose. Then, significant cost savings will be obtained.

(2) Effects on district development

Poor districts surrounding the mines will be able to be developed by the implementation of the project.

(3) Productivity increase in agriculture

Irrigation has been required by the farmers surrounding the mines and in other areas. Construction of irrigation systems using the water will increase the productivity of agriculture in the wide area.

(4) Peaceful resolving of disputes among the brown coal mines and farmers

Good relations among the mines and farmers will be established.

7.2 Indirect Benefit

(1) Favorable effects on development of the new brown coal deposits

Present working open pits will be exhausted within 10 to 15 years. New deposits must be developed to maintain brown coal production. Successful implementation of the projects will assist such development.

8 Weakness of the Project

(1) Lack of funds for implementation of the master plan

Necessity of the project has been pointed out for a long time. Difficulties still exist to find funds for the implementation of the project.

(2) Difficulties in establishing the cooperation mechanism in the area

Lack of leadership to establish the cooperation mechanism for utilization of the water has made implementation difficult.

Project Design Matrix (PDM) for PKI-3 MASTER PLAN STUDY FOR UTILIZATION OF UNDERGROUND WATER FROM MINES

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal New businesses are developed with maximum utilization of the existing resources that the three key industries own.	Number and sales volume of new business enterprises related with the three key industries	Data at the registration office Data at the statistical office	
Project Purpose Underground water is used effectively.	Volume of the water utilized and number of entities and farmers utilizing the water in Konin Province Profits derived from the use.	Data at the registration office Data at the statistical office Calculation based on the data	
Output 1. A master plan for utilization of underground water from the mines is developed. 2. Necessary actions are taken for the implementation of the master plan.	Master plan	Master plan report at the Office of the Konin Governor	
Activities 1. Do detailed investigation on the present situation for this subject. 2. Analyze the present and future problems. 3. Study various methods of underground water utilization. 4. Do detailed study for the prospective methods in view of the effects, investment cost, environmental impact, etc. 5. Select priority projects. 6. Develop a comprehensive master plan.	**Input** Manpower Detailed investigation and planning: 10 people x 6 months Fund US$ 51,500 Facilities none		All gminas, farmers, other private sectors concerned, KWB Konin and Adamow cooperate closely on the project.
			Power stations firing brown coal do not restrict their operations even under further stringent regulations for environmental protection such as CO2 emission.

PID-1 Establishment of a One-stop Investment Service Center (ID-1)

1 Rationale of the Proposed Project

1.1 Situation of direct investment in Konin Province and Poland

Presently, companies in Konin Province are considered to be short of investment capital. In order to develop the provincial economy, people in Konin Province think that investment from outside is necessary, either from other provinces or foreign countries. However, the majority of Polish companies are considered to be short of investment capital in terms of a macro economy. Not only Konin Province but also other provinces are waiting for direct foreign investment. That is why the policy papers accepted by the government such as "Strategy for Poland" and "Package 2000" stress the roles of foreign direct investment in the development of the Polish economy.

1.2 Necessity of investment promotion at the province level

Based on the situation of direct investment in Poland, it is not plausible that the central government exclusively promotes Konin Province as a proposed destination for foreign direct investment. It is also reasonable to assume that the central institution for foreign direct investment, PAIZ, does not always give priority to the promotion of Konin Province. Therefore, Konin Province has to promote itself as a promising destination for foreign direct investment in addition to the promotion by PAIZ.

In spite of that, Konin Province currently does not have any specialized institution or system to promote and attract investment at the province level. Only some of the local self-government authorities have such functions or units at the gmina level. However, in general, the scale of each local self-government organisation is too small to carry out activities to promote and attract investment successfully in terms of both budget and staff. Consequently, investment promotion activities by each local self-government tend to be passive or reactive to walk-in investors. Such activities are not enough to attract foreign investors.

1.3 Existence of potential investors interested in Konin Province

On the other hand, foreign investors are looking for good locations for investment for their own purposes, regardless of the investment-promotion activities. Actually, Konin Province has received some inquiries from foreign investors. For instance, a Japanese automobile company is currently in contact with 12 provinces near the border with Germany, including Konin Province, to help its investment decision on Poland. The Office of the Konin Governor and the local self-government of the Konin gmina are working together to fulfil the company's questionnaire. Also, there have been several other instances of foreign investors coming to Konin Province to investigate the investment climate: A Danish transportation company negotiated with the local self-government of the Konin gmina four years ago and another foreign carton-box company recently bought land in the Konin gmina. In the case of the Danish transportation company, the deal was unfortunately not completed.

1.4 Necessity of investor support services at the province level

If there were to be a unit or section in the Konin Governor's office helping walk-in investors to find suitable locations, it may be very convenient for them. From the standpoint of foreign investors, the central ministries and agencies are the initial contact points for information on the investment climate in Poland and to select prospective locations. Next, investors go to the provinces of selected locations, as detailed information on each location is not usually available at the national level. So, a window for walk-in investors at the province level is required to serve their needs. Although some of the local self-governments may have windows or sections for investors, it is not easy for investors to locate the exact gminas suitable for investment based only on information obtained at the central agency.

1.5 Needs for establishing a one-stop investment service center

The concept of a one-stop investment service center is to provide walk-in investors with basic information and assistance for procedures all in one place. Presently, this kind of facility is not available in Konin Province. Such basic and necessary information for investment decision includes unit costs and/or prices for lands, buildings, energy, water and so forth. Investors have to visit various places to collect information by themselves. By preparing basic

information required for investment decision at one place, walk-in investors' convenience will be significantly increased.

After gleaning basic information and ideas about each location, investors start to make contact with the local self-government, potential business partners, land owners and so forth. Finding appropriate contact persons in such institutions and companies is difficult without the support of local people who know the region concerned. Therefore, an assistance service to help set up meetings is also needed by investors.

1.6 Necessity of active investment attraction at the province level

So far, the necessary services to support walk-in investors have been described. However, such support services are still only passive or reactive in either the Province or the local self-government authorities. More proactive activities to attract investment need to be introduced next to increase foreign direct investment in the Province.

Each gmina has a very limited range of locations for investors. By presenting prospective investment sites of all the gminas in a list, the attractiveness of the Province as an investment destination will be increased and this will, consequently, enhance the attractiveness of each gmina.

1.7 Investment attraction activities

Frequently-used activities to attract investors are seminars held in the target countries from which the Province wants to invite interest. Also, organizing group tours to show potential foreign investors the investment climate of the Province is effective. Preparing incentives such as tax exemption is another measure frequently used. Development of industrial parks, as the study team is proposing in other projects, is yet another valuable initiative. After all, the key to attracting potential investors is to show them enthusiasm for the task in hand.

2 Project Purpose

To attract and promote investment in Konin Province, particularly from foreign investors.

3 Output of the Project

Phase I Setting up a section in charge of investment attraction and promotion

A section in charge of investment attraction and promotion is established under Department of Economy, Transformation and Promotion in the Office of the Konin Governor.

Phase II Preparing basic information for potential investors

Basic information required for potential investors is prepared by the section.

Phase III Providing investor support services

Investor support services are available at the section's one-stop service center.

a) A booklet of basic information is provided at the center.
b) Guided tours to potential investment sites are arranged by the section.
c) Meetings with local self-government representatives, prospective business partners and other parties needed by potential investors are arranged by the section.
d) Information and documentation for registering a new company in Konin Province are available at the section.

Phase IV Carrying out investment-attraction activities

Investment attraction and promotion activities are conducted.

a) Investment promotion seminars are held in target countries.
b) Group tours are conducted to show potential investors prospective sites.

4 Project Description

4.1 Activities of the project

This project is aimed at attracting investors and promoting investment in Konin Province. The project covers the following activities:

(1) Creating a window at the one-stop service center for potential investors,
(2) Supplying basic information necessary for investment decision.
(3) Taking potential investors on guided tours to prospective investment sites.
(4) Introducing potential partners to potential investors.
(5) Arranging negotiating meetings between potential investors and the parties concerned.

(6) Preparing information and necessary application forms for registering a new company in Konin Province.
(7) Answering inquiries.
(8) Helping potential investors find necessary information other than the above basic information.
(9) Conducting investment seminars in target countries for investment promotion.
(10) Inviting foreign potential investors to the province, and showing them the investment climate of the region.

The activities above can be considered as investor support services and investment attraction and promotion. (1), (2), (3), (4), (5), (6), (7) and (8) are more investor support services, and (9) and (10) focus on investment attraction and promotion.

There are other activities and measures such as developing industrial parks, tax exemptions, preparing incentives and so forth, but all of these cannot be done by Konin Province immediately. Some activities are covered by other projects proposed by the study team, for example development of industrial parks.

4.2 Phases of the project

The activities to be covered and achieved by this project are divided into phases, proposed as follows:

(1) Phase I Setting up a section in charge of investment attraction and promotion (SIAP)
(2) Phase II Preparing basic information for potential investors
(3) Phase III Providing investor support services
(4) Phase IV Conducting investment attraction activities

Thus, phase by phase, Konin Province's investment attraction and promotion activities will be expanded.

It is unrealistic for the newly-established SIAP to cover services and activities to attract investment at the beginning and in the early phases, because there is virtually no preparation for incoming potential investors. If the province receives potential investors without preparing proper support services, it will give them a negative impression about its investment climate. Potential investors will consider that the response by the Office of the Konin Governor is

an important factor in making their decision on investment. For this reason, active investment attraction and promotion will be effective only when preparation of the activities for investor support services is completed in SIAP.

4.3 Phase I Setting up a section

It is necessary for the province to create a new section, SIAP, in the Office of the Konin Governor. SIAP will provide one-stop services for potential investors. There are other ways, such as assigning institutions such as RDA and Konin Chamber of Commerce and Industry to set up the one-stop service center. However, in terms of the influence on local self-governments and enterprises in Konin Province, these institutions are not as powerful as the Office of the Konin Governor. For potential investors, it is important such a center gives an impression of authority and reliability. Although SIAP has to ask RDA and the chamber of commerce for their support in conducting its activities, the window to the world outside should be in the Office of the Konin Governor.

In order for SIAP to provide one-stop services, networking within the province is necessary. For example, links must be developed with companies which are potential business partners for investors. To ensure a quick response to requests from potential investors, it is necessary to provide not only information about the companies but, particularly, the exact contact people in those companies. The chamber of commerce plays an important role in developing such a network. Also, the 'database of RDA's information and technology transfer center project, started last year, will be useful.

With regard to the network, strong links need to be forged between SIAP, local self-governments and local companies. Much more than an ordinary corporate directory or telephone directory, the network has to be more practical and pro-active so that SIAP can take prompt action in response to potential investors.

4.4 Phase II Preparing basic information

At the initial contacts with a one-stop service center, potential investors will expect to be provided with basic information for an investment decision. This information should be prepared and updated as documents, preferably in a

booklet, at SIAP. Included in the basic information to be featured:

(1) Laws and regulations including investment law, the tax system, social welfare system, business law, labor law and so forth,
(2) National as well as provincial statistical data on the economy, population, labor force, wages and salaries, industrial sub-sectors, production and sales by sectors, and so forth,
(3) Cost and price information, including land acquisition costs, construction and labor costs, energy costs, material costs and so forth,
(4) Incentives such as tax deduction,
(5) Corporate directories,
(6) Telephone directories, including the central government institutions and public services.

All the above information has to be translated into English and German, at least. Because accuracy is critical for potential investors, the information will need to be updated every year. Pictures and visual descriptions will be useful to describe the present situation in the province.

The preparation work for this basic information may be commissioned to RDA by SIAP. Through the preparation work, RDA staff will learn about the province's present situation in detail and such experience will be helpful for RDA to act as an agency for the Office of the Konin Governor in the next phase.

4.5 Phase III Providing investor support services

In Phase III, SIAP starts providing investor support services. Among these are:

(1) Supplying basic information necessary for investment decisions,
(2) Taking potential investors on guided tours to prospective investment sites,
(3) Introducing potential partners to potential investors,
(4) Arranging negotiating meetings between potential investors and the parties concerned,
(5) Preparing information and necessary application forms for registering a new company in Konin Province,
(6) Answering inquiries,
(7) Helping potential investors find necessary information other than the above basic information.

Some services of SIAP may be performed by RDA on behalf of SIAP. For

example, RDA may take potential investors on guided tours to the prospective investment sites, answer inquiries and help them find necessary information.

On the other hand, there are some activities which have to be performed by SIAP itself. One is the "matching service" for potential investors and prospective business partners. In this service, prospective partners are introduced to the potential investors from a list of local companies. Appointments with prospective partners have to be set promptly by SIAP on request from potential investors.

In order to discuss local privileges, the meetings between potential investors and appropriate persons in the Office of the Konin Governor, as well as local self-government representatives, are individually set by SIAP.

One additional service to be considered in the future is the information service through internet. By having a home page on the internet, SIAP can provide potential investors abroad with immediate information. The information to be listed is the basic information mentioned first above.

4.6 Phase IV Conducting investment attraction activities

In Phase IV, SIAP starts its investment attraction activities. Major activities are:

(1) Conducting investment seminars in target countries for investment promotion,

(2) Inviting foreign potential investors to the province, and showing them the investment climate of the region.

These activities are conducted in a spirit of warm hospitality to display Konin Province as a welcoming prospective investment destination. Technical transfer from foreign experts may be needed to conduct some investment attraction activities.

4.7 Organization and staff

(1) Phase I: Two staff are required to create SIAP and develop a network of local self-governments and enterprises.

(2) Phase II: Two to four staff are required to prepare documents in cooperation

with the statistical office, labor office, RDA and the chamber of commerce. In addition, English and German translators are necessary.

(3) Phase III: Two to four staff are required to provide potential investors with services in cooperation with RDA.

(4) Phase IV: Six staff are required.

4.8 Cost estimation

Estimated total cost of the project for the first 4 years is US $302,200. In this calculation, it is assumed that SIAP staff use the office equipment and machinery already in the Office of the Konin Governor. Table PID-1-1 is the breakdown of estimated costs during the first four years.

If SIAP is staffed by transfers from the current staff in the Office of the Konin Governor, a cost of US $72,000 can be saved on personnel. In addition, office rental costs, US $9,600 for four years, may be saved by using some rooms in the Office of the Konin Governor. In this case, the estimated total cost will be US $220,600.

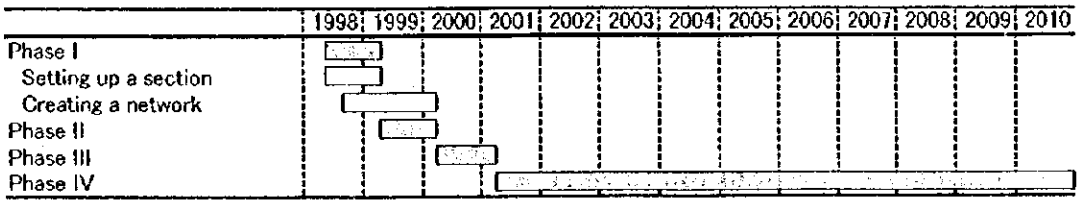
Table PID-1-1 ESTIMATED COST OF THE PROJECT

Total cost for the first four years	US$ 302,200	
(Without personnel cost and office lent	US$ 220,600)	
Phase I	US$ 16,200	
Project management cost	US$ 16,200	
Personnel cost	400 X 12 months X 2 people	= 9,600
Office	200 X 12 months	= 2,400
Local transportation cost	100 X 12 months X 2 people	= 2,400
Communication cost	100 X 12 months	= 1,200
Meeting	50 X 12 times	= 600
Phase II	US$ 87,400	
Information collection and documentation	US$ 65,650	
Procurement cost	500 X 20 reports X 2 languages	=20,000
Translation cost	100 X 20 days X 4 months X 5 people	=40,000
Printing cost	0.3 X 50 pages X 200 copies	= 3,000
Local transportation cost	100 X 12 months	= 1,200
Communication cost	100 X 12 months	= 1,200
Meeting cost	50 X 5 times	= 250
Project management cost	US$ 21,750	
Personnel cost	400 X 12 months X 3 people	=14,400
Office	200 X 12 months	= 2,400
Local transportation cost	100 X 12 months X 3 people	= 3,600
Communication cost	100 X 12 months	= 1,200
Meeting	50 X 3 times	= 150
Phase III	US$ 47,950	
Investor support services	US$ 22,600	
Local transportation cost	100 X 10 investors X 12 months	=12,000
Communication cost	10 X 5 times X 200 people	=10,000
Meeting	50 X 12 times	= 600
Project management cost	US$ 25,350	
Personnel cost	400 X 12 months X 4 people	=19,200
Office	200 X 12 months	= 2,400
Local transportation cost	100 X 12 months X 2 people	= 2,400
Communication cost	100 X 12 months	= 1,200
Meeting	50 X 3 times	= 150
Phase IV	US$ 150,650	
Investor support services	US$ 25,600	
Printing cost	0.3 X 50 pages X 200 copies	= 3,000
Local transportation cost	100 X 10 investors X 12 months	=12,000
Communication cost	10 X 5 times X 200 people	=10,000
Meeting	50 X 12 times	= 600
Investment attraction and promotion	US$ 88,900	
Investment seminars		
Air tickets	2,000 X 2 times X 4 people	=16,000
Transportation	200 X 4 times	= 800
Stay(Overseas)	100 X 3 days X 2 times X 4 people	= 2,400
Hall	2,000 X 2 days X 2 times	= 8,000
Meeting	500 X 4 times X 2 times	= 4,000
Communication cost	10 X 10 times X 2 times	= 200
Fee(Experts)	300 X 30 days X 1 person	= 9,000
Group tours		
Air tickets	4,000 X 1 times X 10 people	=40,000
Transportation	200 X 5 days X 4 cars	= 4,000
Stay(Konin)	50 X 5 days X 10 people	= 2,500
Meeting	50 X 10 times	= 500
Communication cost	10 X 5 times X 30 people	= 1,500
Project management cost	US$ 36,150	
Personnel cost	400 X 12 months X 6 people	=28,800
Office	200 X 12 months	= 2,400
Local transportation cost	100 X 12 months X 3 people	= 3,600
Communication cost	100 X 12 months	= 1,200
Meeting	50 X 3 times	= 150

4.9 Implementation schedule

Phase I may be started in 1998. However, the actual setting-up of SIAP requires a budgetary arrangement in the fiscal year 1999. Although the development of the local network in Phase I may not be completed, Phase II should be started in early 1999. After the preparation of basic documents in Phase II, periodic revisions of the information featured should be done in Phase III, starting from early 2000. After Phase IV is started in 2001, all the activities will have been implemented. (See Figure PID-1-1.)

Figure PID-1-1 AN EXAMPLE OF THE IMPLEMENTATION SCHEDULE



5 Implementation Body and Financing Source

Implementation body: the Office of the Konin Governor in cooperation with the local self-governments, the statistical office in Konin Province, the labor office in Konin Province, RDA, the chamber of commerce and local enterprises.

Source of fund: Primary fiscal budgets of Konin Province and the local self-governments with investment sites to be promoted. Funds by foreign aid will be necessary in Phase II.

6 Activities

Phase I

(1) To begin procedures to establish a new section, SIAP, within the Office of the Konin Governor.
(2) To confirm and determine the range of SIAP's activities.
(3) To make contact with local self-governments and leading enterprises in Konin Province for networking and finance.

Phase II

(1) To determine the information to be covered as "basic information."

(2) To obtain required information from the central ministries and agencies, GUS, the statistical office in Konin Province, the labor office in Konin Province and so forth.
To compile a booklet by selecting "basic" information from all the information collected.

Phase III

(1) To supply basic information to potential investors.
To provide necessary arrangements for potential investors.

Phase IV

(1) To hire experts for investment promotion activities.
(2) To conduct investment seminars abroad.
(3) To conduct group tours from target countries to Konin Province

7 Expected Benefit of the Project

7.1 Direct Benefit

Although it is difficult to estimate how many foreign direct investments will be realized, at least the following services and activities for potential investors will have been prepared and provided.

(1) A window for supporting and promoting potential investors is established in Konin Province.
(2) Documents of basic information for potential investors are prepared.
(3) One-stop services for potential investors are provided.
(4) Activities for investment attraction, including overseas seminars and group tours to Konin Province, are conducted.

In terms of job creation, direct new jobs may not be expected. However, the opportunities for new employment will be significantly increased if the intensive investment promotion activities are successful.

7.2 Indirect Benefit

(1) The name of Konin Province will be known to foreign investors.
(2) Foreign direct investment to Konin Province will be increased.
(3) New employment opportunities will be increased.
(4) Industry in Konin Province will be diversified.

8 Weakness of the Project

The fund to conduct activities and services is to be financed by the Province and local self-governments with prospective investment sites. However, the budgets of the Province and self-governments are small and limited.

Project Design Matrix (PDM) for PID-1 ESTABLISHMENT OF A ONE-STOP INVESTMENT SERVICE CENTER

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal Industry in Konin Province is diversified and invigorated.	Composition of industrial sub-sectors Number of enterprises	Data at the registration office for enterprises and the statistical office	
Project Purpose To increase foreign direct investment as well as domestic investment in Konin Province.	Volume of foreign direct investment in Konin Province	Data at the registration office for enterprises and the statistical office	
Output 1.A section doing one-stop services is established. 2.Basic information required for investors is prepared. 3.Investor support services are available at the one-stop service center. 4.Investment attraction and promotion activities are conducted.	1. Number of staff Budget 2. Contents of the information booklet 3. Number of arrangement services provided by the center Number of seminars and of group tours	1. Annual report of the project 2. Booklet 3. Annual report of the project 4. Annual report of the project	
Activities 1.1 Proceed with steps to establish a section for one-stop services in Konin Province. 1.2 Confirm and determine the range of activities available at the section. 1.3 Contact with local self-governments and leading enterprises in Konin Province for networking and finance. 2.1 Determine the information to be covered as basic information. 2.2 Obtain required information. 2.3 Compile a booklet by selecting basic information from the collected data. 3.1 Supply basic information to potential investors. 3.2 Provide necessary arrangement for potential investors. 4.1 Hire experts for investment promotion activities. 4.2 Conduct investment seminars abroad. 4.3 Conduct group tours to Konin Province from target countries.	**Input** Manpower Full time staff: 2 to 6 persons (phase by phase) Translators : 5 persons X 4months Experts : 1 person X 1month Fund Phase I : US$ 16,200 Phase II : US$ 87,400 Phase III : US$ 47,950 Phase IV : US$ 150,650 Including : Project management cost Information preparation and documentation cost Traveling cost Fees for experts etc. Facilities Office for the one-stop service center		

PID-2 Construction of a Konin Woodworking Industrial Park (ID-2)

1. Rationale of the Proposed Project

1.1 Woodwork & Furniture Industry in Poland

Today Poland's woodwork and furniture industry is one of its major industries accounting for about 3% of the GNP. The exports of woodwork and furniture products amounted, in 1995, to some US $2 billion, or 9% of Poland's total exports. It is said there are about 50,000 woodwork and furniture enterprises in the country. However, most are proprietorships or very small businesses, and the market is largely occupied by some 3,000 medium and large-scale enterprises. The individual sub-sections can be characterized as follows:

(1) Sawmill industry

This sub-section contains about 1,000 major enterprises: About 200 of them are large operations formerly managed by the state. Total sales for 1995 were US $612 million. The most urgent requirement in the sawmill industry is the mechanization of factory operations. Prices of material wood (raw timber) produced in Poland are drawing near EU levels while the quality is deteriorating, so this sub-section is declining in international competitiveness. Besides, in view of growing domestic demand and the need to protect the domestic forests, it is expected that imports of material wood and sawn wood from Russia and Byelorussia will increase in the near future.

(2) Wood-based panels industry

This sub-section contains about 20 major enterprises, 12 of which have already been privatized. Total sales for 1995 were US $648 million. As in many other countries of the world, this sub-section in Poland is expected to experience a dramatic increase in demand for wood-based panels as substitutes for sawn wood and plywood (for both furniture and wooden building materials) in the future. Already, a sharp increase in demand has forced Poland to import certain types of wood-based panels. The new investors in this sub-section include Austria's KEINDE A.G--the biggest manufacturer of wood-based panels in Europe.

(3) Furniture industry

This sub-section contains about 1,700 major enterprises. Total sales for 1995 were US $1,728 million. In the whole woodwork and furniture industry, this sub-section is being privatized at the greatest pace. However, several big enterprises still remain in the hands of the state. During 1970-1980, central government embarked on a major thrust to provide new housing and it consequently invested heavily to foster the furniture industry. As a result, the technical strength of the industry was improved. Since it still maintains respectable international competitiveness, it is one of Poland's major export industries. The current problems are how to cope with the diversification of raw materials for woodwork and how to reinforce the competitiveness of small and medium-scale furniture manufacturers.

1.2 Woodwork & Furniture Industry in Konin Province

At the end of 1996, Konin Province had 318 registered woodwork/furniture enterprises. One third are regarded as woodworking operations. Woodwork and furniture form the third largest industry in the Province in terms of registered enterprises, next to textiles and food processing. However, both sales and the number of employees are small relative to the number of enterprises. This is shown by the results of the questionnaire survey: 92% of the respondent enterprises in this industry have no more than 50 employees while 51% have no more than five. Thus, one of the characteristics of Konin Province's woodwork and furniture industry is that there are many small enterprises managed by private capital.

Distribution: The largest number of woodwork and furniture enterprises are in Konin Gmina. However, taking the distribution of population into account, the greatest concentration of woodworking enterprises is in the Slupca region, especially in Pyzdry Gmina. This gmina, a forest area, contains the Province's largest sawmill, managed by the major domestic sawmilling enterprise WITAR. It has a production capacity of 12,000 m3/year - yet it is the smallest of WITAR's 22 sawmills.

1.3 Supply-Demand Trends of Woodwork Materials in Poland

In Poland, 94% of the forests are controlled by the State Forest Authority (SFA).

The SFA has 17 regional units throughout the country, further divided into 432 district units. For 80% of the material wood distributed on the domestic market, the SFA controls the wholesale price and buyers. It is said that the price of domestically-produced material wood is close to the price set by the EU. In recent years, 10 million cubic meters of material wood (including a fallen tree) have been shipped annually. According to the SFA, the volume of shipment will remain unchanged for the coming 10 years.

Table PID-2-1 PRODUCTION AND CONSUMPTION OF WOOD PRODUCTS

Unit: thousand m3

Products	Production		Consumption	
	1994	1995	1995	per capita(m3)
Sawnwood	5300	5650	4633	0.12
Veneer sheets	12	12	n.a.	n.a.
Flooring	5642	5308	n.a.	n.a.
Sleepers	28	30	n.a.	n.a.
Particleboard	1335	1467	1720	0.045
Fiberboard	500	627	380	0.01
hardboard	315	295	n.a.	n.a.
insulating board	170	186	n.a.	n.a.
MDF	15	146	n.a.	n.a.
Plywood	113	105	63	0.002
Furniture (USD bln)	1.2	1.8	0.636	0.016

Source: Polish Agency for Foreign Investment,

Table PID2-1 shows the production and consumption of main wood products in Poland during 1995. At a glance, consumption volume is less than production. However, some wood materials are used in other wood-based products not shown here, so the real volume of consumption is not clear.

Domestic analyses by the Institute of Wood Technology in Poznan show that the demand for wood use may be met by domestic supplies until the year 2000. Afterwards, increased imports will have to be reckoned with. According to this forecast, the total production of sawn wood will increase in Poland to 7 million cu.m. in the year 2010. The ratio increase for particleboard is expected to be higher than for other wood products.

In another analyses by the Polish Agency for Foreign Investment (PAIZ), the per capita consumption of wood products in Poland for 1994 was only about 70% of

the EU level. However, with the improvement in living standards and a change in lifestyles, the consumption of wood products in Poland will be sure to increase in the future. Most growth will be in the traditional sphere of furniture and in the new field of building materials (roofing, flooring, precut, etc.). This is not only because of the growing domestic demand for housing construction but also because Poland's comparative advantage based on its technical strength in this field is expected to last for some time.

Imports of wood products in recent years are shown in Table PID-2. Up until the late 1980s, domestic demand had been met mostly by domestically-produced material wood. Since then, with the increase in furniture production and the diversification of raw materials, imports of wood products as raw materials have been increasing. Especially, import of particleboard has been increasing remarkably in recent years.

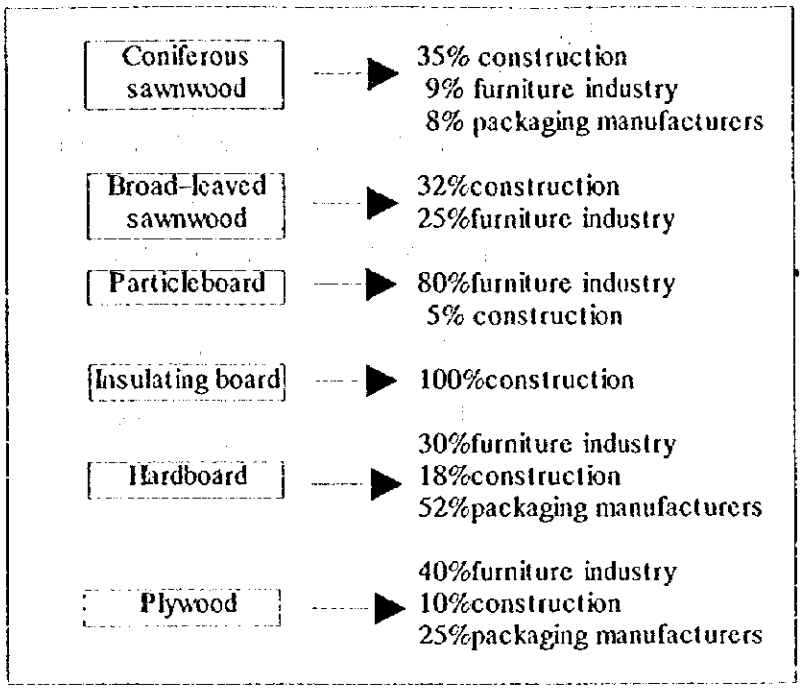
Table PID-2-2 IMPORT OF WOOD PRODUCTS

Unit: thousand m3

Products	1989	1995	1996	Import Share in Production
Sawnwood	119	127	214	4%
Particleboard	105	210	325	19%
Fiberboard	76	30	62	9%
hardboard	76	15	21	7%
MDF	–	15	41	16%
Plywood	53	38	30	27%
Wood-working (Mlzl.)	n.a.	26	46	1%
Furniture (Million zl.)	2.2	359	518	10%

Source: The Marketing Center of Wood and Furniture

The estimated structure of purchasers of basic wood products in Poland looks as follows (estimated portion only):

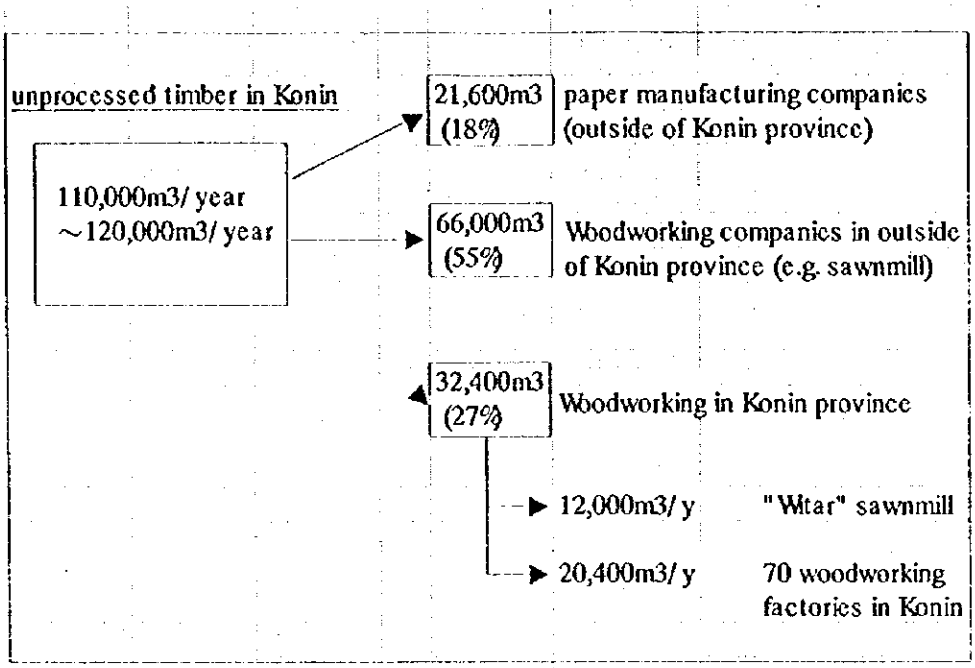


Source: Polish Agency for Foreign Investment

1.4 Supply-Demand of Woodwork Material in Konin Province

In Konin Province, state-owned forests cover a total area of about 50,000 ha. Tree-cutting and selling are controlled by the four district units of the SFA (in Konin, Turek, Kolo and Grodziec) under the Regional State Forest Authority of Poznan. The 1996 sales volume in the Province was 112,000 m3. For the past few years, the annual sales volume has been 110,000 m3 to 120,000 m3. According to Konin District Unit of SFA, the sales volume will remain almost unchanged for the next 10 years. Eighty percent of the forest trees cut are pines, the rest being oaks, beech, etc. The trees are of average quality, though rather inferior to those produced in the north-eastern part of the country.

The four district units of SFA ship about 15%-20% of their material wood to paper-manufacturing enterprises and the remainder to sawmills, wood panels and furniture manufacturers. But about 70% of the whole material wood, including the supply for paper manufacturing, is shipped outside Konin Province, as most of the Province's sawmills and furniture are small-scale. There is no production of particleboard, fiberboard, plywood, etc. in Konin Province, and the only wood products produced are veneer sheets and hardboard for furniture surfacing. Major buyer categories of unprocessed timber from Konin can be estimated as follows:



In Konin Province, there are many furniture manufacturers, though they are small in scale. However, since the sawmill and wood-based panels industries in the Province are still immature, those furniture manufacturers procure most of their materials from outside the Province. Most manufacturers have no more than five suppliers and produce furniture in few types of materials. Poznan and Swarzedz area are major suppliers to Konin Province. These areas, which are about 100 km away from Konin, each form a large woodwork and furniture production center. It is said that about 35% of the sawn wood and wood-based panels used in the country are produced in these areas.

1.5 Problems in Woodwork & Furniture Industry

The present problems in fostering the woodwork and furniture industry in Poland and Konin Province can be summarized as follows:

In the whole country

(1) Funds for mechanization in manufacturing plants are insufficient, though much further mechanization is needed.
(2) Domestic supplies of particleboard and medium density fiberboard (MDF),

the principal raw materials for furniture, are insufficient.

(3) The present wood-drying process requires more advanced equipment and technology.

(4) Small and medium-scale enterprises need further mechanization and rationalization of their manufacturing operations and improvement of their working environment.

Irrespective of these problems, production of furniture in Poland is competitive as compared with production in the European Union. Materials (55%) and salaries (20-25%) are the major cost factors. But because of the much lower comparative salary level and high degree of furniture craftsmanship developed in Poland, the industry has a competitive advantage over production costs in the rest of Europe. What the Polish woodwork and furniture industry needs to do is to modernize factories and produce new wood-based materials such as the engineering woods.

In Konin Province

(1) Absence of manufacture of wood-based products.

The capacity of existing sawmill factories in the province is small, except for "WITAR" in Pyzdry. Moreover, the Province virtually has no manufacture of wood-based panels.

(2) Dependence on outside provinces for supply of material wood.

Most furniture manufacturers in the Province are small in scale and, as an inevitable consequence of (1) above, they have to purchase most of their materials from outside the Province.

(3) Lack of management resources at small-scale enterprises

Most manufacturers consider that expanding outlets for their products and improving their level of technology are the most important management problems. (The results of the questionnaire survey show that the proportion of enterprises in this industry feeling a "lack of reliable business partner" is larger than that in any other industry. Apparently, this suggests their consciousness of the above problems.)

The business trends of woodwork and furniture produced in the Province are

similar to those in Poland as a whole. There is a sizeable demand for wood products used in the manufacture of furniture and wooden building materials, and this is expected to rise in the future. The actual strength (in figures) of the local market (Konin Province) is not clear, but there are about 250 manufacturers without sawmills and they have had to purchase materials from outside the Province so far. In practical terms, this number is not so small.

Total sales by these 250 enterprises are estimated at about 200million PLN, on the assumption of 800,000PLN sales per enterprise. This 200million PLN accounts for only 2.4% total sales of the whole wood-based panels and furniture industries in Poland. If the material costs account for 50 % of sales revenue, there is a market for wood materials of about 100million PLN (about US$28.6million).

In conclusion, it is necessary to develop the local wood-based products industry, not only to enable expansion of the local woodwork and furniture industry but also to diversify Konin's industries generally. If Konin Province promotes and establishes a large-scale supply base for engineering woods, the Province can be in the forefront of the wood-based panel industry in Poland.

2. Project Purpose

To promote Konin brand woodworking products in the country using local wood resources.

3. Output of the Project

1) An industrial area for woodworking (called "Konin Woodworking Park") to be developed.
2) Factories for woodworking such as sawmill, pre-cutting and wood panel industries to be constructed.
3) Furniture industries invited to the area.
4) Local furniture industry to utilize locally- produced wood materials.
5) New type of wood-based materials supplied to the domestic market from the woodworking industrial park.

4. Project Description

The development of a woodworking industrial park project can be divided into

three phases as an initial plan:

Phase I: Preparation of industrial site and invitations to sawmill, pre-cutting and wood-based panel process enterprises.
Phase II: Invitations and development of furniture enterprises
Phase III: Final stage of site development by constructing common facilities for marketing activities (such as a products pavilion).

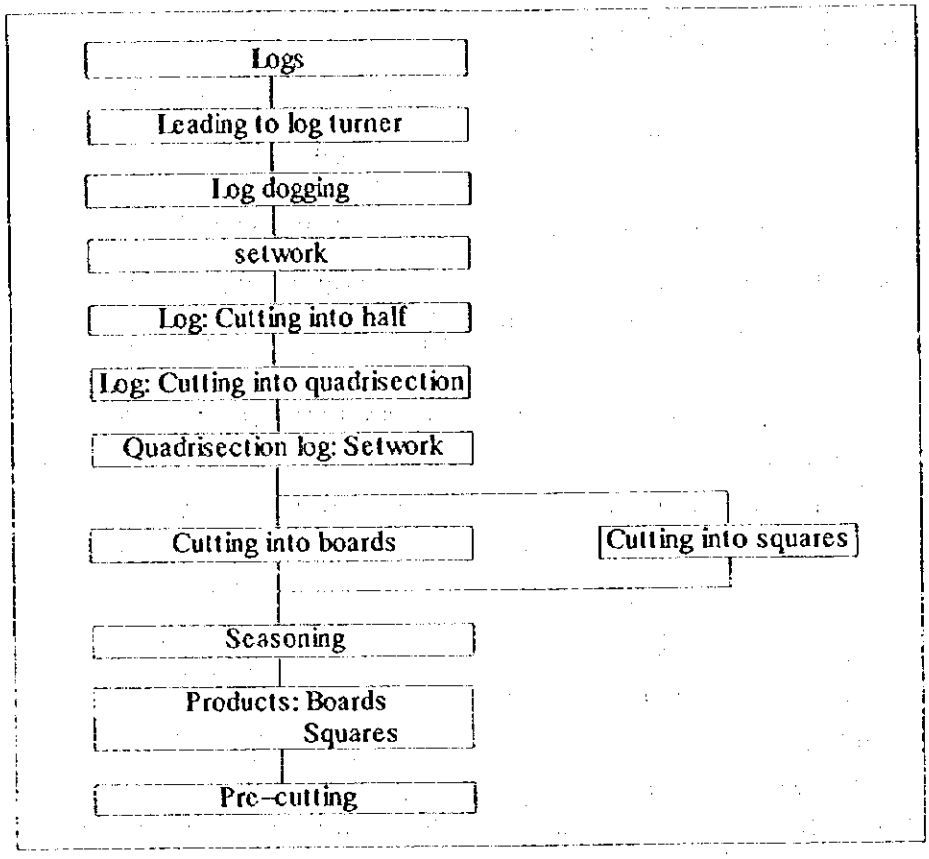
In view of the present circumstances in Konin Province, it is expected that many difficulties will be faced in order carry out this plan. But it may not be difficult to find local investors. The Team therefore recommends that, as a realistic method of implementation, construction of wood-processing factories, from sawmills up to wood drying and pre-cutting, is firstly undertaken in order to meet local demand and also to utilize Konin's natural advantages (e.g. geographical location, heat energy for drying process). After that, implementation of other project components will be undertaken one by one. The following project description describes only a part of the construction of factories up to the pre-cutting process as the first component of Phase I. An outline of the construction of a particleboard factory is mentioned in reference to the future development of the project.

4.1 Construction of Sawmill Plant

(1) Outline of Plant and Process Description

The plant referred to hereafter is one which would operate sawing on a medium scale, attaining the highest efficiency equipped with modern machines. The plant would produce inch-board, furniture wood, and flooring board. Production capacity: 1,500m3 of logs per month (8 hours/day). Yield: Around 65%. If the plant is combined with production facilities for by-products to recover chips from wood waste - the materials for fiberboard and particle board (a plant for these products will be constructed in the later stage of the project) - the total yield of products in the mill will be higher.

The lumbering process, in simple terms, consists of sawing a chunk of log a number of times to obtain lumber or square timber of the desired dimensions. The process flow for a sawmill is as follows:



With the operation of this plant, a multiple-sawing system to meet various wood conditions can be obtained in Poland. Furthermore, no special skill or technique is required for operation. As all processes are semi-automatic through hydraulic and pneumatic pressure or electric devices, safe and accurate operation by remote control can be carried out simply by pushing a button.

(2) Required Area for Plant Site

Some 1,500m2 area required for log storage, 1,500m2 for storage of products and 2,000m2 for plant and office, totalling at least 5,000m2. If possible, another 2,000m2 area as reserve yard is recommended.

(3) Required Employees and Utility

The operation hours are 8 hours/day (2 shifts), or 280 days/year with a plant capacity of 62m3/day.

The monthly requirements of logs, subsidiary materials and utilities are:

Log 1,500m3 (price of logs is around US $2060/m3)

Electricity 25,000kWh (US $ 0.07/kWh)

Employees 22 persons including 3 office workers (average salary is US $300/person)

(4) Project Cost for Sawmill Plant

- Land Acquisition and Preparation Cost (for 7,000m2, $2.85/m2)	US $19,950
- Construction and engineering cost $430/m2 x 2000m2 (factory/office) $200/m2 x 3000m2 (warehouses)	US $1,460,000
- Machinery and equipment Cost	US $640,000

Sawmill machinery

1,200 mm Log bandmill	1
1,000 mm Auto-feed carriage	1
1,100 mm Log bandmill	1
900 mm Auto log carriage	1
Cross-cut saw	1
Table band resaw	3

Saw filing equipment

Large band saw sharpener	1
Medium band saw sharpener	2
Circular saw sharpener	2
Large band saw stretcher	1

Conveying eqipment

Log rail	1
Chain live deck	2
Log stopper	1
Chain loader	2
Deck flipper	2
Live rolls	2
Chain trip skid	1
Lumber stopper	1
Live rolls w/skid	2

- Initial Working Capital	US $205,050
Log $40/m3 x 1500m3 x 3months =	$180,000
Electricity $0.07/kWh x 25,000kWh x 3months =	$5,250
Employees $300 x 22 x 3months =	$19,800
Total Project Cost	**US $2,325,000**

(5) Sales Revenue

Sawmill $65/m3 x 62m3/day x 280 days =	$1,128,400
Wood chips & waste $15/m3 x 3600m3/year =	$54,000
Total Sales Revenue per year	**US $1,182,400**

4.2 Construction of Wood Seasoning Plant

(1) Outline of Plant and Process description

One of the important requirements in the manufacture of wood-based products is the wood drying process. Especially, the first drying process for timber is regarded as critical to enable further manufacturing, no matter what type of wood products are produced. This first drying process is called seasoning and is different from other drying processes. Seasoning methods can be, roughly, either natural or artificial, and this project component is the construction of an artificial seasoning plant by using heat energy from the power plant.

This seasoning plant is constructed together with the above mentioned sawmill plant. Seasoning capacity of the plant is 500m3 per month. The production of 6,000m3/year of seasoning wood can be consumed within Konin province. The process means that one third of cut timber (of the desired dimensions by the furniture industry) is carried from the sawmill to this plant and dried by a roller dryer, composed of a heating chamber and roller conveyors with hot air circulating. Two heating chambers and a surface hardener will be installed. Drying capacity of a heating chamber is 100m3 per 2 weeks.

(2) Required Area for Plant Site

Some 1,500m2 area for plant and office and 500m2 for storage of products with umbrella roof: Totalling at least 2,000m2.

(3) Required Employees and Utility

Cutting chips 500m3/month (price of wood chips is about US $1318)
(Heat energy) 50,000kWh/month (Estimation in conversion of using electricity, price of heat is about US $0.025/kWh)
Employment 10 (One chamber for three shifts, average salary is US $300/person/month)

(4) Project Cost for Wood Seasoning Plant

Land Acquisition Cost	US $5,700
$2.85/m2 x 2,000m2	
Construction and Engineering Cost	US $550,000
$300/m2 x 1,500m2	
$200/m2 x 500m2	
Machinery and Equipment Cost	US $300,000
Drying chambers	2
Surface hardening	1
Side planning	1
Other equipment	
Vehicles, folk lift trucks	1
Initial Working Capital	US $35,250
Cutting chips $15/m3 x 500m3/month x 3months	
Energy $0.025kWh x 50,000kWh x 3months	
Employment $300 x 10 x 3months	
Total Project Cost	US $890,950

(5) Sales Revenue

$80/m3 x 250m3/month x 12 = $240,000
(including seasoning and pre-cutting)
$10/m3 x 250m3/month x 12 = $30,000

(consignment fee for seasoning only)

Total Sales Revenue	US $270,000

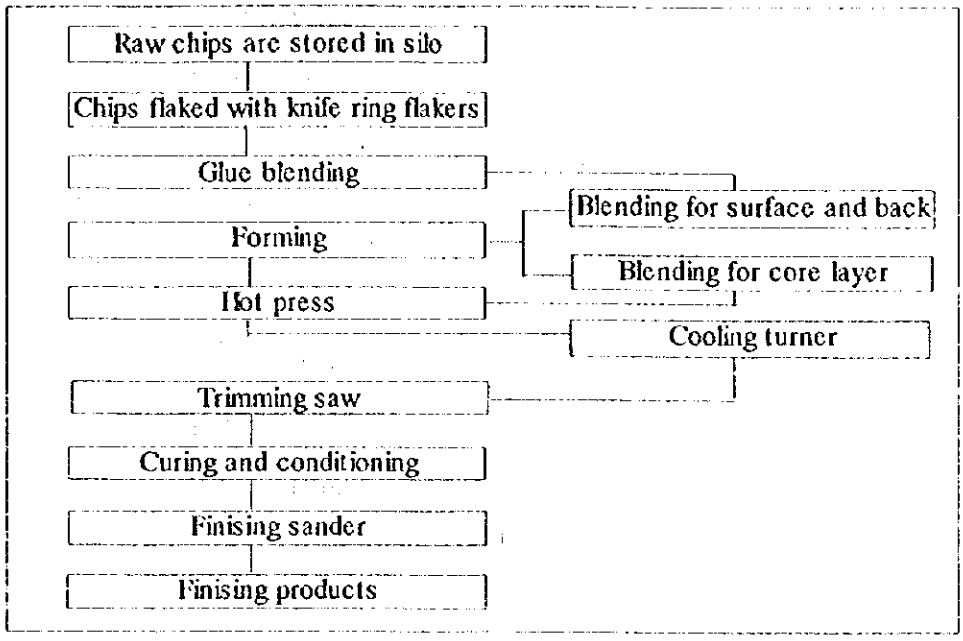
4.3 Particleboard Plant

(1) Outline of Plant and Process Description

Particleboard is now a very important wood-based material, used widely in place of expensive plywood and other wooden structural materials to produce the top, side, front and shelf panels of furniture. Moreover, a particleboard plant utilizes wood chips and waste materials generated by timber felling, so it is regarded as eco-oriented. Therefore, construction of a particleboard plant in the planned woodworking park is recommended.

The monthly production capacity planned is 3,000 - 4,000tons (boards with average density of 0.7 g/cm2). The product will be supplied to the Polish domestic market, including Konin. The main systems and equipment for manufacturing particleboard are imported from Germany and Austria. Central to these systems are the forming machines, opening hot presses, glue supply line and related equipment, which are all controlled by computers.

The manufacturing of particleboard is largely a heating process, aside from a press for continuous forming. It is absolutely essential that the heating plant has a large cross-section to harden the bonding agent efficiently and speedily. As for the heating system, it is necessary to select the optimum energy source--electricity, steam, etc. In Poland, electricity has been used in the past because it is readily available. However, it is widely known that steam offers better diffusibility and stability in the bonding and forming processes. From this point of view, siting the plant near a power station can be an advantage. The manufacturing process of particleboard is as follows:



(2) Required Area for Plant Site

Some 3,000m2 for plant and office and another 1,000m2 for storage

(3) Required Employees and Utility

The operation hours are 8 hours/day (3 shifts), 24-hr working system
Employment 60 persons including office workers
Electricity and Heat energy

(4) Project Cost for Particleboard Plant

Land Acquisition Cost	US $11,400
Construction and Engineering Cost	US $900,000
Machinery and Equipment Cost	US $1,500,000
Initial Working Capital	US$
Total Project Cost	about US $3.03.3million

(5) Sales Revenue

$160/m3 x 1500m3/month x 12 =	US $2,880,000

5. Implementation Body and Financing Source

Primarily private sector, assisted by public sector.
A nucleus body of the project will be established to promote site preparation (mainly a communal area) and investment. The main constituent (shareholder) of this company will be local self-government, investing local money in the company. Land preparation itself will be done by investors in cooperation with the above company within the area where investors purchased. Apart from this company, a cooperative will be established by woodworking and furniture enterprises in the final stage (Phase III).

It is recommended that, during implementation of the project, close cooperation is maintained with the following institutions:

- The Polish Chamber of Timber Industry (Poznan)
- Association of Wood-based Panel Industry (Czarna Woda)
- Institute of Wood Technology (Poznan)

6. Activities

1) Around 40ha estate prepared in total and developed phase by phase.
   a. Local self-government prepare proper site and develop 5ha area for the first component of Phase I.
   b. Local self-government promote investment not only for the first component but also for other components requiring investment later.

2) Sawmill, pre-cutting and wood-based panel process (factories) developed in the planned area (Phase I, around 20ha).
   a. Basic infrastructure inside and outside site is prepared (including heat supplying system).
   b. A sawmill plant is constructed (7,000m2).
   c. A wood seasoning plant is constructed (2,000m2).
   d. Other wood panel industries are developed on the site.

3) Furniture industries are developed (Phase II, around 10ha).
   a. Land preparation

b. Plant construction

4) Common facilities for marketing are developed in the planned area (Phase III, around 10ha).

a. Land preparation
b. Association of Konin Woodworking is organized in the form of a cooperative.
c. Common facilities are developed by the association.

Implementation schedule of the project is as follows:

	Phase I			Phase II			Phase III		
	1999	2000	2001	2002	2003	2004	2005	2006	2007
Activities 1) – a									
1) – b									
2) – a									
2) – b									
2) – c									
2) – d									
3) – a									
3) – b									
4) – a									
4) – b									
4) – c									

7. Expected Benefit of the Project

Direct benefit

1) Encouragement of sawmilling and woodworking industries into the Province

Diversification of woodwork and furniture industry. Users of wooden materials in Konin province can obtain materials locally.

2) Around 500~600 employment is created in the final stage.

This is the estimated figure when development of a woodworking park is completed in Phase III. However, the estimated employment figure for the first component of the project, outlined above, is about 80.

3) Reduction of woodworking cost

Utilizing wasted heat energy from a power station, instead of electricity

energy. The price of heat energy is one-third of electricity in Poland.

Indirect benefit

1) Effective utilization of power station waste heat, as mentioned above.

   By locating the industry in the vicinity of the power station in the Province, the waste heat from the power station can be put to valuable use for drying or heating the woodworking.

8. Weakness of the Project

Potential investors might come from outside the Province: Therefore the promotion of investment is a key element for the materialization of the project.

Project Design Matrix (PDM) for PID-2 CONSTRUCTION OF A KONIN WOODWORKING INDUSTRIAL PARK

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal Industry in Konin Province is diversified and invigorated.	Composition of industrial sub-sectors Number of enterprises	Data at the registration office for enterprises and the statistical office	
Project Purpose Woodworking industries and Konin brand woodworking products are promoted.	Production growth rate and total sales volume and revenue of local woodworking manufactures	Data at the statistical office	
Output 1. An industrial area for woodworking is planned and developed. 2. Investments in sawmill, pre-cutting and wood panel industries are implemented and operations are started. 3. Investments in the furniture industries are implemented and operations are started. 4. Local furniture industry can utilize the locally produced wood materials. 5. New types of wood based materials are supplied to the domestic market.	1. Progress of the industrial park to be developed 2. Number of investors in the industrial park 3. Number of investors in the industrial park 4. Customers of the enterprises in the industrial park 5. Products produced by the enterprises in the industrial park	1. Site visit and annual report of the industrial park 2. Data at the registration office and annual report of the industrial park 3. Data at the registration office and annual report of the industrial park 4. Annual report of each enterprise in the industrial park 5. Annual report of each enterprise in the industrial park	
Activities 1. Prepare and develop around 40 ha estate for attracting potential investors. 2. Develop sawmill, pre-cutting and wood-based panel processes (factories) in the planned area. (Phase I) 3. Develop furniture industries. (Phase II) 4. Develop common facilities for marketing in the planned area. (Phase III)	**Input** Manpower 1. No. of workers : 500-600 (in the final stage) 2. Consultants/Experts (timely) Finance 1. Total investment: US$ 80million (until the year 2007) 2. Operating costs are unknown		**Pre-conditions** 1. Steam for woodwork production is available at cheaper prices. 2. Sales volume of raw wood in the province remains at the same level as present.

PID-3 Establishment of SMEs Support System (ID-4, ID-6, ID-7, ID-8)

1 Rationale of the Proposed Project

1.1 Top managers' visions and strategies in SMEs

Presently, many managers of SMEs in Konin Province are not aware of what they need for improving their companies. Although they are aware of the importance of introducing advanced technologies into their companies, they tend not to consider the significance of (1)having visions and policies of their companies in the competitive market economy and (2)building their organizational and institutional bases to foster improvment. In fact, the success of SMEs operation highly depends on the capability of top management including how to set corporate strategy and how to integrate each employee's effort into a unified direction in the enterprise concerned. SMEs cannot expand or grow beyond the visions of their top management. Therefore, to be competitive, top managers of SMEs have to be informed of and exposed to advanced corporate management in other parts of the world. Based on results of interviews conducted with top managers of enterprises in Konin Province, there are few enterprises which have these clear corporate visions and strategies.

1.2 Need for business foundations in SMEs

SMEs in Konin Province do not have secure business foundations in terms of corporate management and production. A business foundation means an organizational and institutional base built on a policy of how to organize and improve a company or factory. In other words, it is a corporate infrastructure, needed for conducting sound corporate activities, based on an understanding of mechanisms for improving productivity. Such a corporate infrastructure includes (1)corporate directions(management plans), (2)reliable, objective and tangible data about business operations, (3)employees' participation in the improvement of corporate activities and so forth.

The interview results with employees of three large enterprises in Konin Province indicated that the management plan and problems of each enterprise are not shared within the enterprise concerned. Some employees clearly mentioned that problems of the company were not their concerns but their

managers'. In terms of improving productivity in each interviewee's work, employees replied that there was room for improvement. However, they do not consider it necessary to improve their productivity without being ordered by their superiors to do so.

Without management objectives or targets, a company cannot be well managed because it has no reference point in terms of reviewing its business performance. Without "objective and tangible data," discussions about improving corporate activities lead to solutions based on managers' "perceptions" about the corporate activities. Without the participation of employees in improvement activities, top managers cannot implement any plans for productivity improvement. Therefore, building a business foundation in a company is a requirement for the company to conduct its business before considering introduction of advanced technologies.

1.3 Need for management and production technologies in SMEs

Further, SMEs not only lack business foundations but are also not well-informed about effective and advanced management as well as production technologies available in the world. In order for SMEs to be competitive with foreign companies, they need to learn effective management and production technologies suitable for the market economy. Although SMEs want to get new and/or useful technologies at reasonable costs, currently, they have limited channels to do so. In fact, presently available major supporting systems or institutions for SMEs in Konin Province are the following three only: (1)RDA, (2)Konin Chamber of Commerce and Industry (KIG) and (3)NOT. Therefore, supporting systems available for all management levels of SMEs should be developed and prepared for those who require support.

2 Project Purpose

To have SMEs invigorated and upgraded to meet international requirements in the context of the market economy as well as to indirectly facilitate restructuring of enterprises for the transition to privatization.

3 Output of the Project

3.1 Re-education of managers on management and production technologies

(1) The opportunities are increased for managers of SMEs to attend seminars and workshops on corporate management and production technologies in the market economy.

(2) Managers have opportunities to be exposed to advanced corporate and factory management.

(Managers of SMEs have opportunities to learn about business operation, corporate management and production technologies in the market economy in the form of seminars and workshops as well as study tours to advanced companies and factories whether they be foreign or domestic.)

3.2 Movement of diffusion for TQM/"Kaizen(Improvement)")

(1) SMEs have opportunities to get explanation about the importance of productivity improvement as well as principles and directions for improving productivity.

(2) SMEs have opportunities to experience how to build a business foundation for proactively improving management and production, which will capitalize on their capital investment and allow further growth in the future through appreciation, introduction, absorption, adoption and full utilization of advanced individual management and production technologies.

3.3 Execution of traveling clinic services for SMEs

(1) SMEs have opportunities to practically learn working knowledge and know-how of management and production, including disciplines such as accounting, marketing, personnel management, production management and industry specific basic production technologies through on-premise consultation.

(SMEs have opportunities to get consultation with foreign experts and consultants with regard to management and production technologies.)

3.4 To establish an SMEs consulting center

(1) SMEs have access to consulting services for management and production from either domestic or foreign consultants on request at reasonable expense.

(2) The technical staff of the SMEs consulting center have opportunities, through the foreign consultants dispatched, to see actual consulting activities, including how to diagnose client companies' present business situations and provide consulting services.

4 Project Description

This project consists of four components:

(1) Re-education of managers on management and production technologies,

(2) Movement of diffusion for TQM/"Kaizen(Improvement),"

(3) Execution of traveling clinic services for SMEs and

(4) Establishment of an SMEs consulting center.

4.1 Reasons for combining originally four projects

Originally, these four components were proposed as individual projects. Although each of the four components can be treated as an independent project, it is better to combine them into one project in order to comprehensively present a clear picture of the framework of technical support to various management levels of SMEs in Konin Province. Also, by combining the four components, a synergy in project execution can be expected through the accumulation of experience from the implementation of the four components and an intensive information exchange among the implementation bodies.

Further, consistency and linkage between the purpose and expected outputs of the four components can be better maintained by combining the project components, because of the clear picture of the entire frame of the SMEs technical support system proposed. For effective project execution, it is critical to maintain a unified and shared view of: (1)the entire technical support system for SMEs and (2)the demarcation of each component within the system throughout the duration of project implementation and thereafter.

If each of the four project components is proposed as an independent project, it

will be more difficult both to share a unified view of the entire technical support system for SMEs in Konin Province and to maintain a clear demarcation among the four separate projects. In many cases, when such projects are implemented independently, each of them tends to expand its boundary of activities in technical support. Consequently, the focus of each project becomes less clear, and each project tends to increase its redundant activities, which will increase inefficiency of the execution of the components as a whole.

4.2 Demarcation of the four components in the project

The four project components proposed should not compete with each other in terms of the boundary of activities in technical support for SMEs. Instead, they have to be well demarcated and each component must fulfill its own responsibility in association with the other three components. In fact, the four components are designed to be closely related, but each of them focuses on different aspects of SMEs management.

(1) The first component, re-education of managers, focuses on facilitating managers to have their own corporate directions or visions in management. Through seminars and study visits to advanced factories, managers of SMEs learn what should be implemented in their own enterprises.

(2) The second component, movement of TQM/"Kaizen" diffusion, focuses on foundation building for self-improving management of SMEs. Advanced management and production technologies are effective only when the self-improving business foundations of SMEs are prepared.

(3) The third component, execution of traveling clinic services, focuses on upgrading of SMEs regarding management technologies and corporate specific issues including production technologies, but puts its basis on the business foundation built on the TQM/"Kaizen" concept.

(4) The fourth component, establishment of a SME consulting center, focuses on handling the problems of SMEs in respect of various management and production technology issues on requests. SMEs can acquire management and production technologies suitable for their present management levels and needs through this service at reasonable expenses.

4.3 Constraints regarding institutions for project implementation

In the long term, these four components of the project may be managed by a new single institution. However, because of the current budget constraints of Konin Province and limited possibility of acquiring new financing sources for this project, each component might have to be handled by existing organizations such as RDA and NOT for the time being.

4.4 Inclusion of large enterprises into the beneficiaries

Although the targets or beneficiaries of this project are mainly SMEs, large enterprises, which need technical support, should not be excluded from the beneficiary groups.

4.5 Re-education of managers on management and production technologies

4.5.1 Lecturers and topics

In this component, foreign consultants, academic people and top executives of foreign business enterprises are invited as lecturers periodically. Lecturers are selected by the implementation body in cooperation with the foreign experts providing technical cooperation in the other project components. Each seminar or workshop will consist of a variety of aspects and topics.

Examples of topics to be covered are:

a) entrepreneurship,
b) customer oriented management,
c) productivity improvement as the origin of increasing profit,
d) management visions in the international competition,
e) management accounting including the implication of depreciation and hiring of employees with corporate finance,
f) decision making for investment,
g) movement in international standards,
h) business process reengineering,
i) trends in advanced technologies,
j) research and development strategy,

k) sales channels development and sales promotion.

The focus of seminars and workshops should not be on just the theories but on the introduction of actual examples of corporate activities as well as practical knowledge and know-how of each topic.

4.5.2 Participants of seminars and workshops

Expected participants in the seminars and workshops are mainly managers of SMEs in Konin Province. Managers of SMEs can obtain ideas about the directions to which their enterprises should go by attending the seminars and workshops.

4.5.3 Study tours to advanced factories

In addition to the seminars and workshops, study tours to advanced foreign factories should be planned at least twice a year in connection with the topics covered in the seminars and workshops held previously. The factories and plants to be visited are selected and requested also by the implementation body with the support of the foreign experts. Before each study tour, a study team should be organized. A few preliminary study meetings should also be initiatied by the implementation body so that the participants understand the key issues of the study tours. After each study tour, a study tour report should be organized, by the participants with the support of the implementation body, to present the findings of the tour. Such reports are available at the implementation body not only for the participants but also for those who want to learn from the study reports.

4.5.4 Staff and demarcation of work

Two members of staff are required to conduct this component. They will work both collectively and individually to select and negotiate with the prospective lecturers. One of them will also organize study tours to the advanced factories abroad.

4.5.5 Cost estimation

In order for the component to take effect, continuation of it for a period of at least 2 to 3 years is necessary. An estimated cost of implementing the

component for three years is US$ 555,900. A breakdown of the estimated annual cost is shown in Table PID-3-1. Although the duration of the example for the implementation schedule of the component indicated below is 15 months, part of the preparation activities can be done in the previous fiscal year when the component is continued for more than one year. Therefore, one cycle of the component implementation can be considered as one year.

Table PID-3-1 ESTIMATED COST OF THE PROJECT COMPONENT RE-EDUCATION OF MANAGERS ON MANAGEMENT AND PRODUCTION TECHNOLOGIES

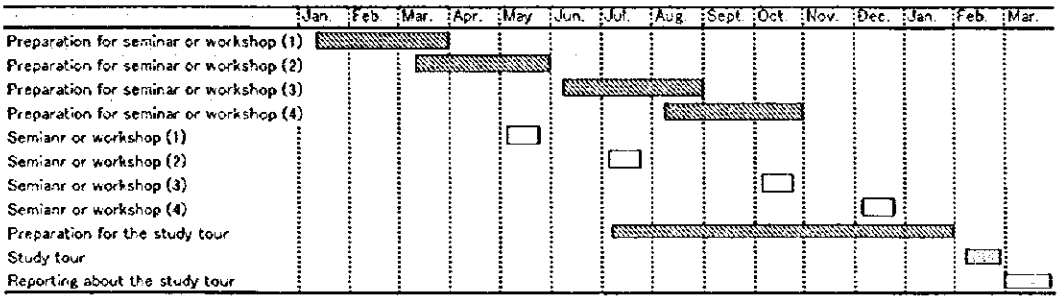
Total cost of the component (per annum)	$185,300	
Seminars and workshops	$81,000	
Fee	1,000 X 5 days X 4 times	= 20,000
Interpretation	250 X 5 days X 4 times	= 5,000
Hall	200 X 5 days X 4 times	= 4,000
Air ticket	4,000 X 3 days X 4 times	= 48,000
Hotel	100 X 5 days X 4 times	= 2,000
Local transportation	100 X 5 days X 4 times	= 2,000
Study tours	$58,200	
Air ticket	4,000 X 10 people	= 40,000
Hotel	100 X 10 people X 8 days	= 8,000
Local transportation	500 X 8 days	= 4,000
Fee	100 X 5 companies	= 500
Interpretation	250 X 8 days	= 2,000
Communication	10 X 20 times	= 200
Reporting	0.3 X 200 pages X 50 copies	= 3,000
Meeting	100 X 5 times	= 500
Project management	$46,100	
Personnel	1,000 X 2 people X 12 months	= 24,000
Office	200 X 12 months	= 2,400
Communication	10 X 100 X 12 months	= 12,000
Local transportation	300 X 12 months	= 3,600
Air ticket	2,000 X 1 person	= 2,000
Hotel	200 X 1 person X 8 days	= 1,600
Transportation	500 X 1 person	= 500

4.5.6 Schedule and duration of seminars, workshops and study tours

In order to get as many attendees as possible, the duration of each seminar or workshop should be a week at most. It seems to be difficult for

managers of SMEs to take time to attend seminars and workshops for any more than one week at a time. The duration of a study tour should be around 10 days. An example of the implementation schedule is shown in Figure PID-3-1.

Figure PID-3-1 AN EXAMPLE OF SCHEDULE FOR SEMINARS, WORKSHOPS AND A STUDY TOUR



4.6 Movement of diffusion for TQM/"Kaizen(Improvement)"

4.6.1 Scheme of the component

In this component, organizational and institutional foundation building within SMEs is targeted. Foundation building in SMEs management is to create organizational and institutional conditions in which SMEs can effectively absorb and internalize management and production technologies. This component involves international cooperation with other countries, for example with Japan. In order to initiate and instruct the movement, foreign experts are dispatched and work in cooperation with the staff of the implementation body.

4.6.2 Method used for the implementation of the component

The method used for the movement is on-premise activities in model factories of SMEs in Konin Province. The first step of the movement is to create a few successful examples of the application of this concept to the actual enterprises (SMEs), because SMEs tend not to believe the effectiveness of such a concept without looking at tangible evidence. To select model factories, there are two basic conditions: a top manager's willingness to apply this concept to his/her factory and the size of the enterprise (at least more than 30 to 50 employees). A top manager's

willingness is necessary to initiate activities in the factory. The size of the model enterprise of more than 30 to 50 employees is important because it has to be a "model" to other enterprises. If the model factory is very small, other SMEs may consider that results of the activities are achieved because of the smallness of the organization. Another reason for selecting relatively large SMEs for the model factories is the expected effects to the economy of Konin Province. Greater influence can be expected when a larger and leading SME's business operation is invigorated and improved rather than when a micro enterprise is. In order to convince a number of SMEs, it is required to have several successful examples of the on-site activities in the model factories.

On-site activities are instructed by foreign experts and include the following:

a) Explanation of the activities to management of the SME by the experts
b) Orientation of the activities to employees by the experts
c) Lectures about the basic concept and principles of TQM/"Kaizen(Improvement)"
d) Application of the concept and principles to the factory by the employees
e) Appraisal and review of the activities in the SME
f) Periodical follow up by the experts

One of the keys to the success of the movement is getting the participation of (conceptually all) the employees including top managers to the activities and ensuring they have a proper understanding of the concept of TQM/"Kaizen(Improvement)". In order to build a self-improving business foundation in an SME, the concept and mechanism of TQM/"Kaizen(Improvement)" has to be understood by all the employees of the SME.

Among the important issues in the concept and mechanism are:

a) understanding what is meant by productivity,
b) understanding how productivity is connected to the value added(profit) of the company and consequently to the benefit of all the employees,
c) creating shared and clear goals of the activities within the SME,
d) conducting activities based on the principles of fact finding (in other

words, using objective data instead of subjective opinions for problem solving),

e) using visuals and clear indications which everyone can understand for showing procedures and information,

f) Implementing a work standard based on the present status of each individual's work instead of trying to set up an ideal work standard (in other words, using the cycle of Do-Plan-Check-Action instead of Plan-Do-Check-Action),

g) Following, and obeying, the rules of work to be established through these on-site activities.

Another key is to collect and incorporate the opinions and suggestions of all the employees through interviews and questionnaire surveys done by managers of the SME concerned. By recognizing their opinions, communication between the managers and the employees is improved.

The third key is to have employees undertake the activities by themselves with the support of the experts. By experiencing success in the on-site activities, the employees of the SME will be able to gain self-confidence and recognize the significance of doing such activities in their factory in terms of productivity.

If the introduction and institutionalizion of the TQM/"Kaizen(Improvement)" concept is successfully implemented through on-site activities in the SMEs, empirically at least a 25% to 50% productivity improvement can be expected in the short term. Business foundations of SMEs, which will enable them to utilize further advanced management and production technologies in the future, are also prepared.

4.6.3 Staff and demarcation

Two members of staff, a chief and an assistant, are required to undertake this component. It is preferable for the chief to have knowledge about factory management or production management. In addition to the two people, a team of four foreign experts are dispatched. The team includes a team leader, an expert in plant management, an expert in the production technology of the industrial sub-sector concerned and an expert with

knowledge about business administration who works as the coordinator.

4.6.4 Cost estimation

An estimated implementation cost of the component is US$1,385,700 for three years. Table PID-3-2 shows annual cost of the project component.

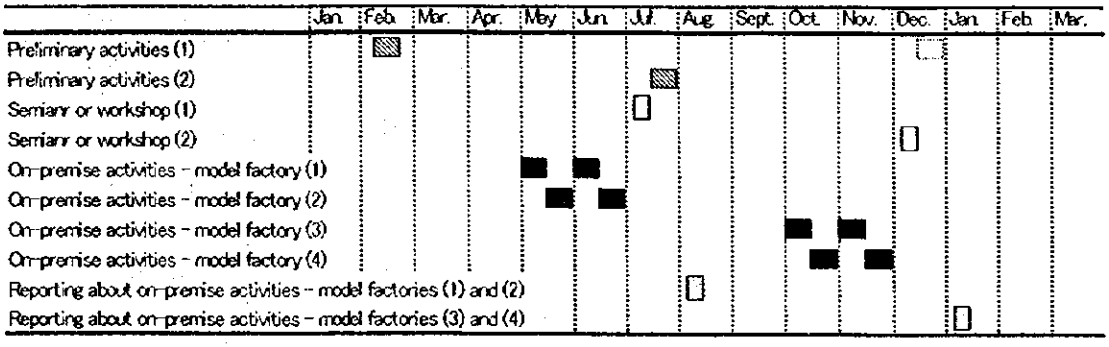
Table PID-3-2 ESTIMATED COST OF THE PROJECT COMPONENT MOVEMENT OF DIFFUSION FOR TQM/"KAIZEN(IMPROVEMENT)"

Total cost of the component (per annum)	$461,900	
Preliminary activities	$ 44,200	
Fee (experts)	500 X 14 days X 2 times	= 14,000
Interpretation	250 X 10 days X 2 times	= 5,000
Air ticket	4,000 X 2 people X 2 times	= 16,000
Hotel	100 X 24 days X 2 times	= 4,800
Local transportation	100 X 12 days X 2 times	= 2,400
(If the preliminary activities are connected to the seminars and workshops implemented in the component of re-education of managers and the experts for this components give lectures, the cost of experts' air tickets for preliminary activities will be saved.)		
Seminars and workshops	$ 0	
(A sum of $ 19,000 should be covered by the component of the re-education of managers)		
Fee (experts)	500 X 7 days X 2 times	= 7,000
Interpretation	250 X 4 days X 2 times	= 2,000
Air ticket	4,000 X 1 person X 2 times	= 8,000
Hotel	100 X 5 days X 2 times	= 1,000
Local transportation	100 X 5 days X 2 times	= 1,000
On-premise activities	$ 338,400	
Fee (experts)	500X 30 days X 4 times X 4 people	= 240,000
Interpretation	250X 20 days X 4 times X 2 people	= 40,000
Air ticket	4,000 X 4 people X 2 times	= 32,000
Hotel	100X 28 days X 2 times X 4 people	= 22,400
Local transportation	100 X 5 days X 2 times X 4 people	= 4,000
Reporting of on-premise activities	$44,000	
Fee (experts)	500 X 5 days X 4 times X 4 people	= 40,000
Interpretation	100 X 10 days X 4 times X 1people	= 4,000
Project management	$35,300	
Personnel	1,000 X 2 people X 12 months	= 24,000
Office	200 X 12 months	= 2,400
Communication	10 X 10 X 12 months	= 1,200
Local transportation	300 X 12 months	= 3,600
Air ticket	2,000 X 1 person	= 2,000
Hotel	200 X 1 person X 8 days	= 1,600
Transportation	500 X 1 person	= 500

4.6.5 Schedule and duration of the movement

In terms of the implementation plan of the movement, the number of model factories selected in a year should be 4. At least a 3 year implementation period is required to diffuse the concept and practice among the SMEs in Konin Province. An example of the schedule of the movement is shown in Figure PID-3-2.

Figure PID-3-2 AN EXAMPLE OF THE SCHEDULE OF THE MOVEMENT



Preliminary activities include procedures for selecting model factories and preparatory meetings with SMEs as candidates for the model factories. Seminars and workshops will be dove-tailed into the activities of the re-education of managers, which is another component of the project. There will, therefore, be a saving in the cost of conducting the seminars.

By continuing the movement for three years, 12 SMEs experience the activities as model factories.

4.7 Execution of traveling clinic services for SMEs

4.7.1 Scheme of the component

In this component, foreign consultants and experts are hired and stationed at the implementation agency and provide traveling clinic services for selected SMEs through periodic factory visits. The traveling clinic services first aim at achieving direct benefits of technology transfer for beneficiary firms. They may also involve technology transfer, to some extent, to the implementation body's staff and local consultants by allowing them to join periodic factory visits. However, such technology transfer to staff and local consultants is not the primary objective. A major difference between the

movement of diffusion for TQM/"Kaizen(Improvement)" and the traveling clinic services is in the technologies to be introduced and transferred to SMEs. The movement of TQM/"Kaizen(Improvement)" diffusion aims at building a self-improving business foundation while the traveling clinic services put more stress on management technologies and fundamental production technologies for each SME concerned, in the context of each SME's business operation.

4.7.2 Method used for the Implementation of the component

The major role of the consultants is giving advice to the client SMEs. In order to build competence to handle technical problems in the client SMEs, the consultant team explains and provides on-the-job training on working knowledge for identifying major managerial and technological problems, helps the client SMEs to find possible solutions for the problems identified by providing know-how and explaining the logic behind prospective countermeasures, and checks the results of implemented solutions by the clients to see if further advice is required. The focus of the traveling clinic services is on the implementation of solutions for problems by the SMEs themselves in consultation with the consultants.

The number of SMEs to be provided with these services are 12 to 15 throughout the duration of the project component. The conditions for selecting SMEs for traveling clinic services are: a top manager's willingness to apply for the clinic service, to be a leading SME in its industry sector in Konin Province, to be an SME belonging to one of the major industrial sub-sectors in Konin Province such as metal processing, woodworking, food processing, textile and clothing and so forth. The reason for selecting leading SMEs is the same as in the case of the previous component, movement of diffusion for TQM/"Kaizen(Improvement)." The ultimate goal of the project is the development of the provincial economy. As this is the case, the magnitude of the effects on the provincial economy achieved through the improvement of management in the SME concerned should be taken into account when selecting the firms to be provided with the clinic services. The targeted industrial sub-sectors of this project component should also be selected and specified so that experts with appropriate experience and expertise can be dispatched.

4.7.3 Staff and demarcation

One secretarial member of staff is required for the implementation of this component. Foreign experts are dispatched as a team which, for example, consists of (1) a leader or a chief consultant who covers overall management issues, (2) a consultant handling production management technology issues, and (3) technical engineers or consultants with experience in the industrial sub-sectors concerned. The duration of the assignment for each expert is 2 to 3 years.

4.7.4 Cost estimation

An estimated cost of implementing the component for three years is US$3,120,600. Table PID-3-3 shows a breakdown of annual cost for the project component.

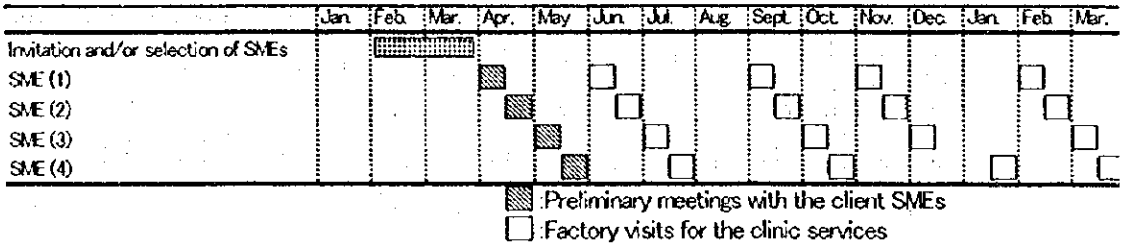
Table PID-3-3 ESTIMATED COST OF THE PROJECT COMPONENT EXECUTION OF TRAVELING CLINIC SERVICES FOR SMES

Total cost of component (per annum)	$ 1,040,200	
Clinic services	$ 1,016,500	
Fee (experts)	15,000X 12 months X 4 people	= 720,000
Interpretation	250X 150 days X 3 people	= 112,500
Air ticket	4,000 X 4 people	= 16,000
Living	2500 X 12 months X 4 people	= 120,000
Local transportation	100X10daysX12monthsX4people	= 48,000
Project management	$23,700	
Personnel	1,000 X 1 person X 12 months	= 12,000
Office	200 X 12 months X 2 rooms	= 4,800
Communication	10 X 10 X 12 months	= 1,200
Local transportation	300 X 12 months	= 3,600
Hotel	200 X 1 person X 8 days	= 1,600
Transportation	500 X 1 person	= 500

4.7.5 Schedule and duration of the traveling clinic services

Around four SMEs are selected as beneficiaries of the clinic services every year during the project period. Foreign experts visit each SME for two weeks at regular intervals. Figure PID-3-3 shows an example of the schedule of the traveling clinic services.

Figure PID-3-3 AN EXAMPLE OF THE SCHEDULE OF THE TRAVELING CLINIC SERVICES



4.8 Establishment of an SMEs consulting center

4.8.1 Scheme of the component

This component aims at providing SMEs with consulting services at their request through the establishment of a consulting center. A consulting center with a pool of registered local consultants in Konin Province is to be established. To provide effective consulting services, it is critical for the center to have accumulation of experience in consulting activities. In this sense, the center to be established should be a permanent institution. However, it may not be possible to do this because of the scarcity of available funds in the province. As an alternative to establishing such a new institution, NOT can take the role of the SMEs consulting center. In fact, NOT is presently providing a limited version of technology consulting services by utilizing its registered technicians and engineers. Therefore, this component may be considered as an upgrading of NOT's technology consulting services to a consulting center for SMEs.

4.8.2 Method and procedures used for the implementation of the component

The activities of the center require a few full time secretarial staff. In addition to the full time secretarial staff, part time technical staff who may be technicians, engineers or local technical consultants are to be hired. On receiving applications from SMEs, part time technical staff are sent to the SMEs to confirm the situations claimed by the clients. Based on the results of these activities by such part time staff, the center starts to select suitable consultants. At first, it is considered to dispatch suitable local consultants registered to the consulting center. If there are no suitable consultants for the clients' needs, the center tries to find suitable consultants from other

parts of the country by using its contacts and networks. Therefore, the center needs to have a national network by all means. However, it is not always possible to find consultants in Poland. In order to satisfy the consulting needs which cannot be handled by Polish consultants, the database service of the information and technology transfer center in RDA, which is now being prepared, may be useful to find foreign consultants.

4.8.3 Capacity building of registered local consultants

In order for the SMEs consulting center to provide effective consulting services, upgrading of its registered local consultants is necessary. One of the ways to increase local consultants' consulting capacity is by involving them in the actual consulting activities performed by the foreign consultants as observers or assistants.

For a consultant, experience through on-the-job training is far more valuable than other training and lectures. Therefore, some of the registered local consultants should be attached as apprentices to the foreign consultants in their consulting projects for which suitable registered consultants have not been found.

Although it is not always possible, if the local consultants to be attached work as interpreters for the foreign consultants throughout the consulting activities, they will be able to see the whole consulting process performed by the foreign consultants.

4.8.4 Creating own database of skillful foreign consultants

It is important for the SMEs consulting center to have its own database of experienced and qualified foreign consultants. Such a database can be made by reviewing each foreign consultant's work after completion of a project and accumulating the information of those consultants considered to have conducted successful consulting work. Such performance review should be done by the part time technical staff of the center.

4.8.5 Staff and demarcation

A few full time staff perform secretarial work for the clients and the registered local consultants. Several part time technical staff provide initial

analyses of the clients and confirm their present situations. After the initial analysis, the full time staff, in cooperation with part time technical staff, search and select suitable consultants from among either registered local consultants or foreign consultants.

4.8.6 Cost estimation

An estimated cost for implementing the component for three years is US$2,092,200. Table PID-3-4 shows the estimated annual cost of the project component.

Table PID-3-4 ESTIMATED COST OF THE PROJECT COMPONENT ESTABLISHMENT OF AN SMEs CONSULTING CENTER

Total cost of component (per annum)		$ 697,400
Consulting activities		$ 559,000
Fee (domestic consultants)	150X 15 days X 100 people	= 225,000
Fee (foreign consultants)	500X 7 days X 20 people	= 70,000
Interpretation	250X 7 days X 20 people	= 35,000
Air ticket	4,000 X 20 people	= 80,000
Hotel(domestic consultants)	100 X 15 days X 50 people	= 75,000
Hotel(foreign consultants)	100 X 7 days X 20 people	= 14,000
Local transportation	100 X 5days X 120 people	= 60,000
(Presently, NOT is providing 177 services consisting of 73 advisory and technical services and 104 training services for not only SMEs but also large enterprises.)		
Project management		$138,400
Personnel(full time)	1,000 X 3 people X 12 months	= 36,000
Personnel(part time)	500 X 15 people X 12 months	= 90,000
Office	200 X 12 months X 2 rooms	= 4,800
Communication	10 X 20 projects X 12 months	= 2,400
Local transportation	300 X 12 months	= 3,600
Hotel	200 X 1 person X 8 days	= 1,600

5 Implementation Body and Financing Source

5.1 Re-education of managers on management and production technologies

Implementation body: Regional Development Agency in Konin (RDA) in cooperation with Konin Chamber of Commerce and Industry (KIG) are the prospective implementation bodies. From the mission and the nature of each

organization, RDA is more appropriate to be the implementation body. The expected role of KIG in this component is to assist RDA in promoting seminars, workshops and study tours and inviting attendees. A close cooperation between RDA and KIG is the key to the successful implementation of this component.

Source of fund: Foreign aid from, for example, PHARE of EU through the SME Fund.
For the first time, 100% of the operational cost has to be financed by funds through foreign aid. However, once the importance of the component is recognized among the SMEs, some portion of the cost should be collected from the attendees.

5.2 Movement of diffusion for TQM/"Kaizen(improvement)"

Implementation body: RDA.
This component is added to the business of RDA .

Source of fund: Foreign aid from, for example, PHARE of EU through the SME Fund.

5.3 Execution of traveling clinic services for SMEs

Implementation body: NOT.
Although both NOT and RDA have the potential to be the implementation body, NOT has an advantage through its experience in consulting services.

Source of fund: Foreign aid from, for example PHARE of EU through the SME Fund, is required.
For example, 80% of the operation cost is to be financed by funds through foreign aid, while 20% of the cost is paid by the beneficiary firms.

5.4 Establishment of an SMEs consulting center

Implementation body: NOT.
Presently, NOT is providing some technology consulting services by charging fees to the clients. Being the implementation body, NOT can strengthen its consulting capacity. On the other hand, the project component could utilize

NOT's experience in providing technology consulting services and its existing consultant base.

Source of fund: For consulting services provided by local consultants, fees are charged to the clients. Part of the fees for consulting services provided by foreign consultants and the cost required for training registered local consultants are expected to be subsidized by funds from foreign aid.

6 Activities

6.1 Re-education of managers on management and production technologies

6.1.1 To conduct seminar and workshops

a) To select topics of seminars and workshops;
b) To decide the dates and duration of seminars and workshops;
c) To select and make contact with lecturers; and
d) To invite and collect attendees.

6.1.2 To conduct a study tour

a) To select major subjects of the study tour;
b) To decide the dates and duration of the study tour;
c) To find and make contact with prospective companies and factories;
d) To invite and collect participants to the study tour;
e) To conduct preparatory meetings;
f) To prepare details of the study tour including schedules, interpreters, transportation and hotels; and
g) To support attendees in writing a report.

6.2 Movement of diffusion for TQM/"Kaizen(Improvement)"

(1) To discuss with foreign experts dispatched about the methods and procedures to be used;
(2) To prepare seminars on movement of diffusion for TQM/"Kaizen(Improvement)" (Preferably, at least one diffusion seminar on the movement is to be held before the preliminary meetings with SMEs. However, it may be difficult to arrange such a seminar before the

preliminary meetings in the first year of the movement. This may be covered by the component of re-education of managers from the second year.);

(3) To invite and/or select SMEs as model factories in cooperation with the foreign experts;
(4) To have preliminary meetings and explain the purpose, program and schedule to the SMEs selected;
(5) To fix the schedule for activities in the model factory with the manager of each SME selected; and
(6) To assist foreign experts in preparing reports on model factory activities.

6.3 Execution of traveling clinic services for SMEs

(1) To discuss with foreign experts dispatched about the methods and procedures to be used;
(2) To invite and/or select SMEs as the clients of the traveling clinic services in cooperation with the foreign experts;
(3) To have preliminary meetings and explain the purpose, program and schedule to the clients in cooperation with the foreign experts;
(4) To fix the schedule for activities in each client; and
(5) To assist the activities of the foreign experts.

6.4 Establishment of an SMEs consulting center

(1) To build or re-build a local consultant pool registered to the implementation body;
(2) To invite clients for consulting services by advertising the consulting activities of the center;
(3) To conduct an initial situation analysis for each client;
(4) To find suitable consultants from either the consultant pool or outside; and
(5) To upgrade registered local consultants by dispatching them as apprentices or interpreters to consulting projects performed by outside consultants.