DWCC- DOOR TO DOOR COLLECTION

Feasibility Analysis for Dry waste Management through DWCC, Aggregation Centres

Prepared by BBMP SWM Expert Committee Member based on data and inputs from the DWCC Collective

Waste collection Data Source – BBMP DWCC data

SEP 2017

BACKGROUND

DWCC - GETTING INTO DOOR TO DOOR COLLECTION (D2D)

- The DWCC was so far buying back the waste from the Collection Autos and PKs at market prices.
- Since April 2017 , the DWCC signed an interim MOA with the BBMP for carrying out the Door to Door collection of waste.

D2D COLLECTION AGREEMENT

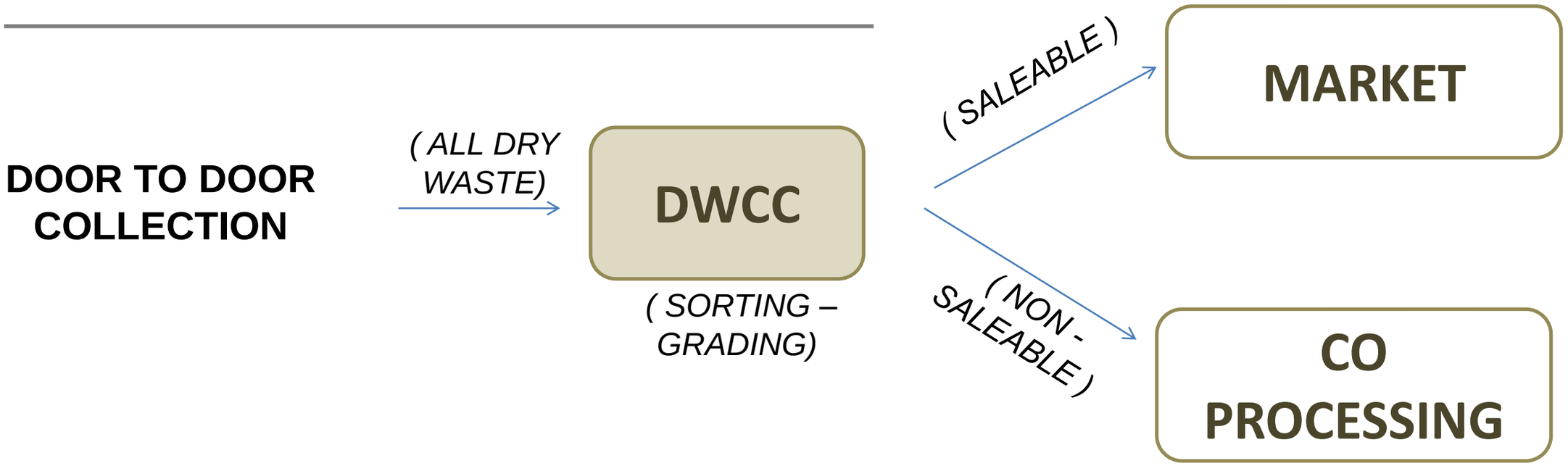
EXISTING D2D AGREEMENT (since Apr 2017)

- The DWCC receives from the BBMP, the compensation of the PRIMARY COLLECTION CHARGES of Vehicle Hire charges , Cost of 1 Driver and 1 Helper per Vehicle, Diesel Cost and Consumable Cost of Rs. 43,000 per month.

PROPOSED D2D AGREEMENT

- Operators can be only Waste pickers / SHGs
- Facilitating third party will be NGOs / EPR companies
- Vehicles will be procured by the BBMP and provided to the DWCC
- NO primary collection charges will be paid i.e. Cost per vehicle of 1 driver , 1helper , Diesel cost and Consumable cost

EXISTING



ARRANGEMENT:

1. **DWCC hires Vehicles , employs 1 driver, 1 helper per vehicle**
2. **Based on the Micro plan the DWCC is required to deploy between 2 to 6 vehicles per Ward**
3. **The BBMP pays the cost of collection of Rs. 43,000 per vehicle**
4. **The DWCC does the sorting – grading, sells the *Saleable* dry waste and the *Non saleable* waste is sent to Cement units . Cost of operations is met from sale of waste.**
5. **In the last few months upto 100 tonnes of *Non saleable* Dry rejects have been sent from a few DWCCs**

FEASIBILITY ANALYSIS

3 DATA POINTS

BASED ON THE DATA OF MAY – AUG 2017 OF DOOR TO DOOR COLLECTION

- Income and Expenditure Analysis
- Dry waste composition
- Sale Price Trends

DWCC - INCOME & EXPENDITURE - 2 VEHICLES

D2D WITH DWCC AUTO (W178)(Sarakki)				
Existing model- with BBMP reimbursement				
		Jun-17	**Jul-17**	**Aug-17**
EXPENDITURE				
Salaries (Sorter)	7 Persons	₹ 49,400	₹ 49,400	₹ 49,400
Salaries (Collection Driver-Helper)	2 Vehicles	₹ 48,800	₹ 48,800	₹ 48,800
Buying Waste		₹ 55,000	₹ 0	₹ 0
Vehicle Hiring Cost		₹ 18,000	₹ 18,000	₹ 18,000
Diesel Cost		₹ 10,400	₹ 10,400	₹ 10,400
Maintenance of vehicle		₹ 2,000	₹ 2,000	₹ 2,000
Centre Utlity (Power, Water)		₹ 700	₹ 700	₹ 700
Consummables (Gloves, mask etc)				
Bags for Waste Storage		₹ 6,000	₹ 6,000	₹ 6,000
TOTAL		**₹ 1,90,300**	**₹ 1,35,300**	**₹ 1,35,300**
INCOME				
Average Sales	HV	79,525	49,800	52,875
Monthly BBMP reimbursement	BBMP Work Order	86,000.00	86,000.00	86,000.00
TOTAL		**₹ 1,65,525**	**₹ 1,35,800**	**₹ 1,38,875**
NET EARNINGS		-₹ 24,775	₹ 500	₹ 3,575

Average per person	9,880
Average per person	12,200

BBMP Monthly DATA	**Jun-17**	**Jul-17**	**Aug-17**
Total Incoming Waste	27,880	40,588	40,794
Total Outgoing Waste	27,833	23,727	21,244
Total Reject	3,200	4350	5,500
TOTAL			
Paper	**2,428**	**265**	3000
Metal	144	105	80
HV	3,561	3,323	900
Tetrapak	229	291	250
HV TOTAL	**6,362**	**3,984**	**4,230**
LV	6,211	7,525	4,500
Thermocol	271	159	200
Cloth	4,161	4,471	5,500
Glas	3,678	3,985	4,000
E waste	101	111	60
Furn/wood	7,049	3,492	2,754
LV TOTAL	21,471	19,743	17,014
TOTAL	**27,833**	**23,727**	**21,244**

Average per kg	12.50	12.50	12.50
High-Value Waste (kgs)	6,362	3,984	4,230

Observation:

1. The Saleable waste recovered is low
2. The number of Sorters is higher , as secondary and tertiary segregation has to be carried out.
3. There is Net Loss in this DWCC despite receiving cost of collection

DWCC - INCOME & EXPENDITURE - 4 VEHICLES

D2D WITH DWCC AUTO (W194)(BOMMANAHALLI)					
Existing model- with BBMP reimbursement					
		May-17	**Jun-17**	**Jul-17**	**Aug-17**
EXPENDITURE					
Salaries (Sorter)	12 Persons	₹ 1,06,600	₹ 1,06,600	₹ 1,06,600	₹ 1,06,600
Salaries (Collection Driver-Helper)	4 Vehicles	₹ 1,04,000	₹ 1,04,000	₹ 1,04,000	₹ 1,04,000
Vehicle Hiring Cost		₹ 44,000	₹ 44,000	₹ 44,000	₹ 44,000
Diesel Cost		₹ 20,800	₹ 20,800	₹ 20,800	₹ 20,800
Maintenance of vehicle		₹ 6,000	₹ 6,000	₹ 6,000	₹ 6,000
Centre Utlity (Power, Water)		₹ 1,000	₹ 1,000	₹ 1,000	₹ 1,000
Consummables (Gloves, mask etc)					
Bags for Waste Storage		₹ 15,000	₹ 15,000	₹ 15,000	₹ 15,000
TOTAL		**₹ 2,97,400**	**₹ 2,97,400**	**₹ 2,97,400**	**₹ 2,97,400**
INCOME					
Average Sales	HV	1,54,038	93,031	3,07,500	2,68,000
Monthly BBMP reimbursement	BBMP Work Order	1,72,000.00	1,72,000.00	1,72,000.00	1,72,000.00
TOTAL		**₹ 3,26,038**	**₹ 2,65,031**	**₹ 4,79,500**	**₹ 4,40,000**
NET EARNINGS		₹ 28,638	-₹ 32,369	₹ 1,82,100	₹ 1,42,600

BBMP Monthly DATA	May-17	Jun-17	Jul-17	Aug-17
Total HV	12,323	7,443	24,600	21,440
Total LV	23,547	28,576	33,200	30,086
Total Reject	14,255	14,256	14,257	14,258
Total Incoming Waste	**58,265**	**67,285**	**63,450**	**60,620**
Paper	10,250	12,465	17180	14570
Metal				
HV	5,738	5,429	6515	5810
Tetrapak	475	730	905	1,060
HV TOTAL	**12,323**	**7,443**	**24,600**	**21,440**
LV	8,248	8,125	10,180	9,740
Thermocol	190	164	225	230
Cloth	7,710	8,175	9,880	8,596
Glas	5,115	5,527	6,510	5,835
E waste				
Furn/wood	2,284	2,584	2,845	3,010
Others		4,001	3,560	2,675
LV TOTAL	**23,547**	**28,576**	**33,200**	**30,086**
TOTAL	**35,870**	**36,019**	**57,800**	**51,526**

Average per kg	12.50	12.50	12.50	12.50
High-Value Waste (kgs)	12,323	7,443	24,600	21,440

Observation:

1. This is a high performing DWCC

2. Since the Saleable waste recovered is higher about 35 -40% there is net earnings, however this is will vary from month to month and is not predictable

DWCC - INCOME & EXPENDITURE - 6 VEHICLES

D2D WITH DWCC AUTO (W150)(SOUTH)						
Existing model- with BBMP reimbursement						
		Apr-17	**May-17**	**Jun-17**	**Jul-17**	**Aug-17**
EXPENDITURE		Rs.	Rs.	Rs.	Rs.	Rs.
Salaries (Sorter)	16 Persons	₹ 75,800	₹ 1,48,600	₹ 1,48,600	₹ 1,48,600	₹ 1,48,600
Salaries (Collection Driver-Helper)	6 Vehicles	₹ 81,000	₹ 1,62,000	₹ 1,62,000	₹ 1,62,000	₹ 1,62,000
Buying Waste		-	-	-	-	-
Vehicle Hiring Cost		₹ 27,000	₹ 54,000	₹ 54,000	₹ 54,000	₹ 54,000
Diesel Cost		₹ 4,650	₹ 9,300	₹ 9,300	₹ 9,300	₹ 9,300
Maintenance of vehicle		₹ 1,500	₹ 3,000	₹ 3,000	₹ 3,000	₹ 3,000
Centre Utlity (Power, Water)		₹ 1,000	₹ 1,000	₹ 1,000	₹ 1,000	₹ 1,000
Consummables (Gloves, mask etc)						
Bags for Waste Storage		₹ 2,000	₹ 4,000	₹ 4,000	₹ 4,000	₹ 4,000
TOTAL		**₹ 1,92,950**	**₹ 3,81,900**	**₹ 3,81,900**	**₹ 3,81,900**	**₹ 3,81,900**
INCOME-1 (based on avg price of Rs. 6 per kg in base sheet)						
Average Sales	HV	13,863	92,000	1,22,475	1,37,125	1,19,688
Monthly BBMP reimbursement	BBMP Work Order	2,58,000	2,58,000	2,58,000	2,58,000	2,58,000
TOTAL		**₹ 2,71,863**	**₹ 3,50,000**	**₹ 3,80,475**	**₹ 3,95,125**	**₹ 3,77,688**
NET EARNINGS		₹ 78,913	-₹ 31,900	-₹ 1,425	₹ 13,225	-₹ 4,213

BBMP Monthly DATA	Apr-17	May-17	Jun-17	Jul-17	Aug-17
Total Incoming Waste	**12744**	**30003**	**87863**	**60595**	**83605**
Total Unsorted Stock	5,135	13,003	23653	13885	43591
Total Reject	2,720	5,155	19800	17190	14700
TOTAL	**10,024**	**24,848**			
Paper	0	6299	7275	8480	7260
Metal	0	25	173	265	70
HV	955	1036	2025	1525	1810
Tetrapak	154	0	325	700	435
HV TOTAL	**1,109**	**7,360**	**9,798**	**10,970**	**9,575**
LV	2743	966	16415	8475	8032
Thermocol	113	244	310	360	2497
Cloth	304	1180	8935	2340	2840
Glas	294	1792	5165	6760	800
E waste	31	129	35	15	610
Furn/wood	245	74	3652	500	860
LV TOTAL	**3730**	**4385**	**34512**	**18450**	**15639**
TOTAL sorted	4,839	11,745	44,310	29,420	25,214

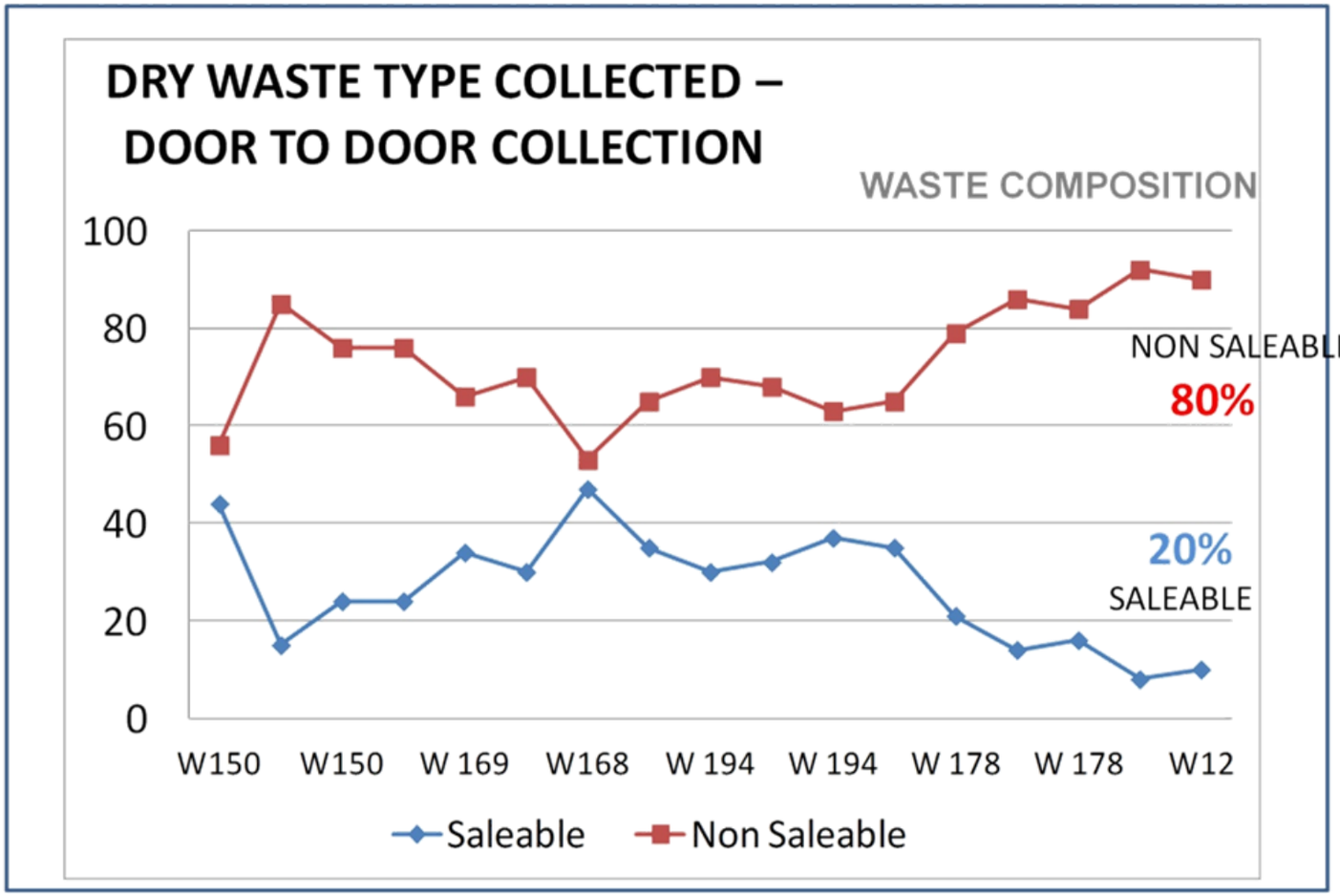
Average per kg	12.50	12.50	12.50	12.50	12.50
High-Value Waste (kgs)	1,109	7,360	9,798	10,970	9,575

Observation:

1. **The scale of operations in this DWCC , with 6 vehicles is very high, there is a very high cost of collection to the DWCC**
2. **Sorting cost is also very high with more than 16 persons required to complete sorting of all waste**

FEASIBILITY ANALYSIS

Composition of Saleable vs. Non Saleable waste -

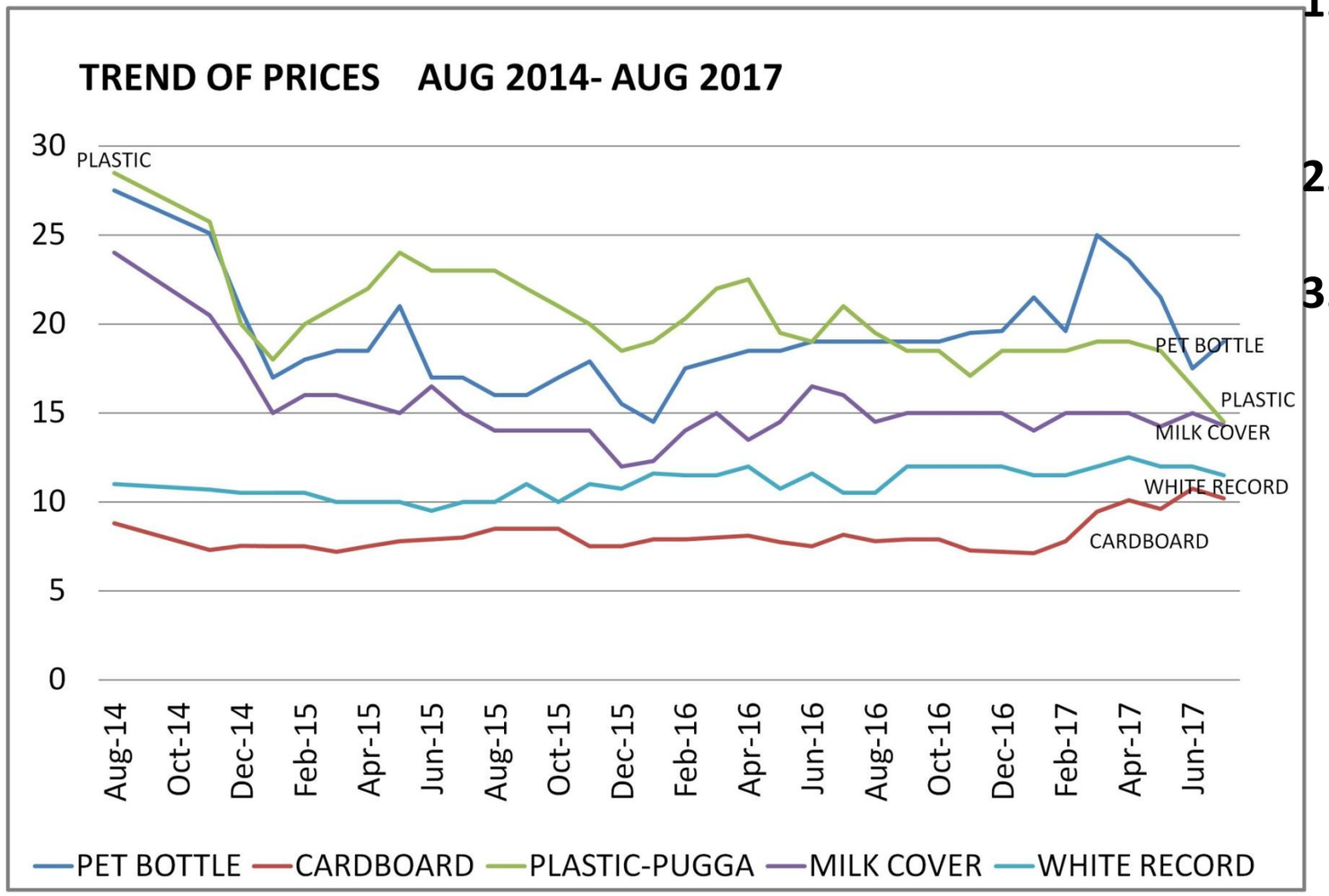


Observations:

1. The collection Data from 5 data sets between Apr –Jul 17, shows the composition of waste from the the Door to Door collection
2. All the DWCCs are doing between 1.5 to 2.5 tonnes per day
3. This is the reverse of the composition of the waste in the Buy Back model
4. All Non Saleable waste recovered is a diversion from the Landfill . This is now sent for co processing
5. All Non Saleable waste is input material for the upcoming RDF plants

FEASIBILITY ANALYSIS

Sale Price Trends



Observations:

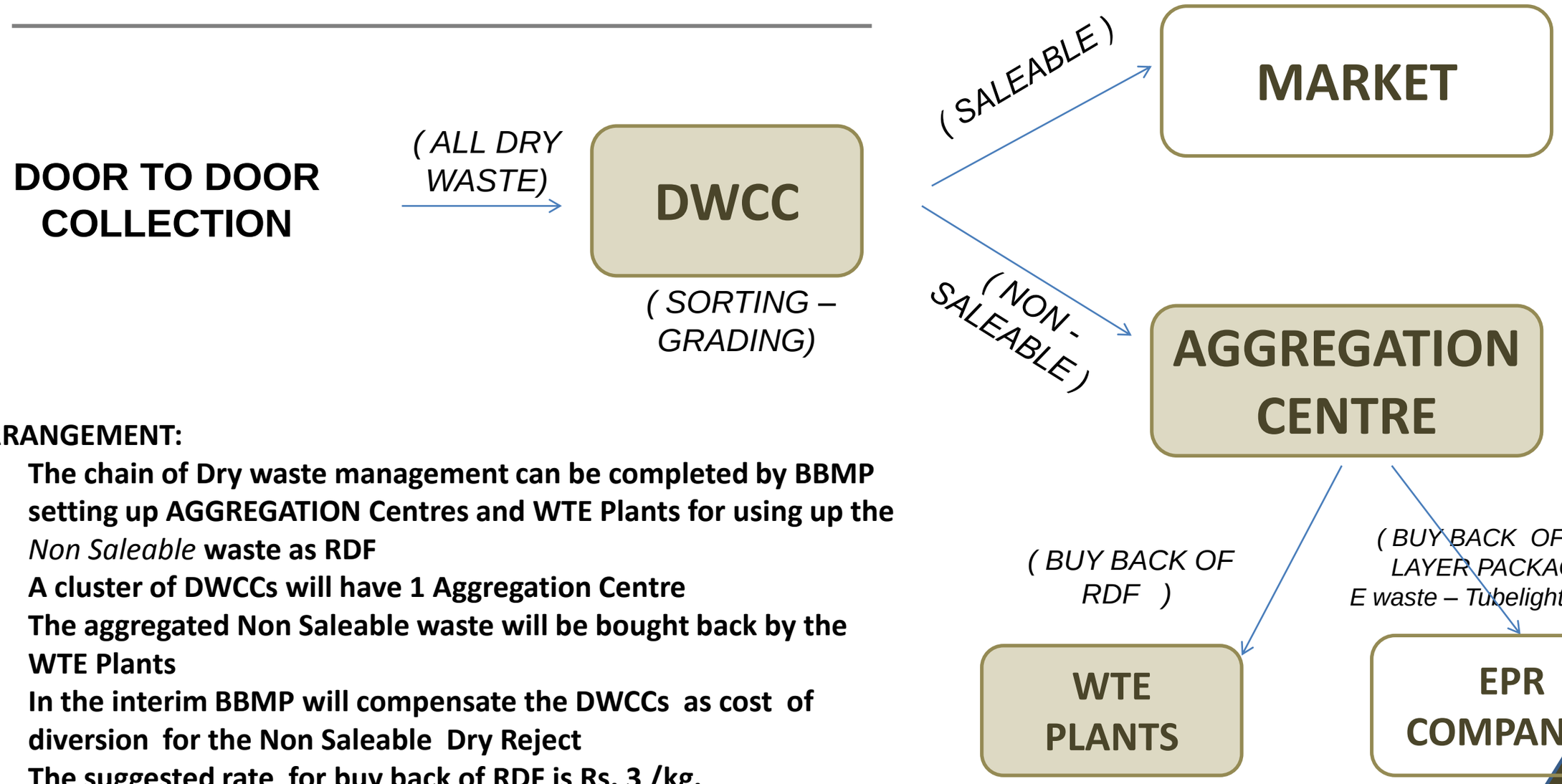
1. **The price of Plastic has seen a 50% drop from Rs. 30 in 2014 to about Rs. 15 in 2017**
2. **PET has been very volatile and is seeing some recovery**
3. **White reocrd (Rs. 11) and Carboard (Rs. 8) have been steady**

FEASIBILITY ANALYSIS

CONCLUSIONS

- **Income and Expenditure Analysis shows that despite the reimbursement of the cost of collection , most of the DWCC s have shown net loss in the last 4 months**
- **This is because ALL dry waste is collected and the composition of waste is now 80%** *Non Saleable* **and 20%** *Saleable*
- **The number of Sorters needed has gone up from 5 persons per tonne to 8 persons per tonne for secondary and tertiary sorting . This is a higher cost.**
- **Overall Sale Price Trends are on a downward trend.It is also seasonal and subject to many external variables. The global crude price, Demonetisation and the changeover to GST all have had major impact on the Sale prices, thus affecting the earnings.**
- **Income from Saleable waste is not sufficient to cover the cost of Collection and the cost of Sorting –Grading operations .It will cause severe cash flow problems and force Operators to bail out . This will threaten the DWCC system as a whole .**

PROPOSED



ARRANGEMENT:

1. **The chain of Dry waste management can be completed by BBMP setting up AGGREGATION Centres and WTE Plants for using up the *Non Saleable* waste as RDF**
2. **A cluster of DWCCs will have 1 Aggregation Centre**
3. **The aggregated Non Saleable waste will be bought back by the WTE Plants**
4. **In the interim BBMP will compensate the DWCCs as cost of diversion for the Non Saleable Dry Reject**
5. **The suggested rate for buy back of RDF is Rs. 3 /kg.**
6. **Multi layer packaging is bought back by the EPR companies between Rs. 3-4 per kg . This is already happening**
7. **E waste – Tubelights & CFL will also bought back by EPR companies. This is in pilot mode.**

Feasibility of the Proposed Model

CONCLUSIONS

- Initial cost of setting up Aggregation centres to be borne by the BBMP
- Initial and Interim cost of diversion for the RDF, to be paid to the DWCC, can be recovered by the BBMP from the WTE plants
- Dry waste collection and its management will be based on a completely sustainable model for all the stakeholders
- The savings on cost of Primary and Secondary transportation for the BBMP will pay back the BBMP its investment on the DWCC and the Aggregation Centre between 3 to 5 years.
- There will be a total and complete diversion of all dry waste from the processing plants and the landfills

Payback Calculation of one time investment in DWCC , Aggregation Centre

- Total One time Investment cost is **Rs. 69.38 crores**
  (198 DWCCs - 565 Collection Vehicles - 16 Aggregation Centres)

- Annual Savings of Primary and Secondary C&T of dry waste is **Rs. 54.45 crores**

- Payback period of the total One time investment cost is **1.5 years**

- There is NO ongoing C&T cost for dry waste collection to the BBMP
  There is NO ongoing O&M cost of DWCCs to the BBMP
  There is a ongoing O& M cost of Aggregation centres to be borne by the BBMP

Payback Calculation of one time investment in DWCC , Aggregation Centre

CALCULATION OF PAYBACK PERIOD FOR INVESTMENT MADE IN DWCC- AGGREGATION CENTRES

Total Capital Cost	No. of DWCCs	Dry waste Capacity	Dry waste received	Capacity Utilised	Savings in C&T		Savings per month	Annual Savings	**Payback period**
					Primary	Secondary			
Rs. (in crores)	**TPD**	TPD	TPD	%	Rs. (in crores)	Rs. (in crores)	Rs. (in crores)	Rs. (in crores)	**years**
69.38	198	693.0	3.5	**100%**	**2.43**	2.11	4.54	54.45	**1.27**
69.38	198	495.0	2.5	60%	**2.43**	1.51	3.94	47.22	**1.47**
69.38	198	297.0	1.5	40%	**2.43**	0.90	3.33	40.00	**1.73**

DWCC One time cost		Rs.
Building cost	*Incurred*	25,00,00,000.00
F&F	*@1 lakh / dwcc*	1,98,00,000.00
Vehicle	*@6.5 lakhs/ vehicle*	25,10,00,350.65
DWCC Upgrade	*@Rs. 10L/dwcc ; 25 dwcc/ year for 5 years*	12,50,00,000.00
Total One time cost		**64,58,00,350.65**
Total One time cost		**Rs. 64.58 Crores**
Aggregation Centre One Time Cost		Rs.
Building Cost	16 Centres (Big zones -3, small zones 1-2)	4,80,00,000.00
F&F	@ Rs. 30 Lakhs per centre	
Total One time cost		**Rs. 4.8 Crores**
Total One time cost		**Rs. 69.38 Crores**

Primary C&T = 565 Vehicles * Rs. 43,000pm = Rs. 2.43 Crores

Secondary C&T = (3.5tpd * 198 DWCC* 30 Days) * Rs. 1014 cost per tonne = Rs. 2.11 crores

DWCC Vehicle procurement- 550 nos		Rs.
Vehicle	@Rs. 6.5Lakhs/ vehicle	36,72,50,000.00
Insurance	@Rs. 15,000 p.a	4,23,75,000.00
Vehicle Cost		40,96,25,000.00
Sale at Book Value (in the 5th year)		15,86,24,649.35
Net Vehicle Cost		**25,10,00,350.65**

Projected RDF supply chain for WTE plants (through the DWCC and Aggregation Centre)

- Dry waste that can be collected by DWCC (@ 3.5TPD/DWCC) is **693 TPD**
- 80% Non Saleable Dry Rejects will be **554 TPD .** (This includes Multi layer packaging, RDF and E waste)
- RDF component will be **485 TPD**
- Buy Back by WTE plants of this RDF component will be at Rs. 3/ kg i.e. **Rs. 53 crores annually**

CONCLUSION

- The Dry waste management will be a Zero cost of C&T operations to the BBMP . It will make it the first Municipality to achieve this.
- The DWCCs will become sustainable without a O&M dependance
- The Aggregation Centres will need BBMP O&M support
- The Aggregation Centres will make it attractive for EPR companies
- The WTE plants will be ensured of a supply chain of good quality RDF
- There is total diversion of dry waste from the Landfill and only the non recyclable material will be input into the RDF plants
- This is in compliance with the SWM Rules 2016

THANK YOU