



Report about the Bus Body making Sector of Pakistan

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Report about Bus Body Making Sector of Pakistan.

Under the National Transport Scheme the urban bus transport system is being revamped. In addition to the changes being made in the regulatory framework, it is planned to introduce 15,000 new buses in the major cities of the country over a three year period.

This programme opens up a new market for buses, which was non-existent before and presents new opportunities for automobile companies interested in marketing their products in Pakistan. The Government is also offering incentives for investors in the form of duty free imports of machinery and equipment not manufactured in Pakistan, required for CKD assembly and bus bodybuilding.

A bus manufacturing company can start its operation if it has a plan to arrange local CKD assembly and follow an approved deletion programme. CBU imports of buses, upto 100 units, is allowed to an OEM so that it can start its business without waiting for the completion of its manufacturing facilities. All urban buses should meet the minimum specifications as issued by SMEDA.

For this, we at SMEDA's light engineering were given the task of evaluating the local bus body makers and assess their body building capability with emphasis towards the proposal of their working in collaboration with an OEM, as we feel that the body of the buses which are to be run in the urban cities should be made in Pakistan. This will boost the local industry, save time, save foreign currency, generate local employment and because bus body making is a highly labour intensive process, lower the final price of a bus.

In the next few pages of this report, we have explained the present scenario and the investment required by the local bus body makers to be able to team up with the bus operating companies. The emphasis is on what type of equipment and personnel they will need to establish themselves as a bus body building company, obeying international standards.

Three of the big local bus body makers, namely HinoPak, National Motors and Sindh Engineering, already have the required machinery and manpower in place, but the rest public and private sector firms will have to invest in machinery and personnel. Even the small bus body makers have some of the machinery that has been recommended in this report as mandatory for upgradation but not all of them possess such machinery. Financial investment required will vary according to the equipment already available.

Summary

The investment required for the bus bodybuilding is based on the premises of the following conditions:

1. In the case where the lead time for bus body is 4 months and the bus body maker wants to make 100 bus body in a year, they will have to make 12.5 bus bodies per month. In 26 working days amounting to $\frac{1}{2}$ a bus body per day.
2. Each bus body takes nearly 1800 man-hours to make. This implies that in an 8 hour shift and on a two shift basis, the bus body making plant will need 113 persons to run the two shifts.
3. To keep the quality of our buses intact as per OEM/SMEDA standards and to ensure a constant production flow of 12.5 buses per month, a minimum of a 10 men team will have to be hired. This is described on chart D.
4. To get any order a minimum investment of Rs.35.6 million other than land itself will have to be done by an average bus body maker.
5. A neat clean image of an organisation worthy of being a sub-contractor to an incoming OEM will have to be created. The organisation will have to be free of child labour.
6. Improvement of the working of the organisation as per enhanced standards and a marry-up of owners, equipment, men, investment and standards applicable will have to be created.

State of Bus Body Making Industry in Pakistan

World wide, bus body manufacturing is a labour intensive process, which due to the low cost of Pakistani labour can save money on the final price of a bus. With the requirement of 15000 buses over a three year period or 5000 buses annually for National Transport Scheme, we undertook the task to determine whether the bus body can be manufactured locally and upto the standards of the OEMs.

There exist a very large number of small scale bus body makers who are making bus body but these are not upto the international standards in terms of technology used and final finished bus.

Presently there are three categories of prospective bus body makers:

- Bus body makers who are working in collaboration with multinational companies.
- Bus body makers who have manufactured buses previously for OEMs like Fiat, Volvo, Bedford and Leyland.
- A SEC company and private companies that have shown interest in manufacturing buses, without having a prior experience.

We at SMEDA feel that they have the required facilities, including setup and machinery which can be utilised to manufacture standard quality buses in collaboration with OEMs. These three categories of short listed bus body makers could be introduced to investors or OEMs at a short notice.

The state of the bus body making industry in this country is represented by HinoPak and Sindh Engineering Ltd at the top end. At the middle end, there are many State Enterprise Units and private sector companies. At the bottom end there are hundreds of bus body makers in the main towns of the country.

We believe with the right kind of hand holding, the craftsmen of this SME industry can be organised to produce world class buses under the guidance of an OEM management. All the bus

body makers are willing to invest in new body plants provided they have up front confirmed orders and the possibility of forming a Joint Venture with an OEM or an investor in a bus operating company.

Total Capacity of all Bus Body Builders in Pakistan:

Bus body making has been done in this country since early 1950's. Bus bodies of a variety of bus chassis are made in Karachi, Lahore, Rawalpindi and Peshawar. The kind of buses SMEDA has in its plans are fabricated only in Karachi and Lahore.

A list of major bus body makers in Pakistan is given in Table 1 below along with their production capacities per annum.

Company	Ownership	Lead Time months	Capacity /annum units	Capacity per shift per month units	No. of Seats
Hinopak	JV with Hino	2	1800	60	70
National Motors Ltd	Gandhara Group	3-4	200	8	70
Trailer Dev. Corp.	PACO	2	176	6	70
Sindh Engineering	PACO	3	176	6	26
Pak Engineering Works	Pvt.	3	500	18	70
Spinning Machinery Corp.	State Enter.	2	50	2	70
S. Fakhuruddin & Co	Pvt.	3	400	14	70
Hakimullah	Pvt.	3-4	250	10	70
Ghulam Sarwar & Bro	Pvt.	3	100	4	70
S. Mughal Body Makers	Pvt.	3-4	48	2	70
Pak Ittehad Bus Body Builders	Pvt.	3-4	48	2	70
National Engg Works	Pvt.	3	110	10	70
Total Units			3858	142	

Table 1: List of Major Bus Body Makers of Pakistan

There are a lot of **small players** who are in the business of bus body making and some have fabricated bus body for government departments. This list is given in Table 2:

Company	Ownership	Lead Time	Capacity /annum	Capacity per shift per month
		months	units	units
New Diamond Bus Body Builders	Pvt. - Lahore	3-4	73	3
Master Brothers Bus Body Works	Pvt. - Lahore	3-4	100	4
United Steel Body	Pvt. - Lahore	3-4	100	4
Al Sadiq Bus Body Works	Pvt. - Lahore	3-4	48	2
Abdul Rab & Sons	Pvt. - Peshawar	4		
Aman ullah & Sons	Pvt. - Peshawar	4		
Babu Haleem Body Makers	Pvt. - Peshawar	4		
New Sarhad Body Builders	Pvt. - Peshawar			
Total Units			321	13

Table 2: List of Small Bus Body Makers

The list of small manufacturers is by no means complete or a comprehensive list. It contains only those names from Lahore that have a valid RTA (Regional Transportation Authority) registration licence. There are a number of other small scale bus body makers who do not have a RTA registration licence and are making bus body. According to a list provided to us by the Bus Body Builders Association of Lahore, there are some 56 small and big players in Lahore alone with an estimated monthly production of 200 units.

Other than Lahore, another big cluster of bus body builders is in Karachi, where too approximately 500 bus body per month can be made.

The **OEMs** who have shown an interest in setting up their own bus body assembly plant are:

Company	Lead Time	Capacity/annum
	months	units
Fecto/FAW	6	150
Total		150

Table 3: Business Groups who have shown interest in setting up a bus body making unit

Volvo will be assembling their chassis in Pakistan but do not want to make bus body. Similarly, talks are going on with **Daimler Chrysler**, **Daewoo** and **Scania** for setting up their plant in Pakistan. Whether they will build chassis or chassis plus body has not yet been finalised.

Companies that have already ordered buses or are in the process for finalising their order and to whom exemption certificates has been issued, include:

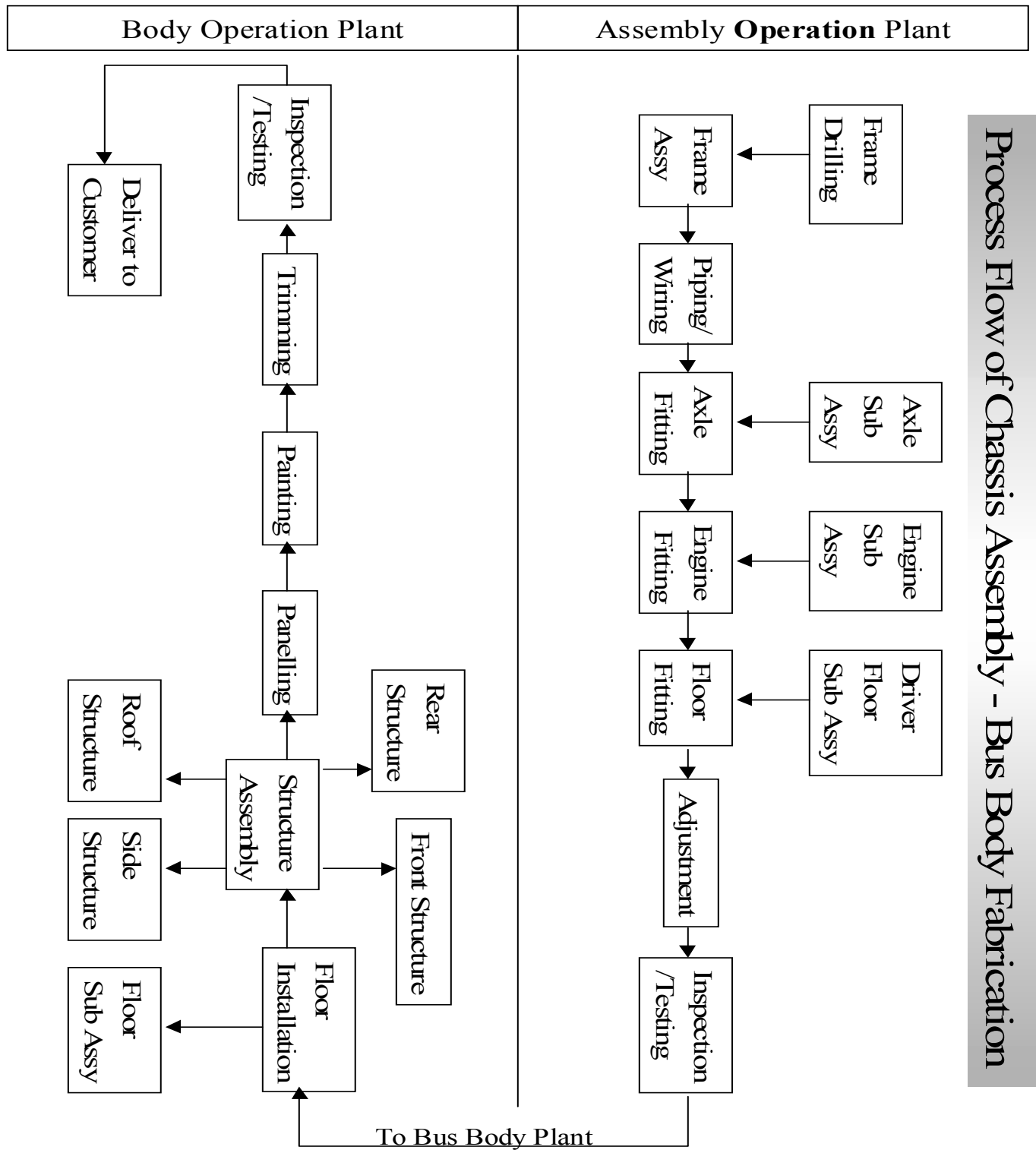
Sr.	Company	Order	Planned	Body to be manufactured by	Status
1	Daewoo	400		Not Yet Decided	Body to be made locally
2	New Khan	120	880	Hino	In process
3	Metro	30	170	Hino	Already delivered
4	Varan	50	100	Hino	Will increase order
5	Khan Brothers	65		Hino	In process
Total		665	1150		

Table 4: List of confirmed orders

Other than these 680 buses, Daewoo have been allowed to import 300 in CBU form duty free, bringing the total of work in progress/already ordered buses to 980.

Table 4 also shows the list of companies that have shown interest in increasing their orders by the planned figure. They are in discussions with the Punjab Government Transport Department and SMEDA regarding the number of buses that they want to order.

Process flow of a Bus Body Making Unit:



Process Flow of Chassis Assembly - Bus Body Fabrication

Figure 1: Process flow of a Bus Body Making Unit.

The above picture shows the processes involved through which a bus body is sub assembled and gradually fitted onto a bus. This process flow is being used in HinoPak, National Motors and Sindh Engineering while the rest are assembling buses under a shed without a flow process.

National Motors are currently making only truck body but have the processes in place to manufacture buses against a secured order. Sindh Engineering is currently making body for small 26 seater coasters while Spinning Machinery Corporation and TDC Vehicle Engg. Pvt. Ltd. are not making any bus body, but we feel that they can as they have the required machinery, setup, design office and the experience to make good quality bus bodies.

Upgradation Requirement:

Nearly all the big players, which are private bus body building companies, are currently making bus body but we feel that they need to invest in new machinery if they are to have a Joint Venture with any OEM. They have all shown their willingness to invest but only against a secure order.

According to our estimate, the total upgradation cost, which includes machinery, sheds and area is Rs.34.25 million, as a good bus body maker will need all on the following list given in Table 5, except presently available machines.

MACHINERY, SHEDS, AREA REQUIRED FOR UPGRADATION

St.	Description	Qty	Price (Rs.)	
			New	S-Hand
1	Sheet Straitener	1	250,000	100,000
2	Shearing Machine 10 ft length, capability to cut 4.5mm thick sheet	1	1,000,000	250,000
3	Press brake 300 tons capacity	1	1,000,000	250,000
4	Pipe bending machine 1 ¼" diameter x 1.6thickness	1	200,000	80,000
5	Forming roller	1	300,000	
6	200 ampere welding transformer 20-500Amp Co2 welding - 200,000	20	1,000,000	
7	Paint spray booth 14 meter length X 5 meter width	1	3,000,000-4,000,000	
8	Baking oven 14 meter length X 5 meter width	1	3,000,000-4,000,000	
9	Steam cleaning with phosphating chemicals	?	400,000-500,000	
10	Riveting machine capacity		50,000	
11	Drill machine ½", ¾", 1"	1,1,1	5000-20,000	
12	Mechanical press 50 Tons X 3 #s	1x3	150,000	
13	Hoists 2 Tons capacity X 8 hoists	1x8	3,200,000	
14	Fiber reinforced plastics (FRP) shop		1,000,000	
15	Air Compressor	2	200,000	
16	Tank to feed paint (agitation)	1	70,000	
17	Battery charger		50,000	
18	Hand tools		20,000	
19	Assembly Line & Paint Shop @ Rs400/sq ft = Rs4300/sq meter	2000 M ²	8,600,000	
20	Manufacturing Area & Vendor Part Stores @ Rs.400/sqft = Rs.4300/sq meter	625 M ²	2,687,500	
21	Parking area for incoming chassis and completed buses @ Rs100/sqft = Rs1076/sq meter	625 M ²	672,500	
22	Shed to house working machines 25M x 25M @ Rs4300/sqm	625 M ²	2,687,500	
23	Store for raw material 15M x 15M @ Rs4300/sqm	225 M ²	967,500	
24	Office @ Rs600/sq feet = Rs6450/sq m	225 M ²	1,451,250	
25	RTA Licence annual fee		20,000	
26	District Council License Fee		150,000	

Investment required

Rs 34.25 million

Table 5: List of Machinery, Shed and Area required for Upgradation

The bus body maker needs to install the following fixtures, which will cost the bus body makers approximately Rs.1.35 million.

Details on fixtures required for bus body making on production line basis

1	Bus side fixture (left)	Rs.200,000		
2	Bus side fixture (right)	Rs.200,000		
3	Bus front side fixture	Rs.100,000		
4	Bus rear side fixture	Rs.100,000		
5	Bus roof fixture	Rs.150,000		
6	Bus floor fixture	Rs.150,000	Gauges	Rs.100,000
7	Door fixture	Rs.100,000	Foot rulers	
8	Driver's door fixture	Rs.100,000	Calipers	
9	Emergency door fixture	Rs.100,000	Thickness gauges	
10	Seat fixture	Rs.50,000		
	Sub Total:	Rs.1,250,000	Investment required	Rs 1.35 mn

Table 6: List of Fixtures Required

Working Material:

The following table contains the material list along with the amount required in quantity and rupees for a 2.5 meter wide * 12 meter long bus, which will be used in making a bus body.

WORKING MATERIALS (Bus Size 2.5meter X 12meter)		
Sr.	Description	Rupees
1	Prime quality imported Electro galvanised steel sheet @ Rs48 to Rs50/kg, sold as 3 ton coil 1mm thick, 830 kg required for bus size 2.5m*12m	40,000
2	Electro galvanised rectangular pipes for structure Rs.50/kg. 3 ton structure	150,000
3	Hard wood frame for floor, frame height ¾", treated against water absorption, Rs1200/cubic ft (9 cubic ft required)	10,800
4	Checker board steel sheet for floor 9 sheets required, imported Rs50/kg sheet size	14,400
5	Bus front made of reinforced fiber glass @Rs1,615/M2, 6.25 M ²	10,094
6	Bus back made of reinforced fiber glass @Rs.1,615/M2 , 6.25 M ²	10,094
7	2 piece fiber glass seats mounted on 1½" dia powder coated pipes, secured with clamps 28 seats @Rs1500/seat	42,000
8	2 doors (along with imported safety features)	200,000
9	Driver door	10,000
10	Emergency door	10,000
11	Contoured Dash board made of fiber glass 130/sqft 8ft x 3ft x 2ft	20,000
13	Rubber packing in windows, 1 inch thick Rs.35/meter Rs.1,000	3,000
14	Front single piece curved glass windshield Pakistani made safety glass	40,000
15	Rear single piece flat glass screen Pakistani made safety glass	10,000
16	Passenger window glasses with frame Pakistan made	60,000
17	Electrical harness	10,000
18	Tail lamps, indicating lamps on body	20,000
19	Lights inside bus	15,000
20	Phosphating, paint, primer, baking/stoving type	23,419
21	Stainless steel pipe: Stainless steel pipe 38.2mm dia, 1mm thick @Rs.615/meter Stainless steel pipe 51mm dia, 1mm thick @Rs.820/meter - Horizontal pipe (3L) 31.5meter 38.2mmc - Stanchions 2.1m x 15 Nos. 51mm - 2 pipe frames on each door entrance insides 4#s	19,400 25,800 7,000
22	Fittings for pipes (floor & roof)	15,000
23	Driver enclosure perspex glass	15,000
24	Hardware (Nuts, Bolts, Rivets)	20,000
25	Welding electrodes & grinding discs	15,000
26	Fire extinguishers = 2 #s	10,000
27	Paint work disposable items	2,000
28	Packing & insulating materials for bus sides and bus roof 27M ²	2,700
29	Labour charges Rs.50/hour	90,000
30	Utilities cost Rs.15/hour	27,000
31	Overheads Rs.15/hour	27,000
32	18 %ST on price of bus	
	Sub Total	974,707
	18% ST	175,447
	Total	1,150,154

Table 7: List of Working Material to be used for Bus Body Making.

According to the data above, the total cost of a 2.5 meter wide * 12 meter long bus body is nearly Rs.1,150,154. This figure includes the cost of phosphating, primer and paint, which has been further broken down in:

CALCULATION ON PHOSPHATING, PRIMER & PAINT

(for a 2.5 meter wide and 10.5 meter long bus body)

A	Category stoving paints Degreasing of sheet Degreasing chemical required 10 liter/bus Std packing 20 liter @ Rs.1600/packing Consumed = Rs.800+15% ST
B	Phosphating of sheet Phosphating chemical required 10 liter/bus Std packing 25 liter @ Rs.2200/packing Consumed = Rs.880+15% ST
C	Primer coating on the outside body & epoxy ester Primer consumed 38 liters Std packing 20 liters @ Rs.3360 Consumed = Rs.6,384+15% ST
D	Use of thinners in paints and primers Thinner required per bus is 50 liters Packing of 200 liters @ Rs.14,000 Consumed = Rs.3500+15% ST
E	Paint on outside of body Alkyd melamine topcoat Quantity used per bus is 22 liters Std packing of 20 liters Which colour will you use? - white colour @ Rs.3200+15%ST/20 liters pack - Blue colour @ Rs.5000+15%ST/20 liters pack - Red colour @ Rs.800 +15%ST/20 liters pack
If all bus was red coloured, then paint consumption = Rs.8800+ST	

Total of A,B,C,D & E = Rs. 23,419 (including ST)

Note: If SMEDA/OEM choose their own colour contrast in a paint, then ICI will need one month in processing and developing the colour scheme. Also ICI will need one more month to receive raw materials for such a colour scheme.

Table 8: Calculation on Phosphating, Primer and Paints

There are 2 options that can be utilised in painting the body of the bus. The effect that will have on the cost of the bus is given in the next table.

Option I of paints and thinners only		Option II of paints, primers and thinners only	
Nitro Cellulose paints (NC paints) air dry paint		Poly Urethane paints, for gross retention called 2K paints	
D	Thinner quantity 50 liters/bus but packing of 200 litres cost Rs24000 Consumed = Rs.6000+15%ST	Metallic base coat + clear coat - air dry paint Mix and use within 8 hours, that is shelf life then it becomes a gel	
E	Paint quantity 25 liters/bus Which colour will you use? White colour @Rs.5480/20 liters pack Red colour @Rs.8500/20 liters pack Yellow colour @Rs.9100/20 liters pack Consumed = Rs.11375+15%ST	C	Primer 40 liter/bus Rs.1000/liter Min Packing 20 liters Consumed = Rs.40,000+15%ST
Total of A,B,C,D,E = Rs.29,255 (including ST)		D	Thinner 55 liters per bus Rate is Rs.260/liter Consumed = Rs.14300+15%ST
		E	Paint 23 liters per bus Rate is Rs.1300/liter Consumed = Rs.29900+15%ST
		Total of A,B,C,D,E = Rs.98,762 (including ST)	

Table 9: 2 options for Paint

Labour Force Requirements:

Currently, most of the bus body makers do not have a specialist draftsman or an engineer and their labour force is on a contract basis. The advantage of contract based employment is that the labour force can be hired or fired with an increase or decrease in orders. Most of the bus body makers do not make any drawings and are making bus body through past years of experience.

Currently, HinoPak, National Motors Ltd, Sindh Engineering Ltd., SMC and TDC are the only manufacturers who have employed diploma/degree holders in the bus body making process and possess a design office. Many of the private bus body makers need the manpower on the following two lists to qualify as bus body makers.

CHART-D (General Shift)			
Technical & Non-Technical Manpower to be taken on Board			
		Estd./ Shift	Wage/month Rs.
Draftsman	(Diploma in designing)	1	8,000
Diploma Engineer	(Diploma in auto technology)	1	10,000-12,000
Store Keeper	(Experienced store keeper who knows lengths, measures & weights)	1	4,000
Q.C. Inspector I	Diploma Mech. Engr/Cert. Holder	1	10,000
	Inspection of paint, glass, rubber fitting		
Q.C. Inspector II	Inspection of incoming raw material, jigs and fixtures	1	10,000
Accountant ICMA	(Proper accounting, registration with sales tax and income tax)	1	10,000
Purchaser	Cert. Holder	1	6,000
Marketing Man	(Owner himself/MBA)	1	Owner
Production Engineer	(B.Sc Mech. Engr)	1	20000
Plant Manager	(B.Sc Mech. Engr)	1	Owner
	Total	10	

Table 10: List of Technical Manpower recommended

Manpower Required for Up-gradation (Shift 1, 2 & 3)

		Approx. (Rs/mont	Min. (Rs/month)	Per Shift	Total Cost/mth (Rs.)
1	Arc welder	7,000	5,000	8	40,000
2	Black Smith	8,000	3,500	2	7,000
3	Sheet Metal worker	7,000	3,000	6	18,000
4	Carpenter	12,000	6,000	2	12,000
5	Painter	11,000	6,000	8	48,000
6	Laminator	8,000	4,000	6	24,000
7	CO2 welder	14,000	5,000	2	10,000
8	Press operator	5,000	3,000	6	18,000
9	Fabricator	8,000	3,500	4	14,000
10	Electrician	8,000	6,000	2	12,000
11	Trim fitter	8,000	3,500	6	21,000
12	Chowkidar	2,500	2,500	2	5,000
13	Gate Keeper	3,500	3,000	1	2,500
-	Sub-Total 1		53 Persons		232,000
-	Sub-Total 2		53 Persons		232,000
	Sub-Total 3	2 Chowkidar, 1 Gate		3 People	8,000
	Total				240,000

Table 11: List of worker cadre Manpower required

Conclusion:

Four of the private bus body makers interviewed by us showed willingness to join their hands with an OEM organisation.

They have the money for land, buildings and machinery to put up a bus body making plant. They are willing to build the plant according to the OEMs requirement. They are also willing to leave the technical management of the bus body making plant with the OEM.

But the bus body makers are not interested to invest up front to improve the present premises *without having secured orders* from the bus operating companies.

The bus body makers feel that without any orders to OEMs, who in turn could make joint arrangements with the private sector bus body making companies, investment is futile.

Another option which has been put forward by bus body makers is for OEMs to make joint arrangement with one bus body maker, who in turn could get them manufactured according to OEMs standards and specifications.

Volvo at present has made arrangements with Hinopak to have bus bodies made on Volvo chassis.

Other OEMs are still reluctant to enter the Pakistani market because of prevailing economic situation. The OEMs do not feel confident in entering into any JV arrangements at present, because of the local bus body builders' lack of prior track record in building bus bodies as per international specifications.

We still feel hopeful as bus body craftsmanship exists in this society since past 50 years.

Note: Financial modelling for investment returns is awaited from our financial team at SMEDA.

Contact Number/Addresses of Major Bus Body Maker:

Company	Name	Address	Contact No	Fax No	Email
National Engg Works	Sh. Mohd Ilyas - Director	F-497/B, SITE. Karachi	(9221) 2562101	(9221) 2562101	
Hakimullah	Mohammad Ilyas - Managing Director	LR-10/36 Nishtar Road. Karachi	(9221) 7734810, (9221) 7730439	(9221) 7730439	
Pakistan Engg Works	Iqbal Ahmaed Sheikh	D/134, SITE, Monghopir Road. Karachi	(9221) 2576377, (9221) 2576457	(9221) 2562429	pew@cyber.net.pk
Sindh Engg Pvt. Ltd	S. Musharraf Hussain GM(Tech)	16, Dockyard Road, West Wharf Road, Karachi	(9221) 202721-25, (9221)2310057	(9221)2313552	
HinoPak Motors Ltd	Sirajuddin-Manager Development	D-2, SITE, Manghopir Road. Karachi-75700	(9221) 111252525, (9221) 2563510	(9221) 2563028	hinopak.motors@ibm.net
Gandhara Nissan Diesel Ltd	Rizwan ul Haq Razi-Manager Development	Ghnadara House, 109/2 lifton. Karachi 75600	(9221) 111190190, (9221)5830251	(9221) 5830258	
TDC Vehicle Engg Pvt Ltd	Sh. Muzaffar Ali - Mktg Consultanat	B/66, Estate Avenue, SITE. Karachi	(9221)2573813, (9221)2571938, (9221)5675395		
Pak Ittehad Bus Body Builders	Haji M.. Yousaf	Goga Chowk, Bund Road. Lahore	(9242) 7236376, (9242) 7111938		
Butt Bus Body Buildres	Ghulam Sarwar Butt	Bund Road. Lahore	(9242) 7462534, (9242) 7587328	(9242) 7466778	
S. Mughal Body Makres	Javed Mughal	Near Shezan Factory, Bund Road. Lahore	(9242) 7410749, (9242) 7414645		
S. Fakhur-uddin & Co	Irfan Ahmed Sheikh	G.T. Road, Shahdard. Lahore	(9242) 200888, (9242) 7925888		
Spinning Machinery Co	Dr. Abdul Qayyum	Kot Lakhpat. Lahore-54760	(9242)5120545, (9242)5120549	(9242)5120546	