JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

FEDERATIVE REPUBLIC OF BRAZIL

THE STUDY FOR THE DEVELOPMENT OF AN INTEGRATED SOLUTION RELATED TO INDUSTRIAL WASTE MANAGEMENT IN THE INDUSTRIAL POLE OF MANAUS

FINAL REPORT

DATA BOOK

August 2010

KOKUSAI KOGYO CO., LTD.

EX CORPORATION

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List of Volumes

Volume I	**Summary**
Volume II	**Main Report**
Volume III	**Supporting Report**
Volume IV	**Data Book**

This is the Data Book.

The exchange rate used in this report is as follows.
US$ 1.0 = 89.25 Yen, 1 BRL = 48.784 Yen
(March 2010)

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1. Waste Stream

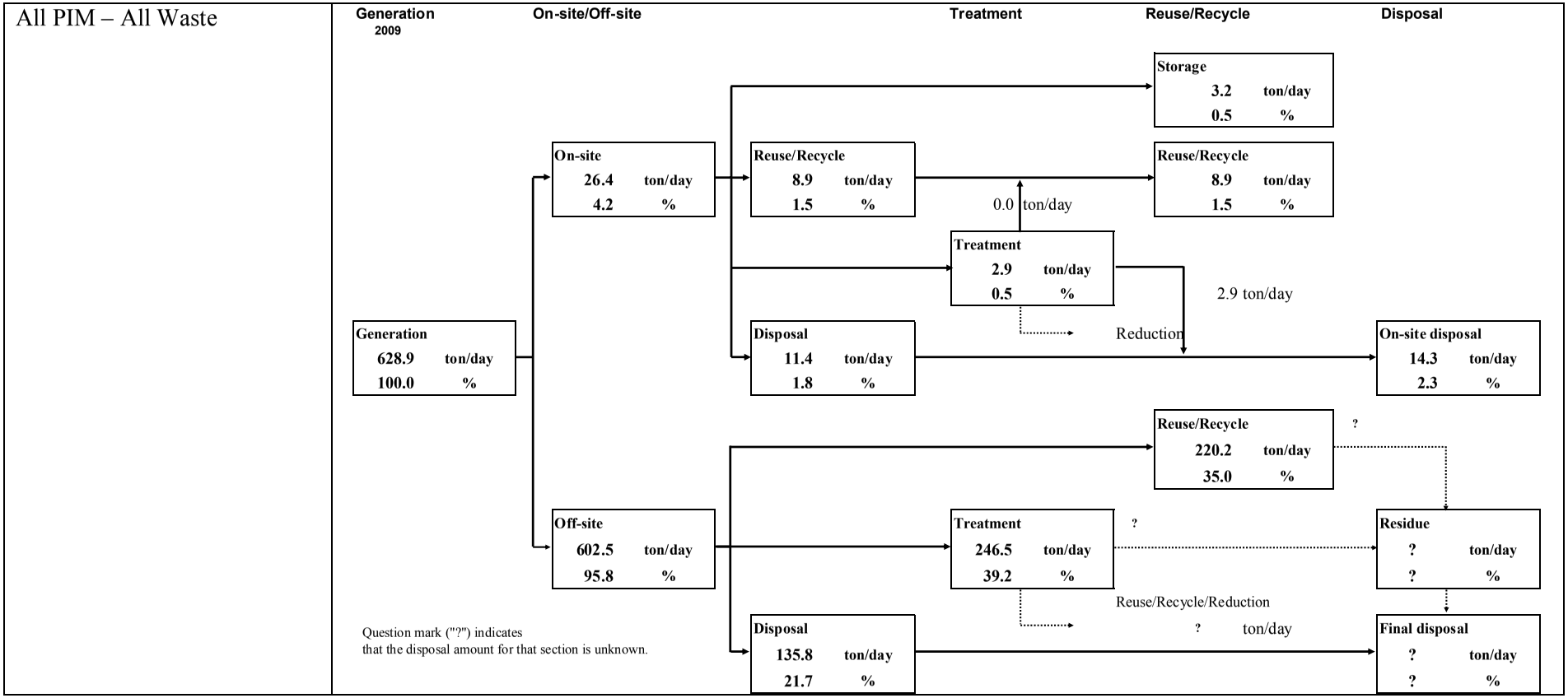
1 Waste stream

1.1 : Simplified Waste stream (2009)
1.2 : Simplified Waste stream (2015)
1.3 : Detailed Waste stream (2009)
1.4 : Detailed Waste stream (2015)

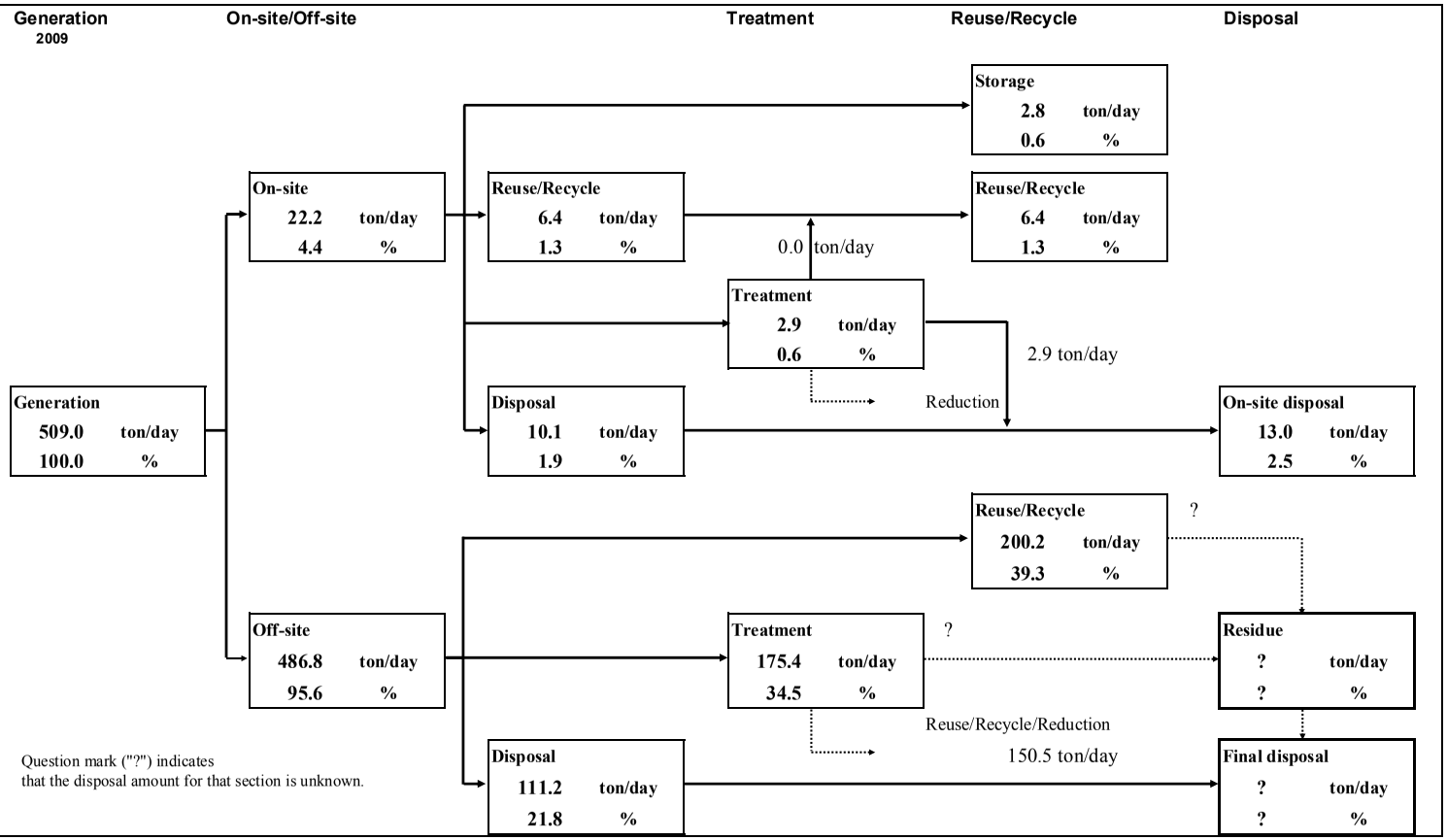
Remark: Question mark (“?”) indicates that the disposal amount for that section is unknown.

1.1 Simplified Waste stream (2009)

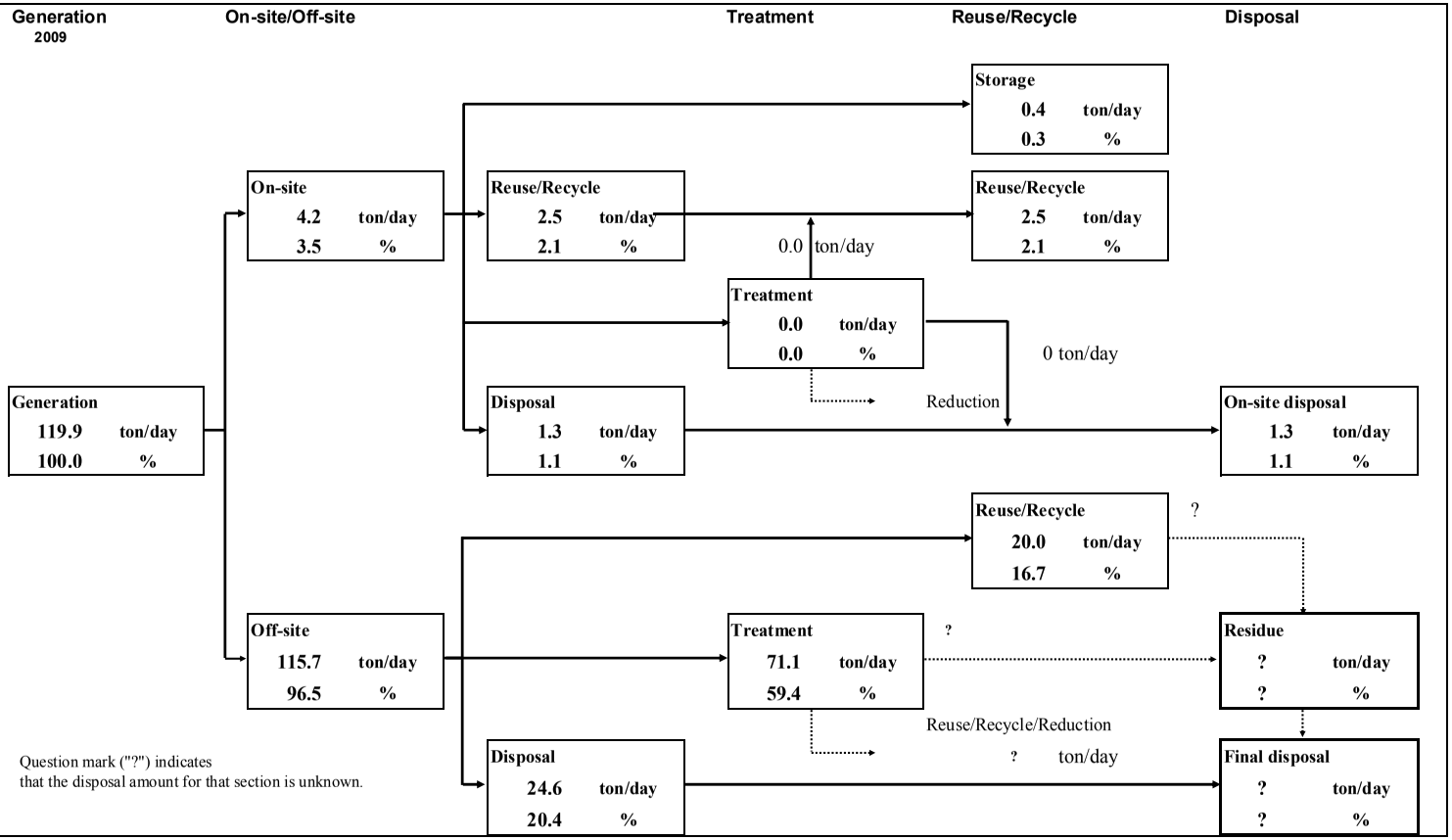
a. Industrial Wastes (IW) generated from PIM (2009)



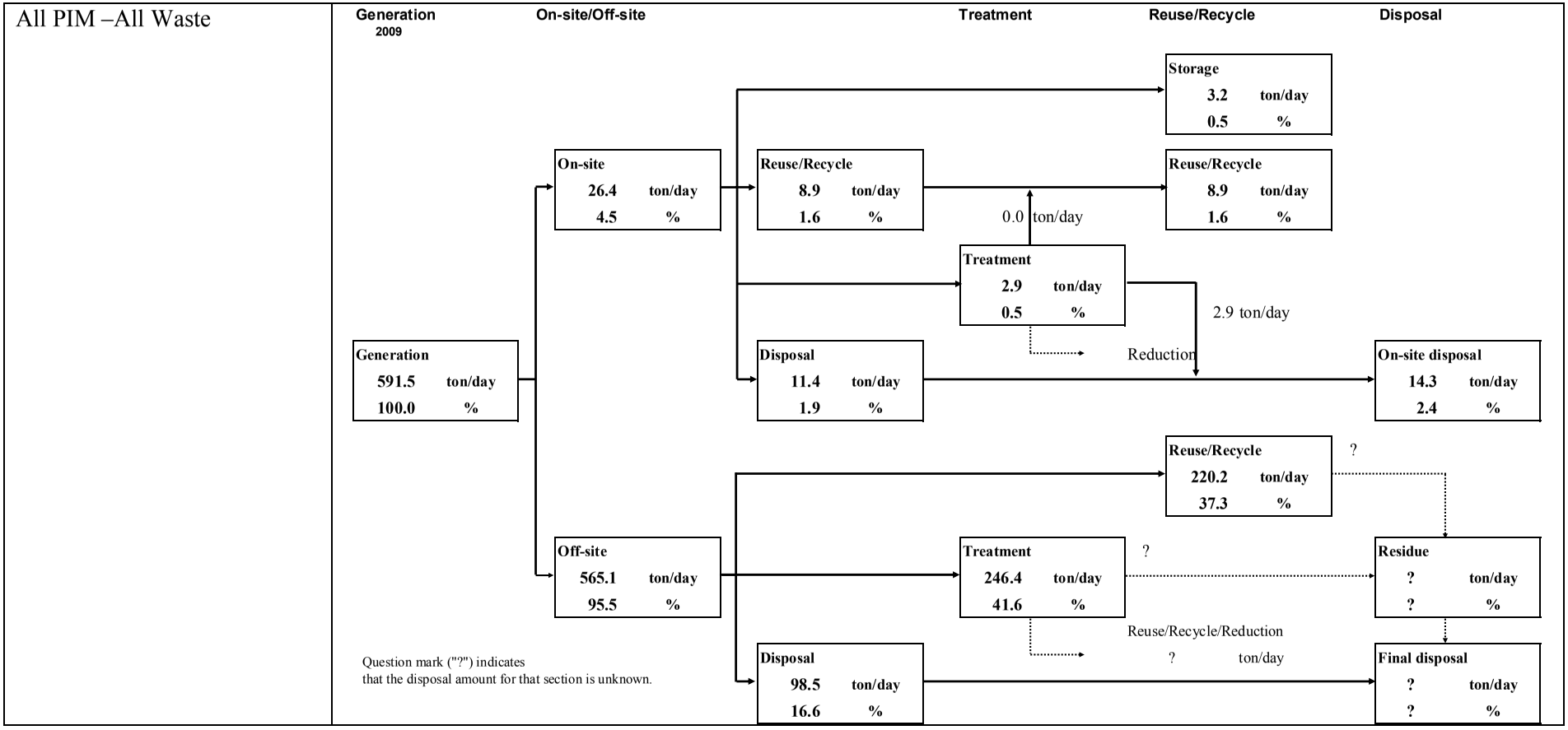
All PIM – Non HIW



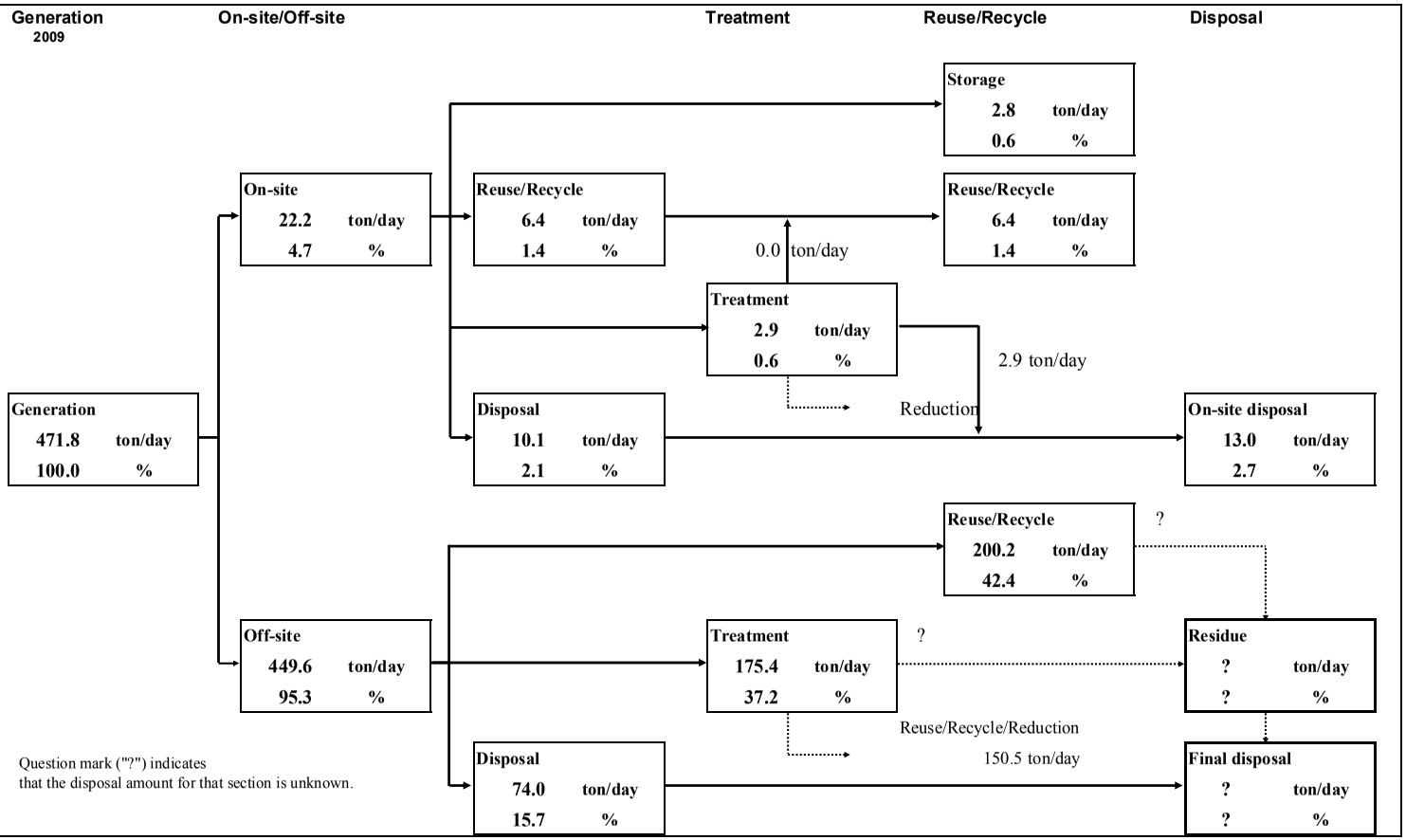
All PIM – HIW


Generation
2009
On-site/Off-site
Treatment
Reuse/Recycle
Disposal
Storage
0.4 ton/day
0.3 %
On-site
4.2 ton/day
3.5 %
Reuse/Recycle
2.5 ton/day
2.1 %
Reuse/Recycle
2.5 ton/day
2.1 %
0.0 ton/day
Treatment
0.0 ton/day
0.0 %
0 ton/day
Generation
119.9 ton/day
100.0 %
Disposal
1.3 ton/day
1.1 %
Reduction
On-site disposal
1.3 ton/day
1.1 %
Reuse/Recycle
20.0 ton/day
16.7 %
?
Off-site
115.7 ton/day
96.5 %
Treatment
71.1 ton/day
59.4 %
?
Residue
? ton/day
? %
Reuse/Recycle/Reduction
? ton/day
Disposal
24.6 ton/day
20.4 %
Final disposal
? ton/day
? %
Question mark ("?") indicates
that the disposal amount for that section is unknown.

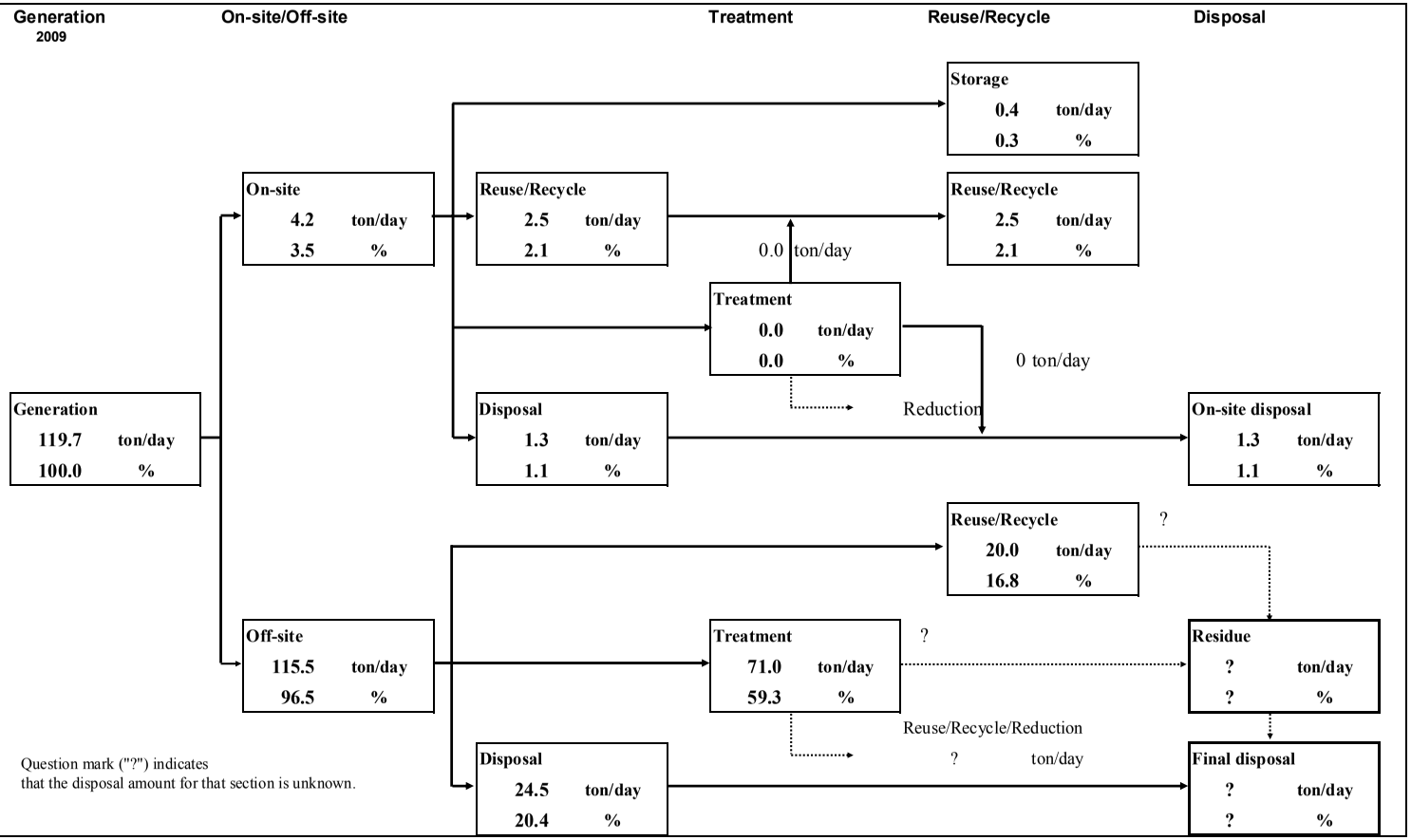
b. General IW generated from PIM (2009)



All PIM – Non HIW

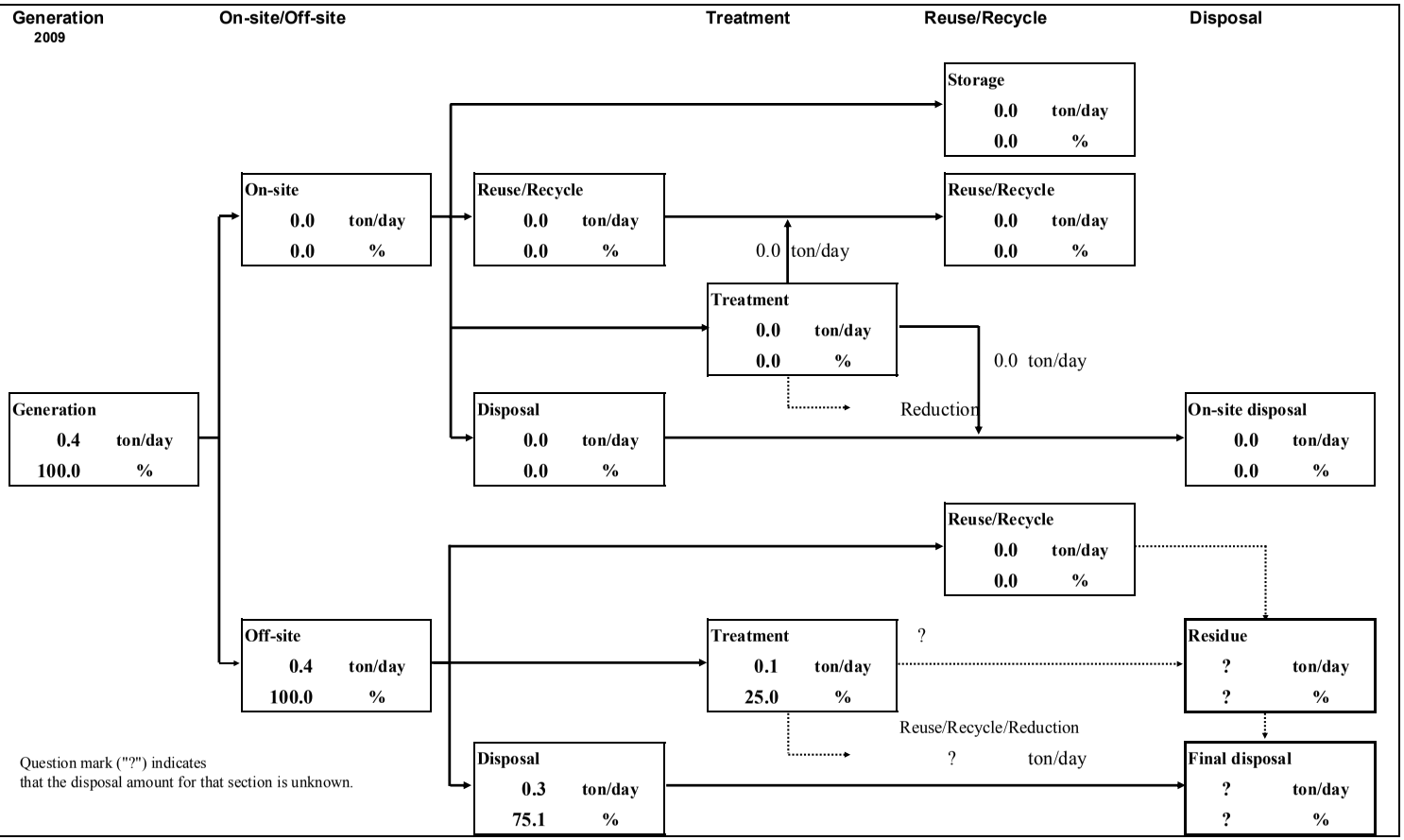


All PIM – HIW

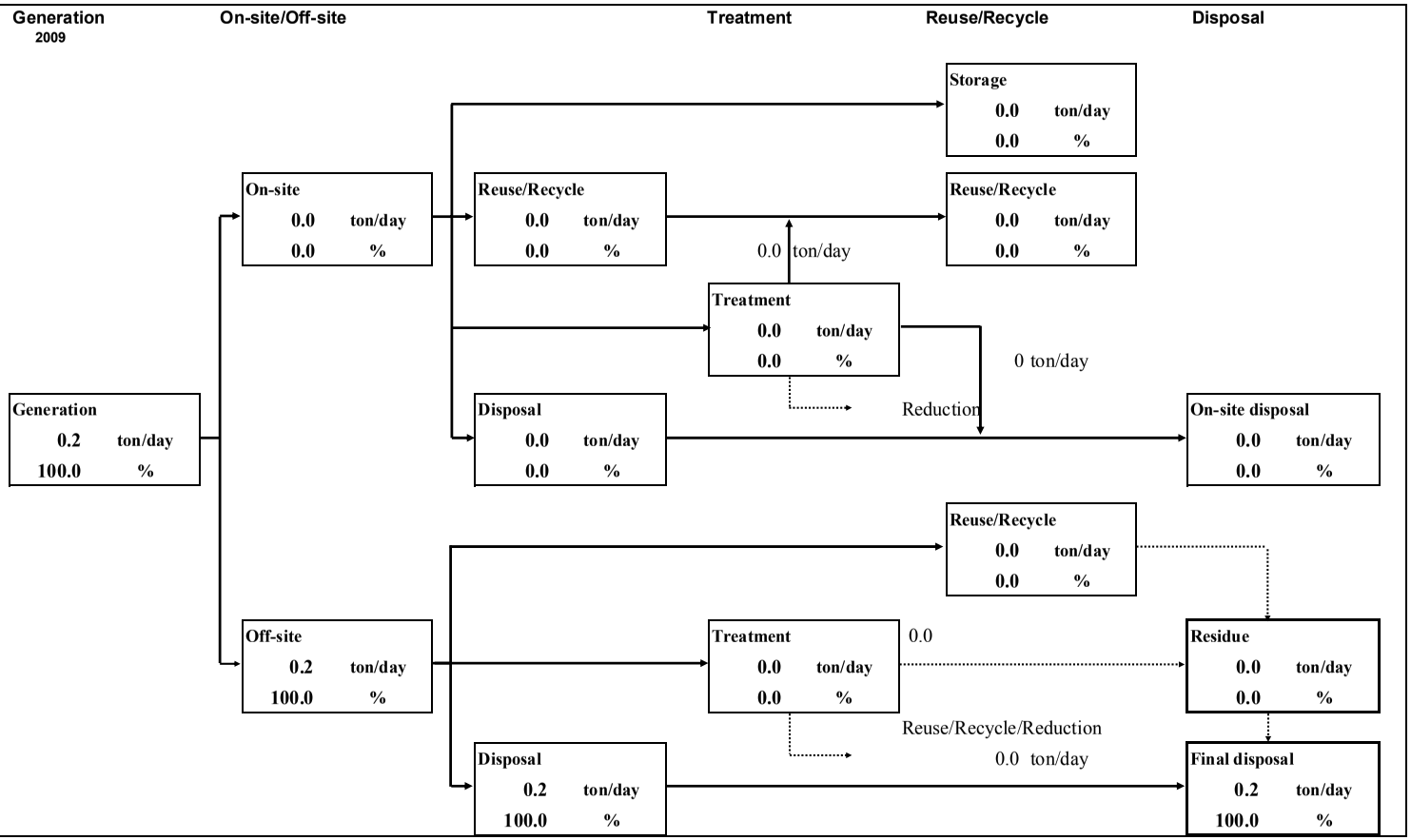

Generation
2009
On-site/Off-site
Treatment
Reuse/Recycle
Disposal
Storage
0.4 ton/day
0.3 %
On-site
4.2 ton/day
3.5 %
Reuse/Recycle
2.5 ton/day
2.1 %
Reuse/Recycle
2.5 ton/day
2.1 %
0.0 ton/day
Treatment
0.0 ton/day
0.0 %
0 ton/day
Generation
119.7 ton/day
100.0 %
Disposal
1.3 ton/day
1.1 %
Reduction
On-site disposal
1.3 ton/day
1.1 %
Reuse/Recycle
20.0 ton/day
16.8 %
?
Off-site
115.5 ton/day
96.5 %
Treatment
71.0 ton/day
59.3 %
?
Residue
? ton/day
? %
Reuse/Recycle/Reduction
? ton/day
Disposal
24.5 ton/day
20.4 %
Final disposal
? ton/day
? %
Question mark ("?") indicates
that the disposal amount for that section is unknown.

c. Health-care Waste

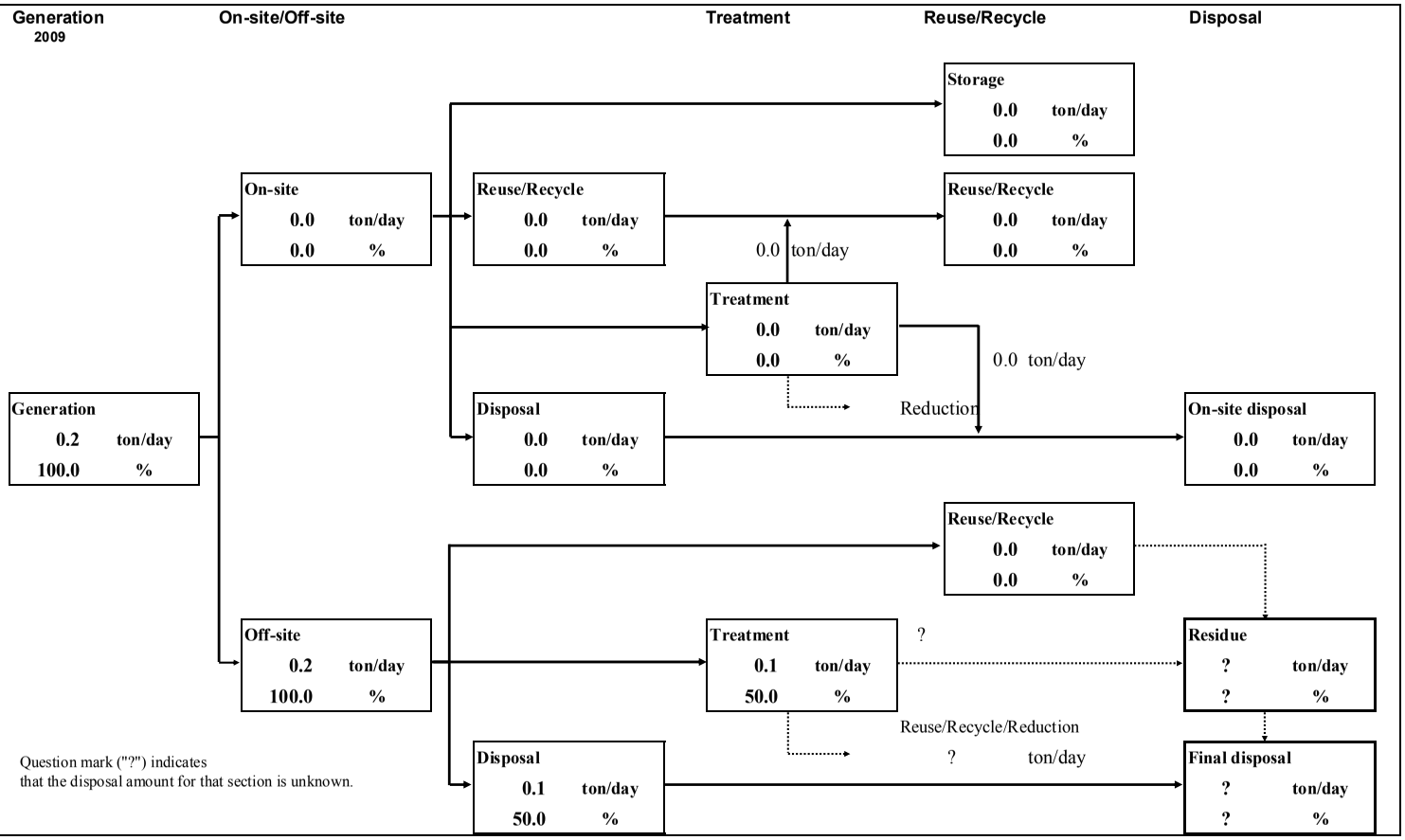
All PIM –All Waste



All PIM –Non HIW

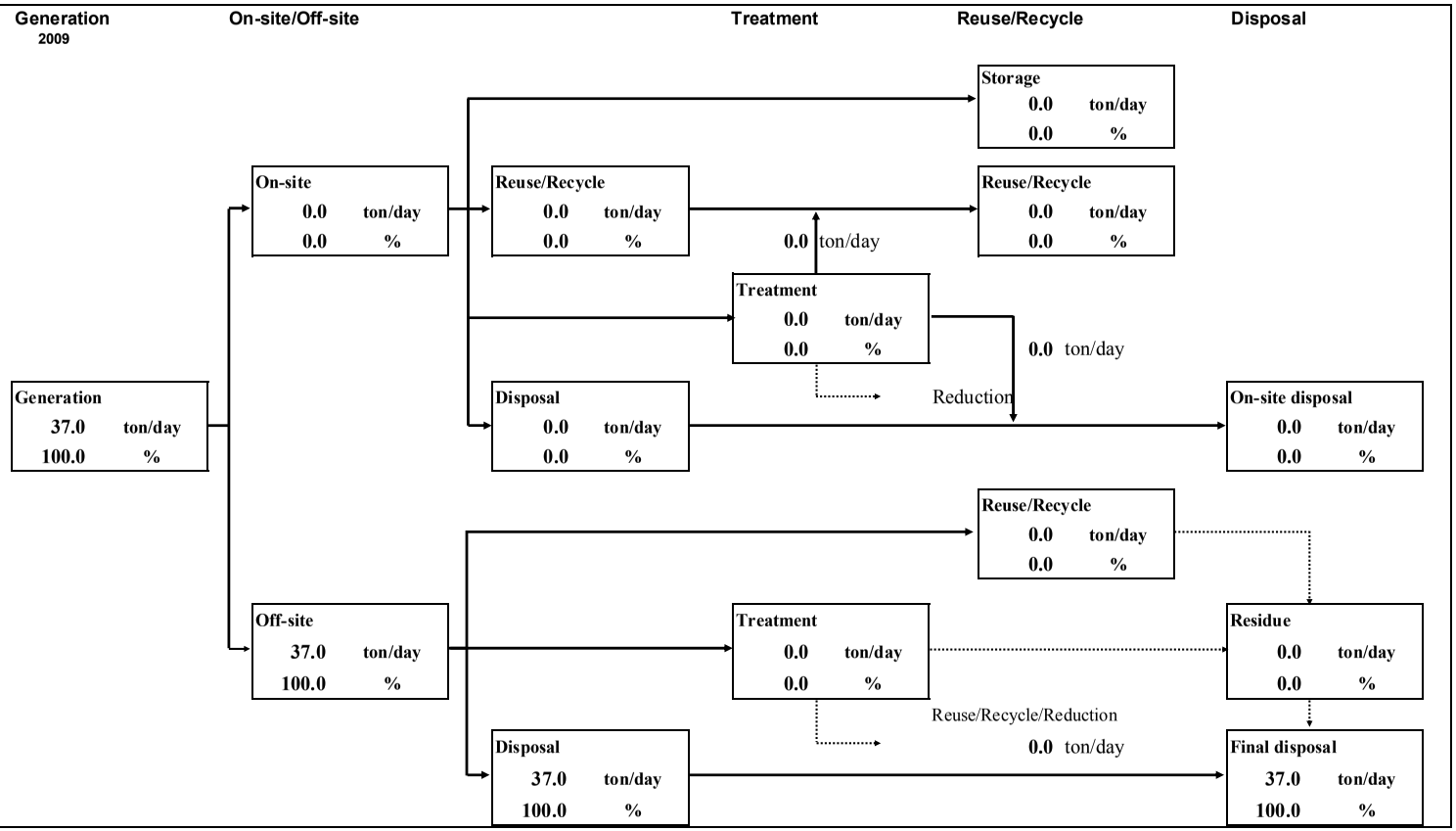


All PIM – HIW


Generation
2009
On-site/Off-site
Treatment
Reuse/Recycle
Disposal
Storage
0.0 ton/day
0.0 %
On-site
0.0 ton/day
0.0 %
Reuse/Recycle
0.0 ton/day
0.0 %
Reuse/Recycle
0.0 ton/day
0.0 %
0.0 ton/day
Treatment
0.0 ton/day
0.0 %
0.0 ton/day
Generation
0.2 ton/day
100.0 %
Disposal
0.0 ton/day
0.0 %
Reduction
On-site disposal
0.0 ton/day
0.0 %
Reuse/Recycle
0.0 ton/day
0.0 %
Off-site
0.2 ton/day
100.0 %
Treatment
0.1 ton/day
50.0 %
?
Residue
? ton/day
? %
Reuse/Recycle/Reduction
? ton/day
Disposal
0.1 ton/day
50.0 %
Final disposal
? ton/day
? %
Question mark ("?") indicates
that the disposal amount for that section is unknown.

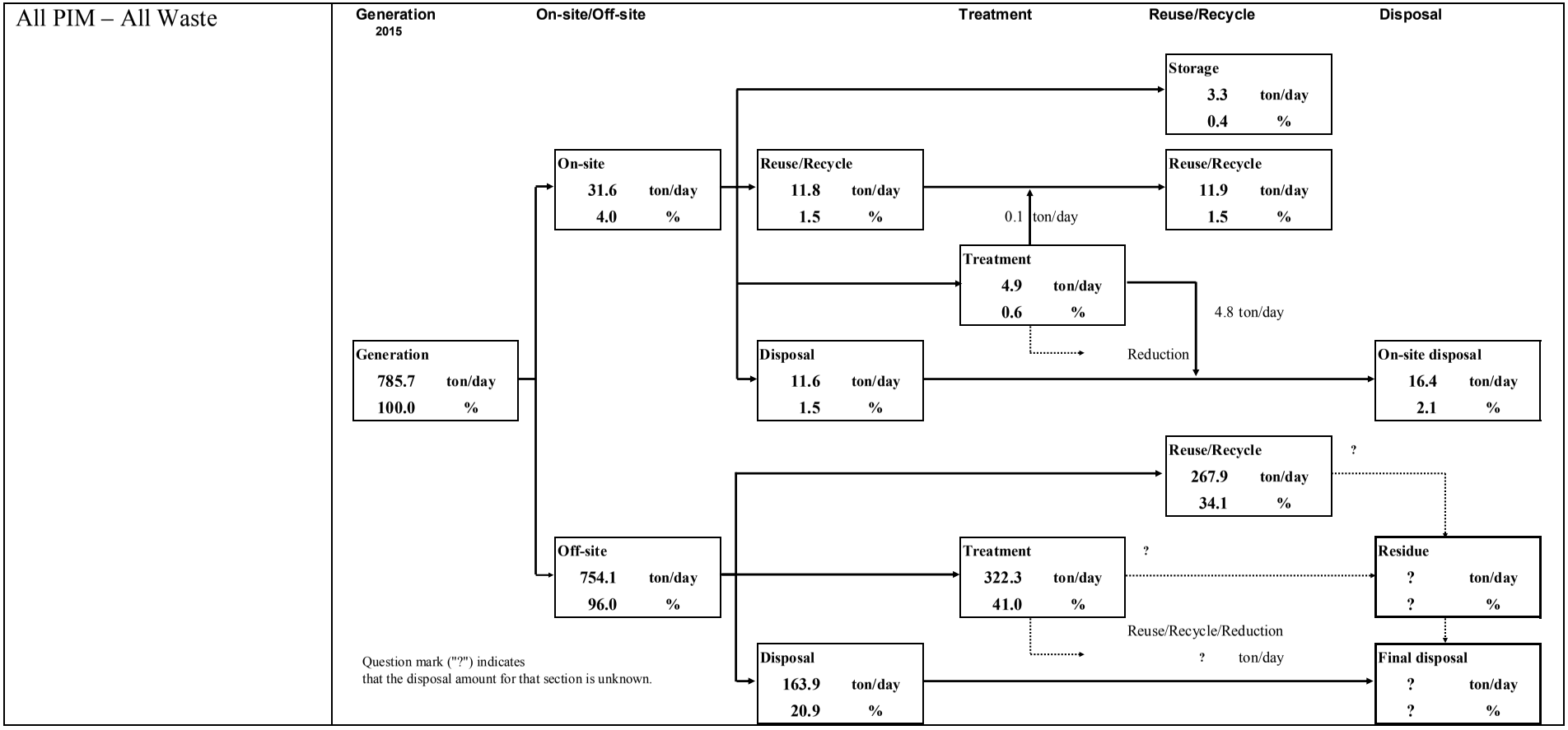
d. Construction Waste

All PIM
– All Waste (Non HIW)

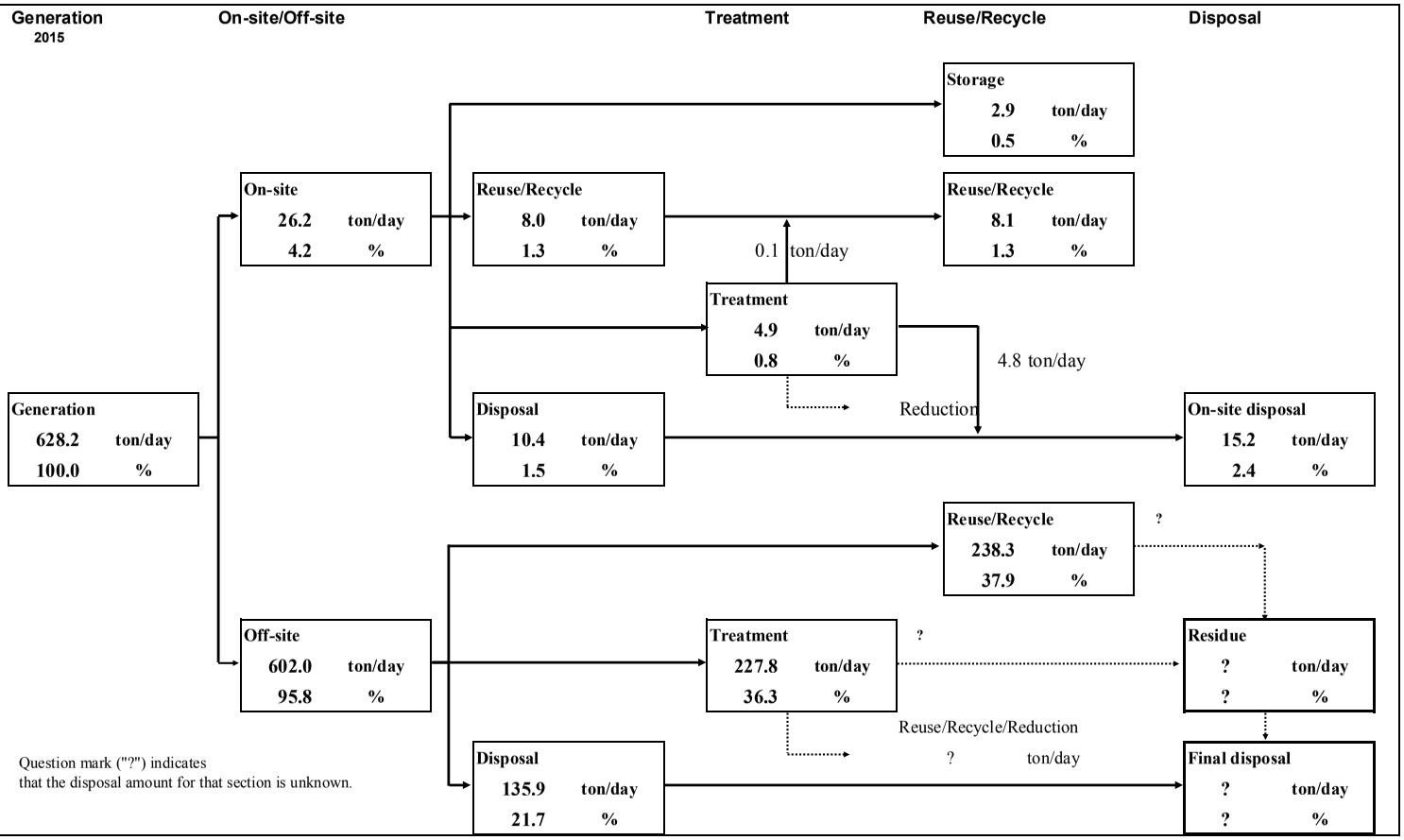


1.2 Simplified Waste stream (2015)

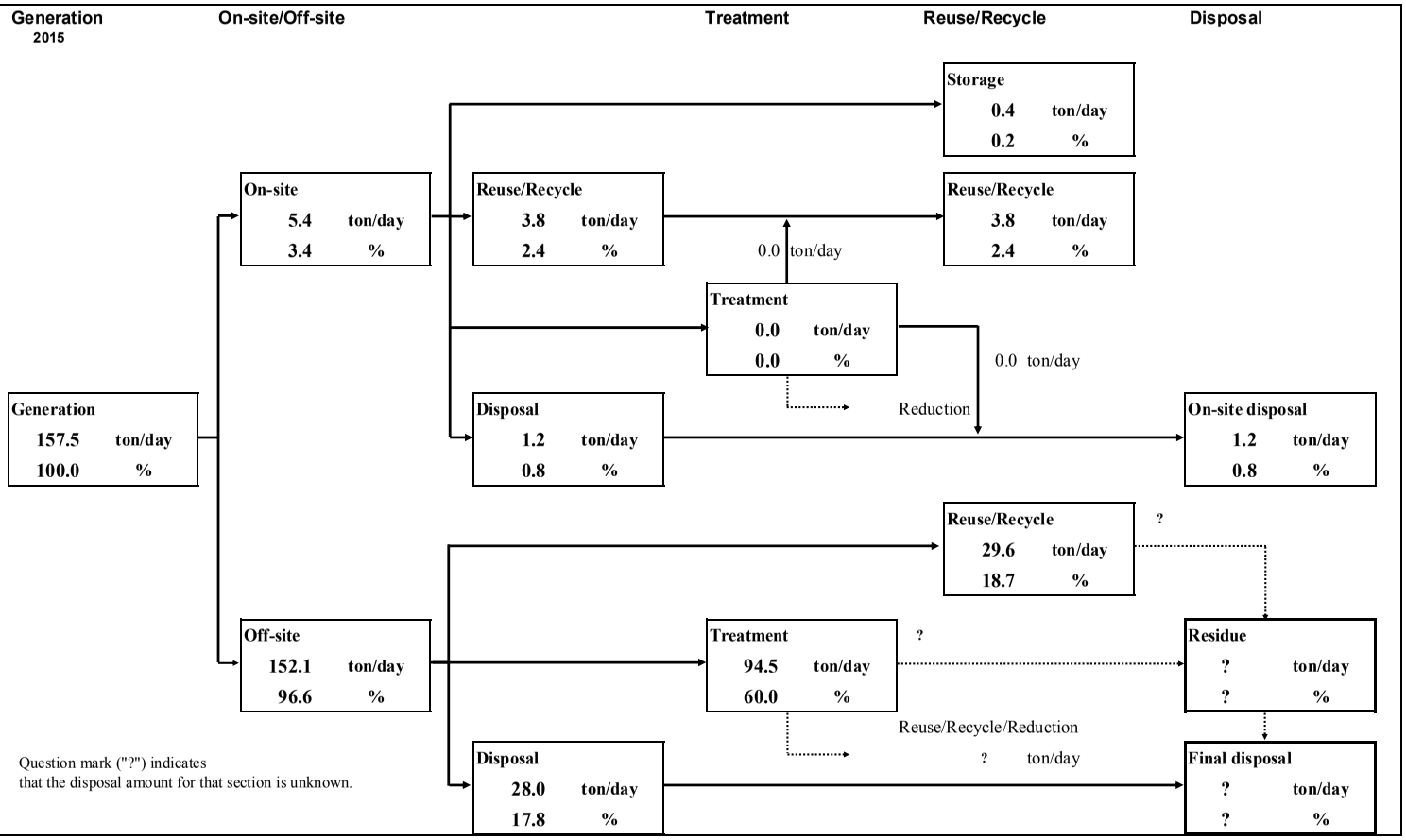
e. All waste (GIW + Health-care waste + Construction waste)



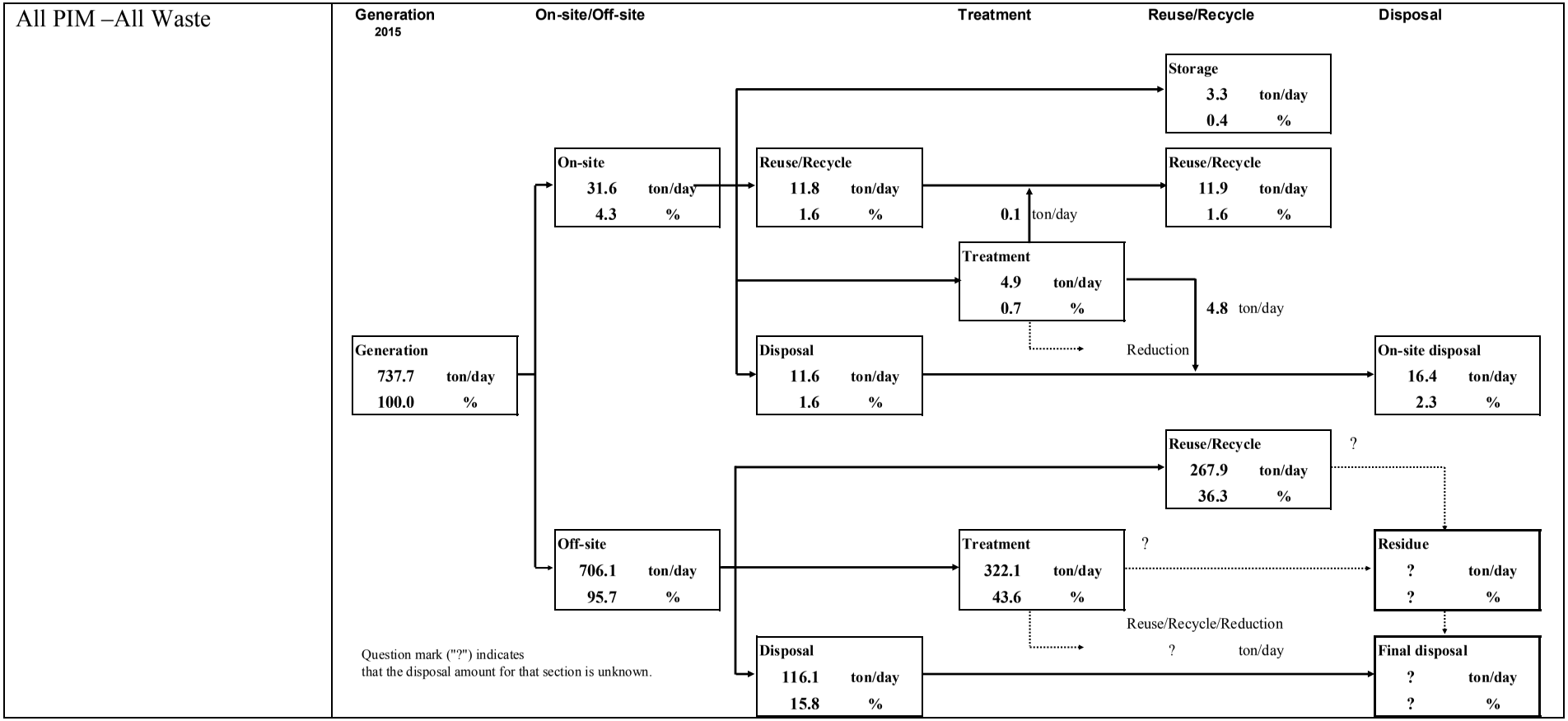
All PIM – Non HIW



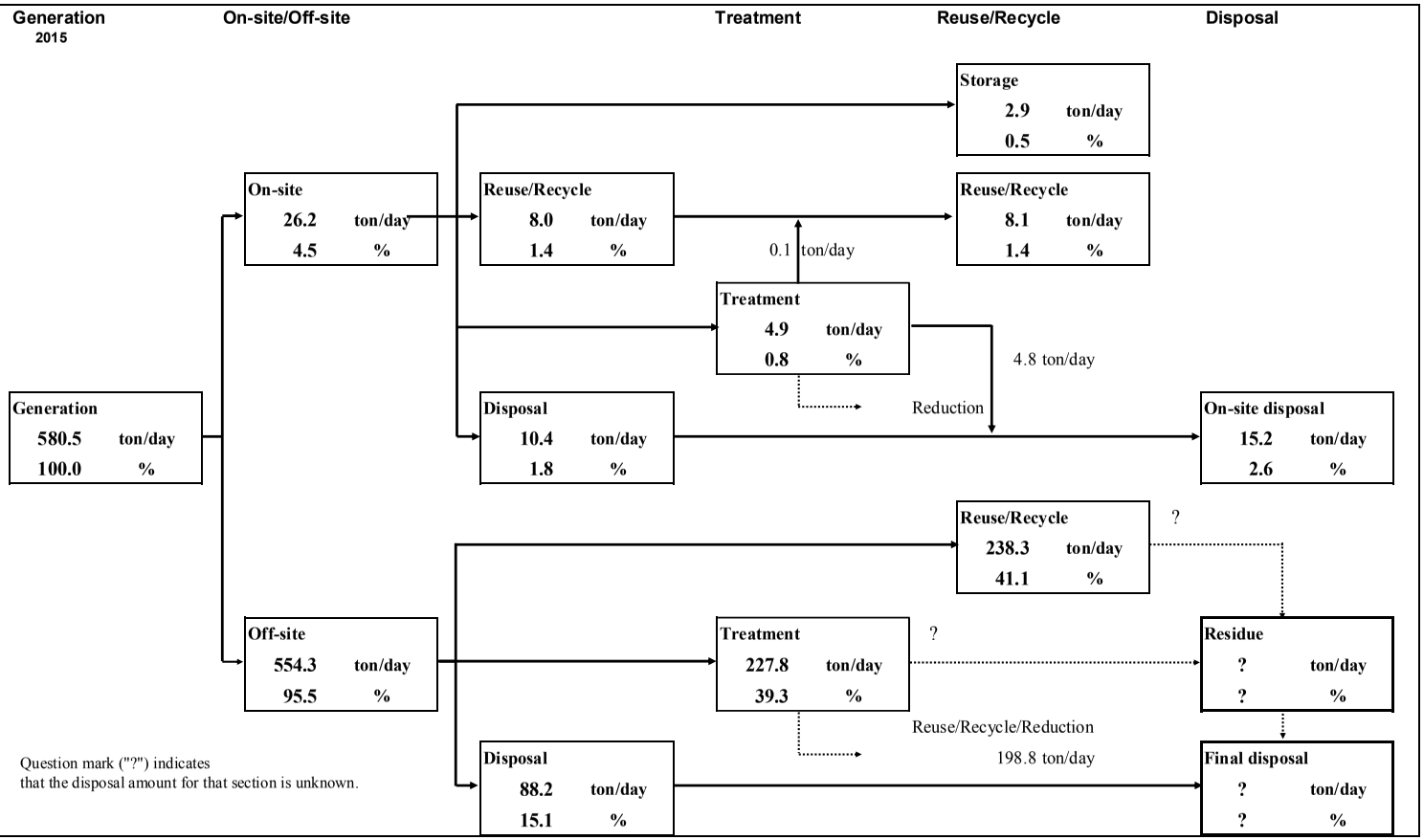
All PIM – HIW


Generation
2015
On-site/Off-site
Treatment
Reuse/Recycle
Disposal
Storage
0.4 ton/day
0.2 %
On-site
5.4 ton/day
3.4 %
Reuse/Recycle
3.8 ton/day
2.4 %
Reuse/Recycle
3.8 ton/day
2.4 %
0.0 ton/day
Treatment
0.0 ton/day
0.0 %
0.0 ton/day
Generation
157.5 ton/day
100.0 %
Disposal
1.2 ton/day
0.8 %
Reduction
On-site disposal
1.2 ton/day
0.8 %
Reuse/Recycle
29.6 ton/day
18.7 %
?
Off-site
152.1 ton/day
96.6 %
Treatment
94.5 ton/day
60.0 %
?
Residue
? ton/day
? %
Reuse/Recycle/Reduction
? ton/day
Disposal
28.0 ton/day
17.8 %
Final disposal
? ton/day
? %
Question mark ("?") indicates
that the disposal amount for that section is unknown.

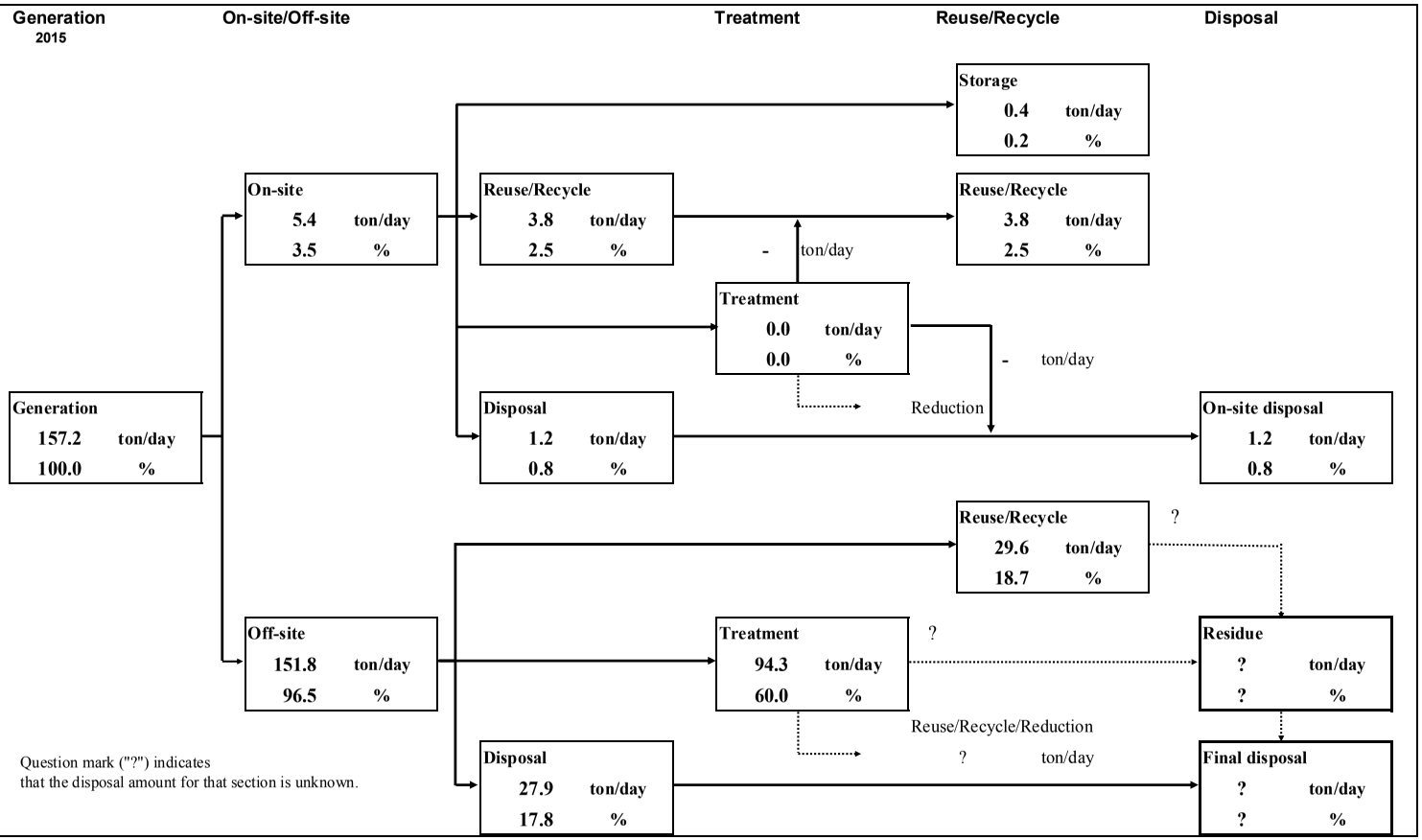
f. General IW generated from PIM (2015)



All PIM – Non HIW

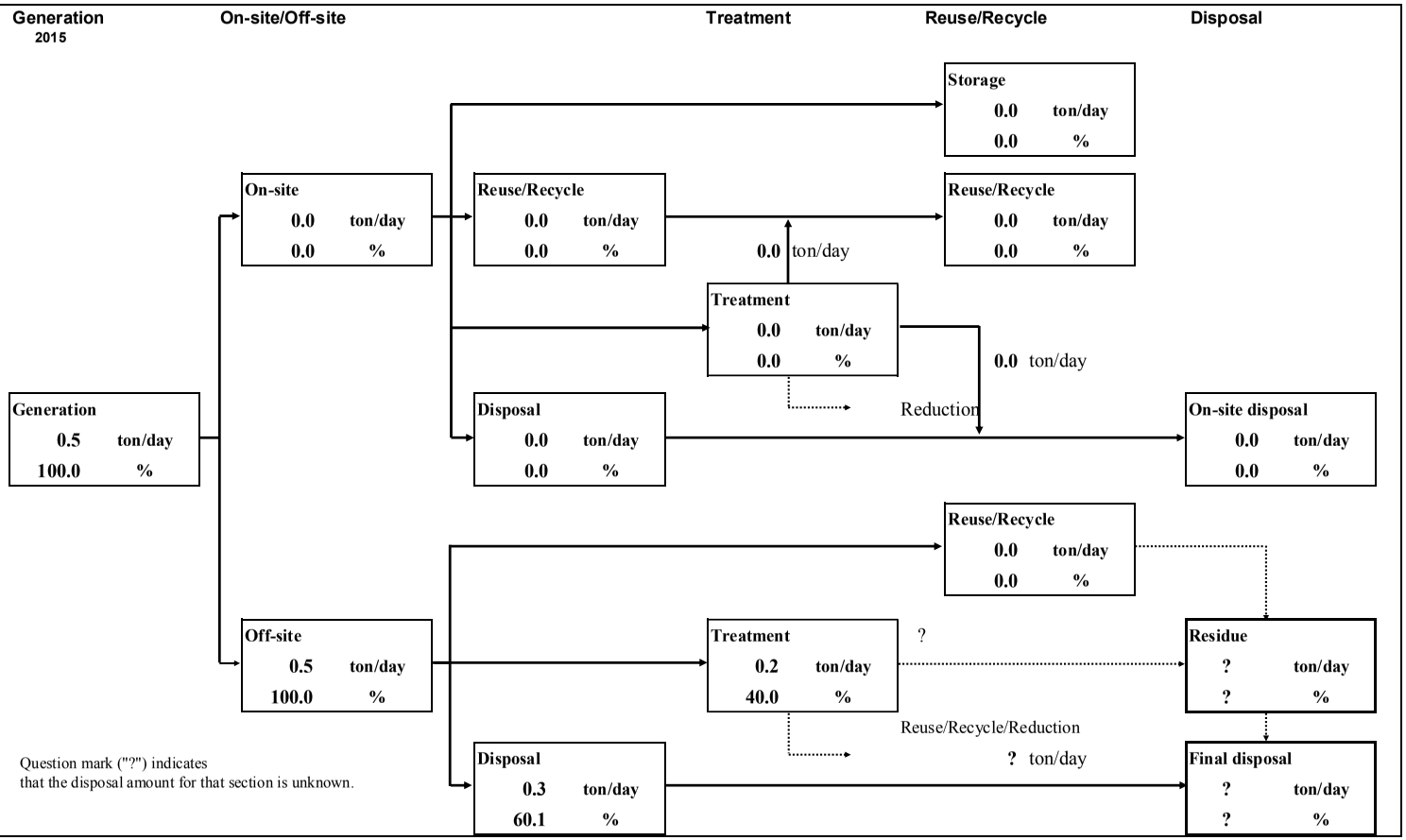


All PIM – HIW

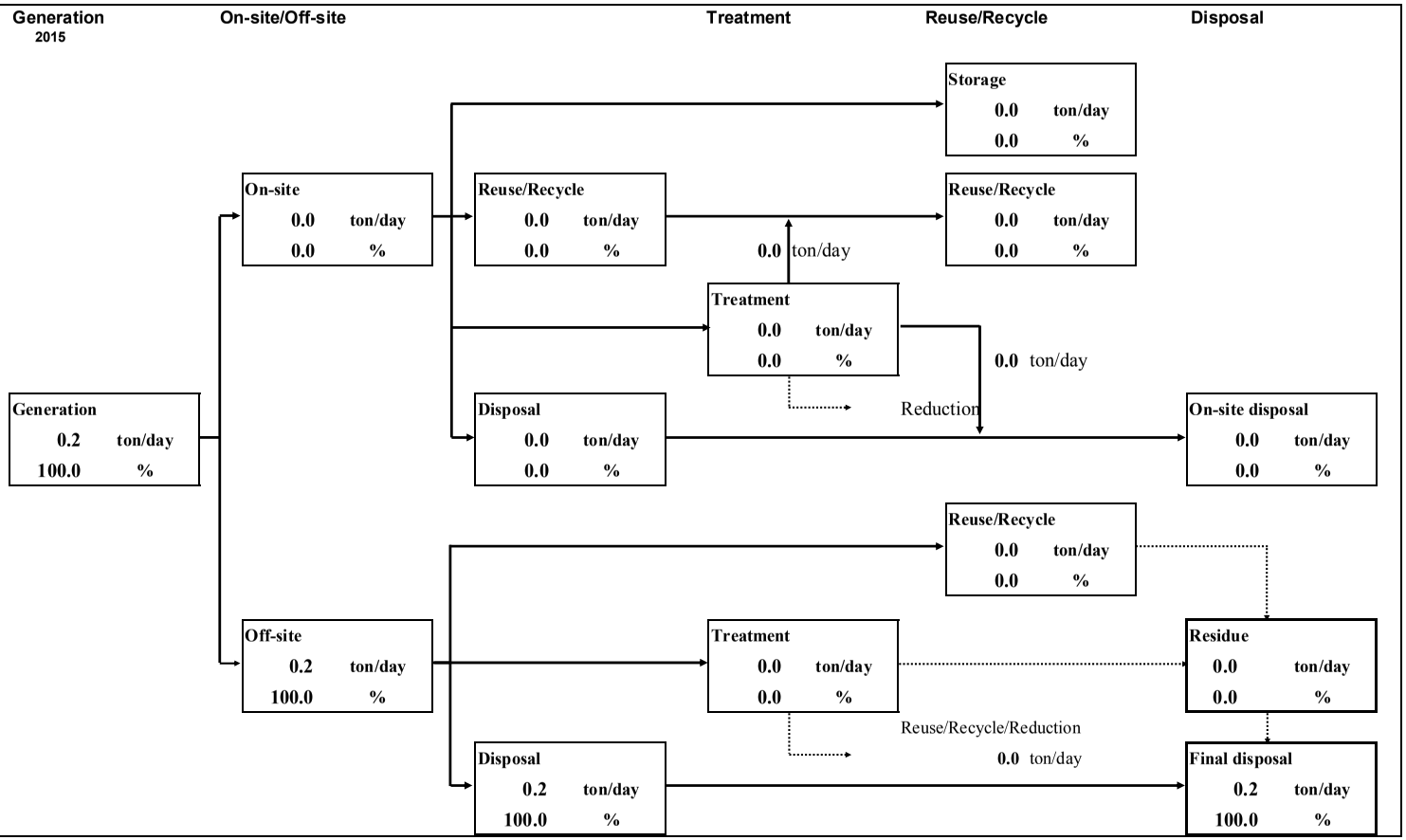

Generation
2015
On-site/Off-site
Treatment
Reuse/Recycle
Disposal
Storage
0.4 ton/day
0.2 %
On-site
5.4 ton/day
3.5 %
Reuse/Recycle
3.8 ton/day
2.5 %
Reuse/Recycle
3.8 ton/day
2.5 %
- ton/day
Treatment
0.0 ton/day
0.0 %
- ton/day
Generation
157.2 ton/day
100.0 %
Disposal
1.2 ton/day
0.8 %
Reduction
On-site disposal
1.2 ton/day
0.8 %
Reuse/Recycle
29.6 ton/day
18.7 %
?
Off-site
151.8 ton/day
96.5 %
Treatment
94.3 ton/day
60.0 %
?
Residue
? ton/day
? %
Reuse/Recycle/Reduction
? ton/day
Disposal
27.9 ton/day
17.8 %
Final disposal
? ton/day
? %
Question mark ("?") indicates
that the disposal amount for that section is unknown.

g. Health-care Waste

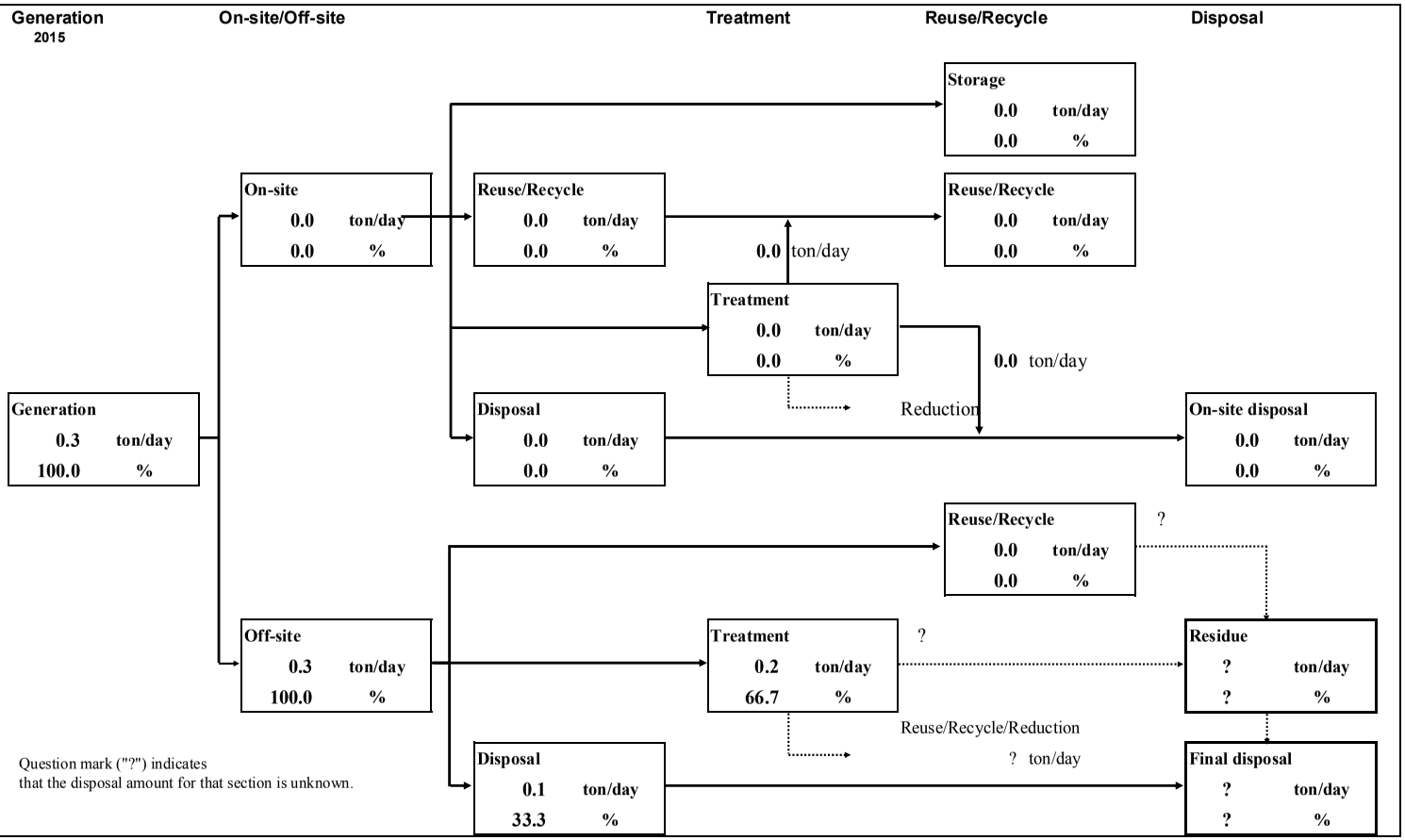
All PIM –All Waste



All PIM –Non HIW

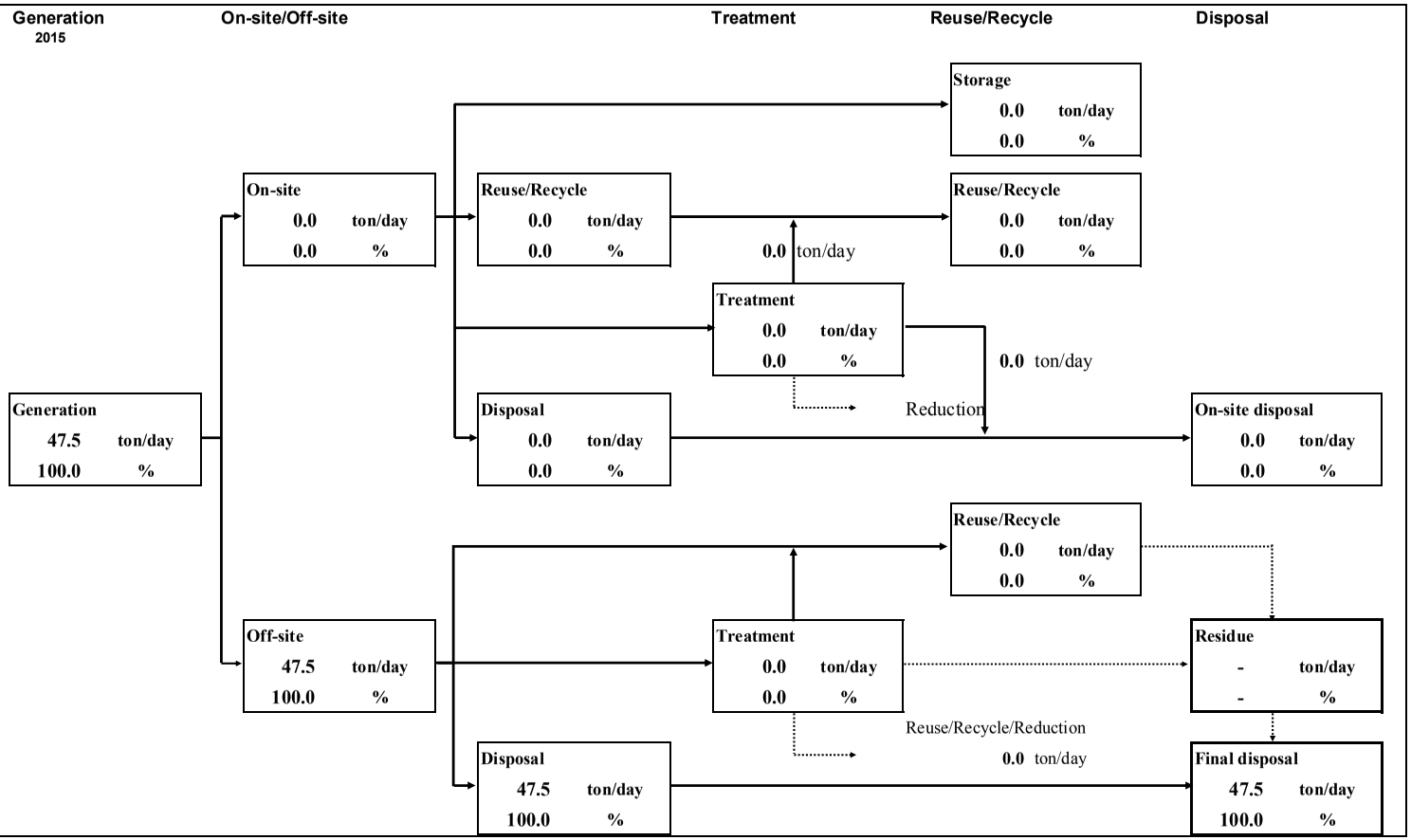


All PIM – HIW


Generation
2015
On-site/Off-site
Treatment
Reuse/Recycle
Disposal
Storage
0.0 ton/day
0.0 %
On-site
0.0 ton/day
0.0 %
Reuse/Recycle
0.0 ton/day
0.0 %
Reuse/Recycle
0.0 ton/day
0.0 %
0.0 ton/day
Treatment
0.0 ton/day
0.0 %
0.0 ton/day
Generation
0.3 ton/day
100.0 %
Disposal
0.0 ton/day
0.0 %
Reduction
On-site disposal
0.0 ton/day
0.0 %
Reuse/Recycle
0.0 ton/day
0.0 %
?
Off-site
0.3 ton/day
100.0 %
Treatment
0.2 ton/day
66.7 %
?
Residue
? ton/day
? %
Reuse/Recycle/Reduction
? ton/day
Disposal
0.1 ton/day
33.3 %
Final disposal
? ton/day
? %
Question mark ("?") indicates
that the disposal amount for that section is unknown.

h. Construction Waste

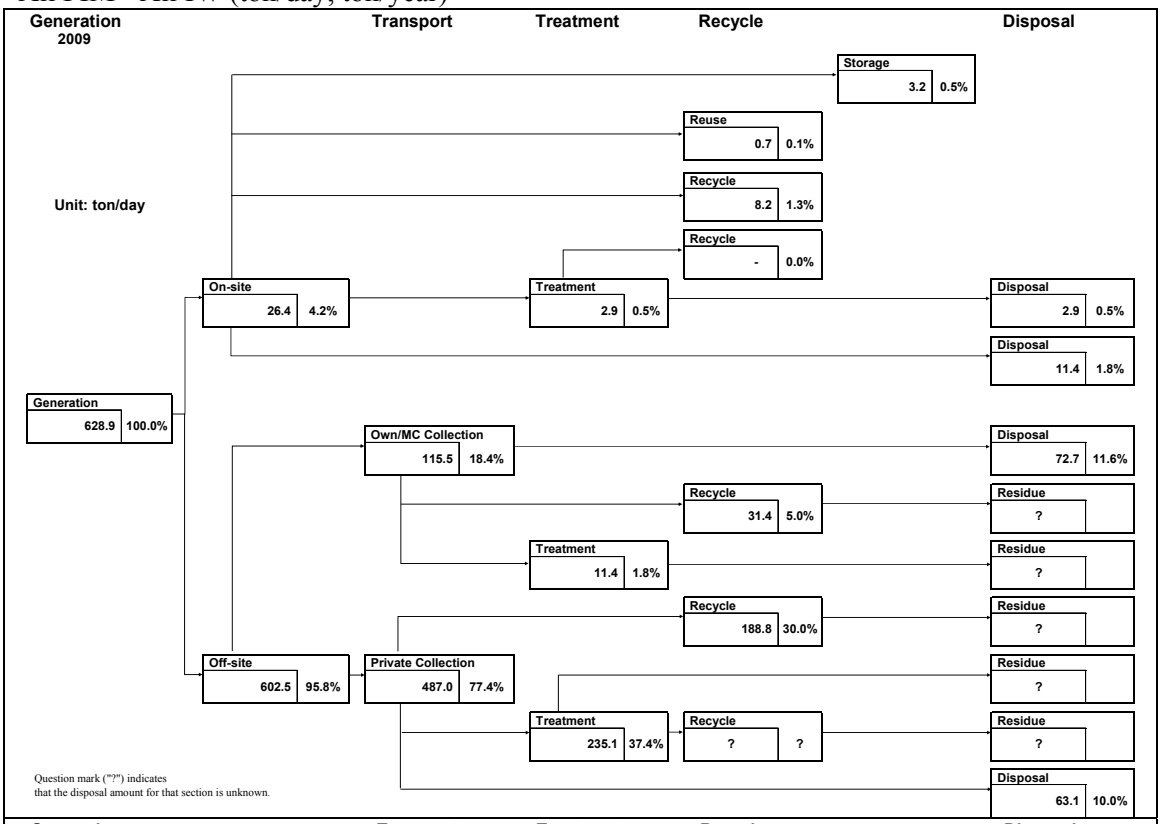
All PIM
– All Waste (Non HIW)

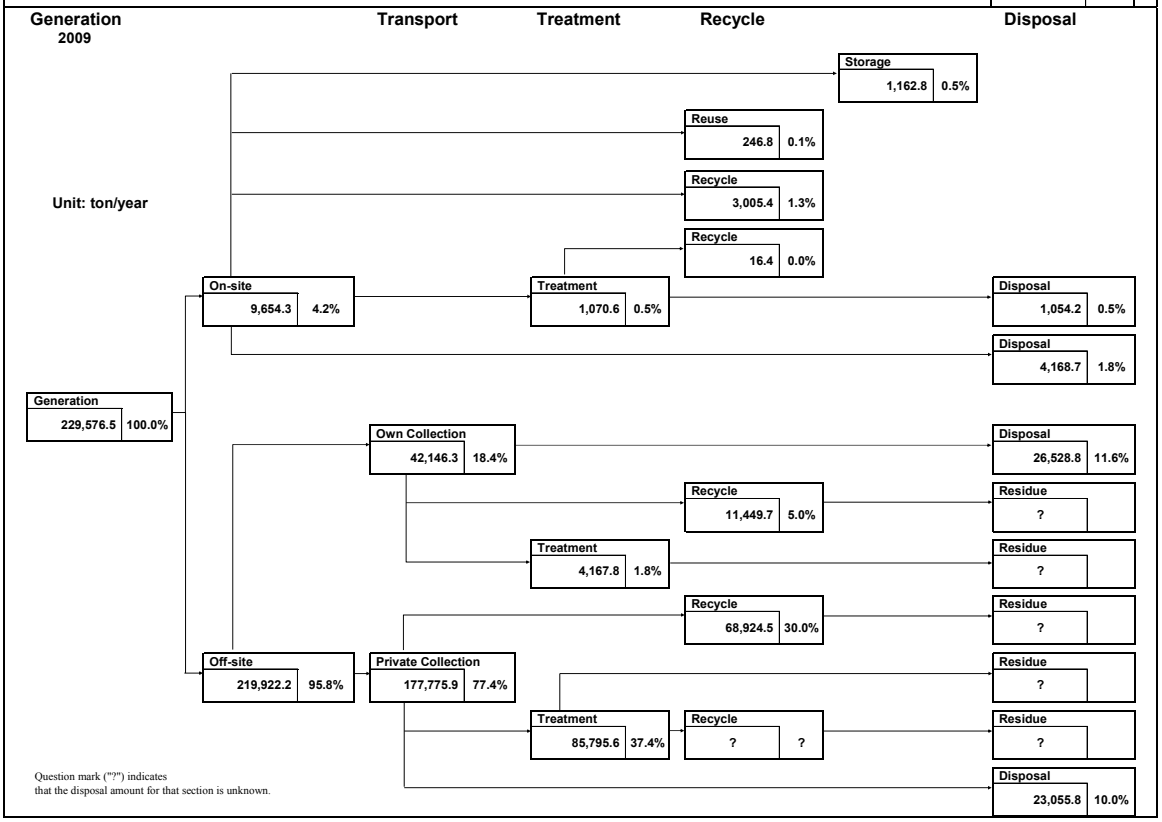


1.3 Detailed Waste stream (2009)

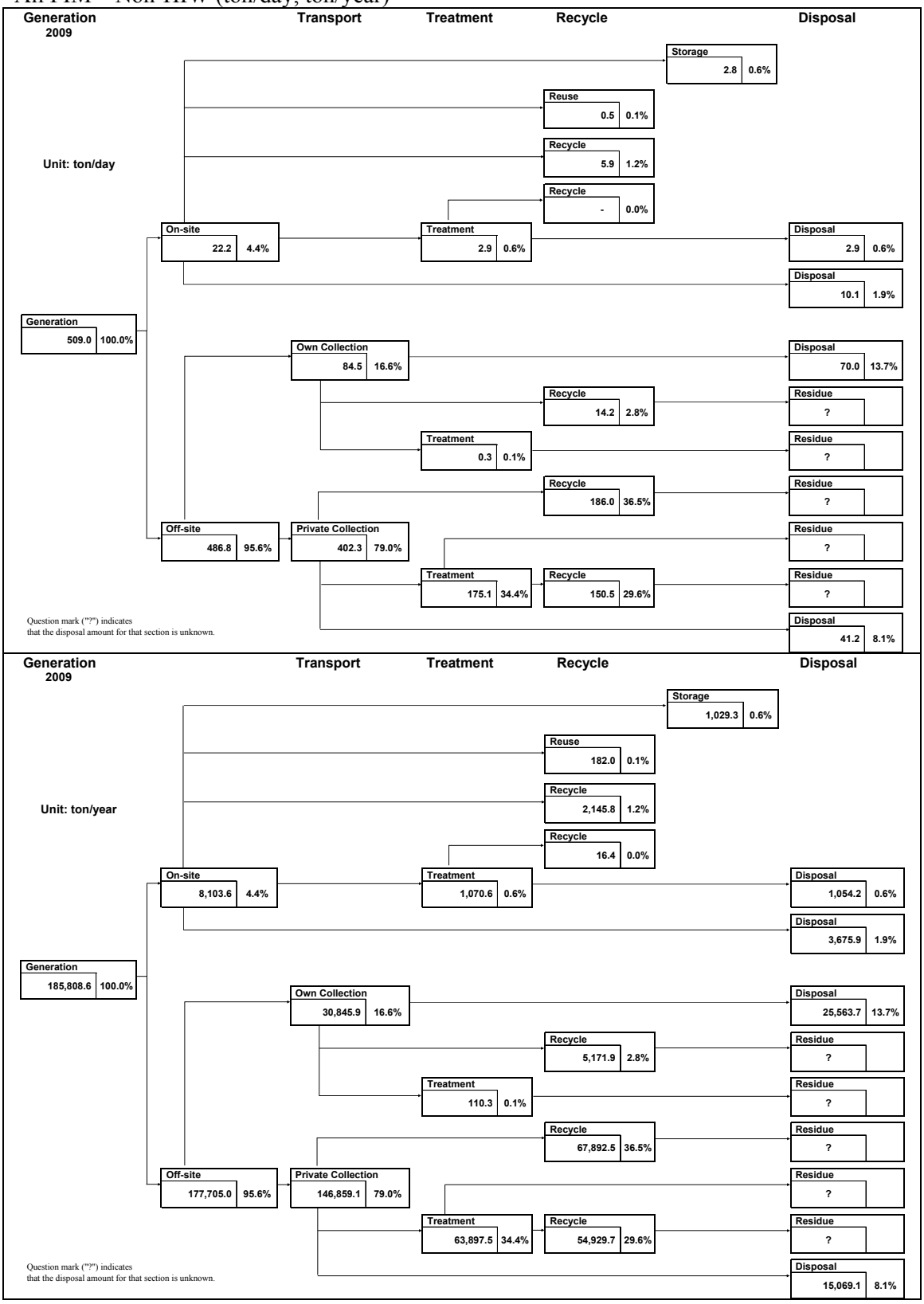
a. Industrial Waste (GIW + Health-care waste + Construction waste)

All PIM - All IW (ton/day, ton/year)

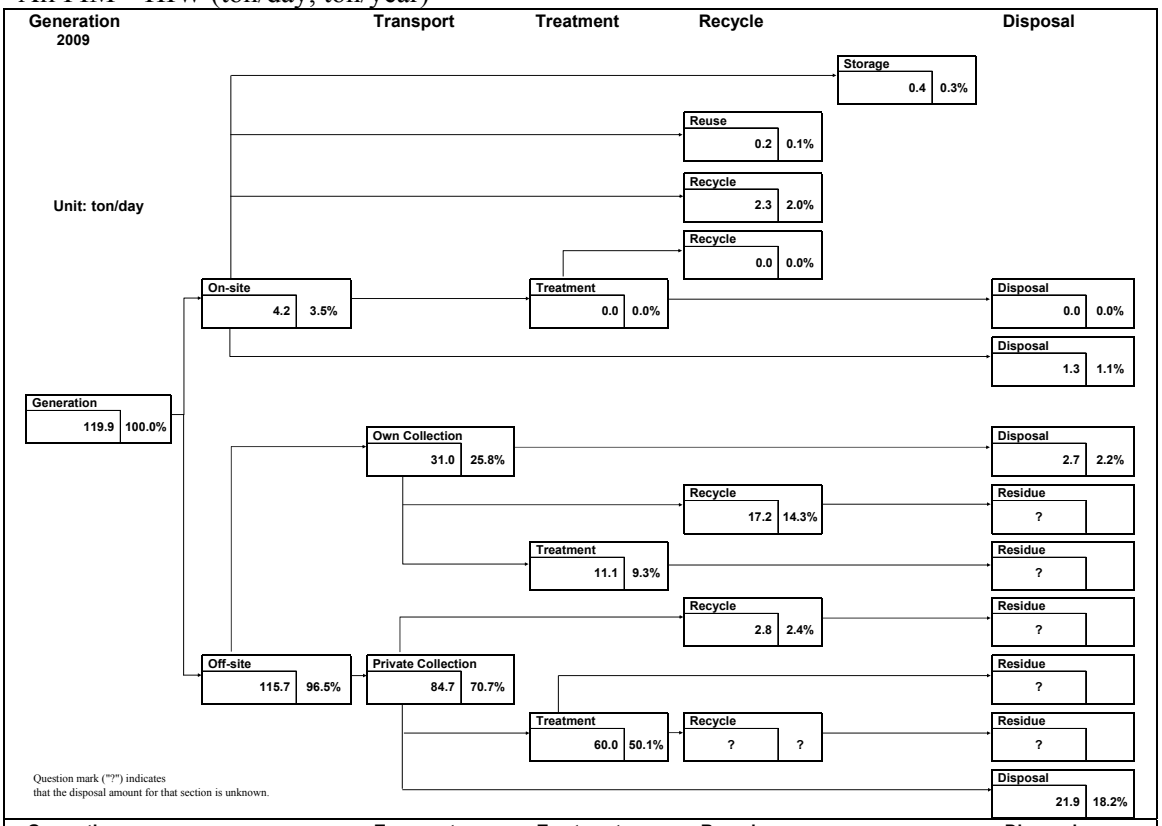


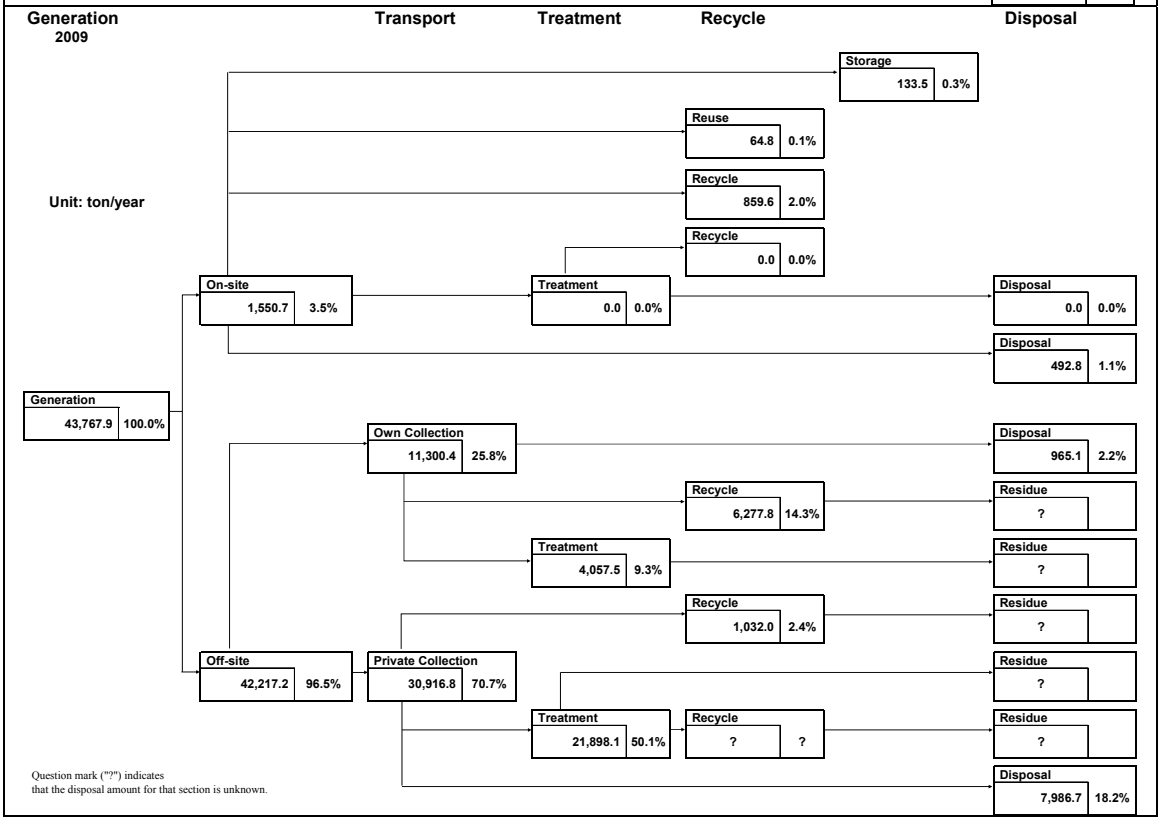


All PIM – Non-HIW (ton/day, ton/year)

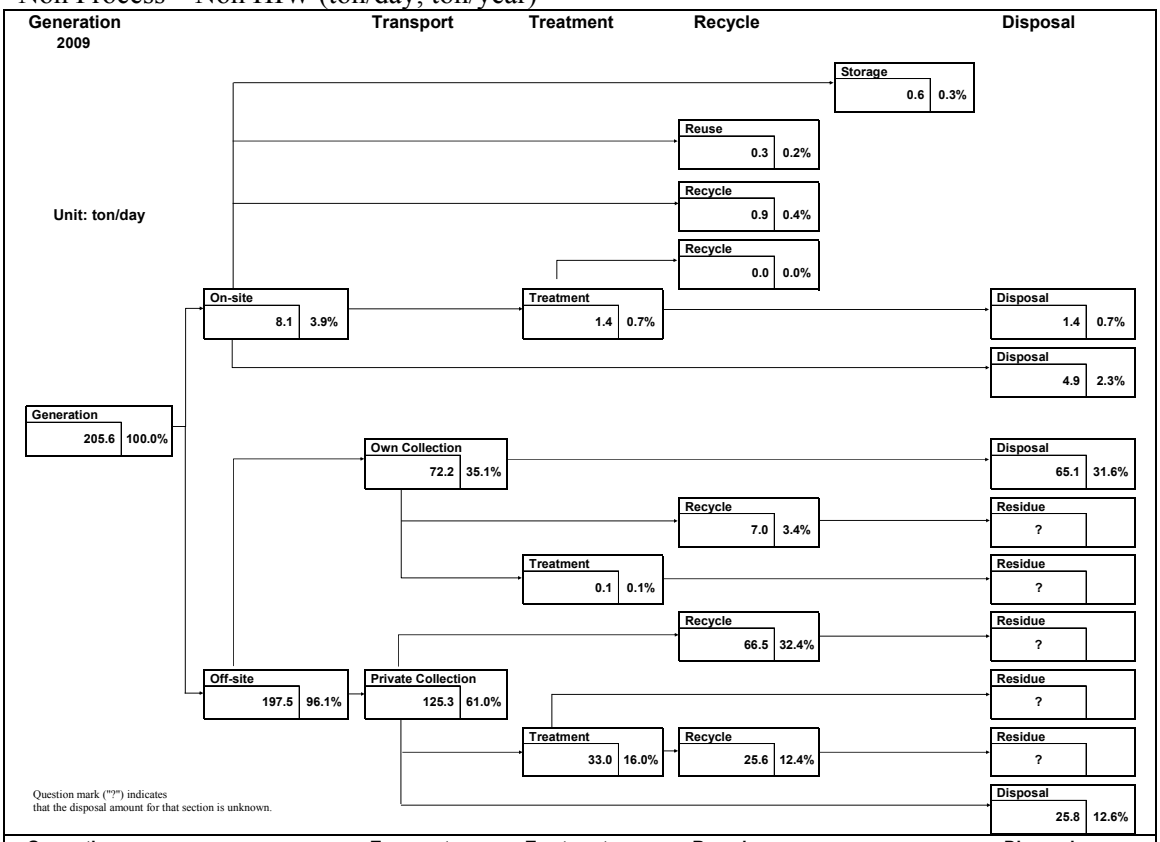


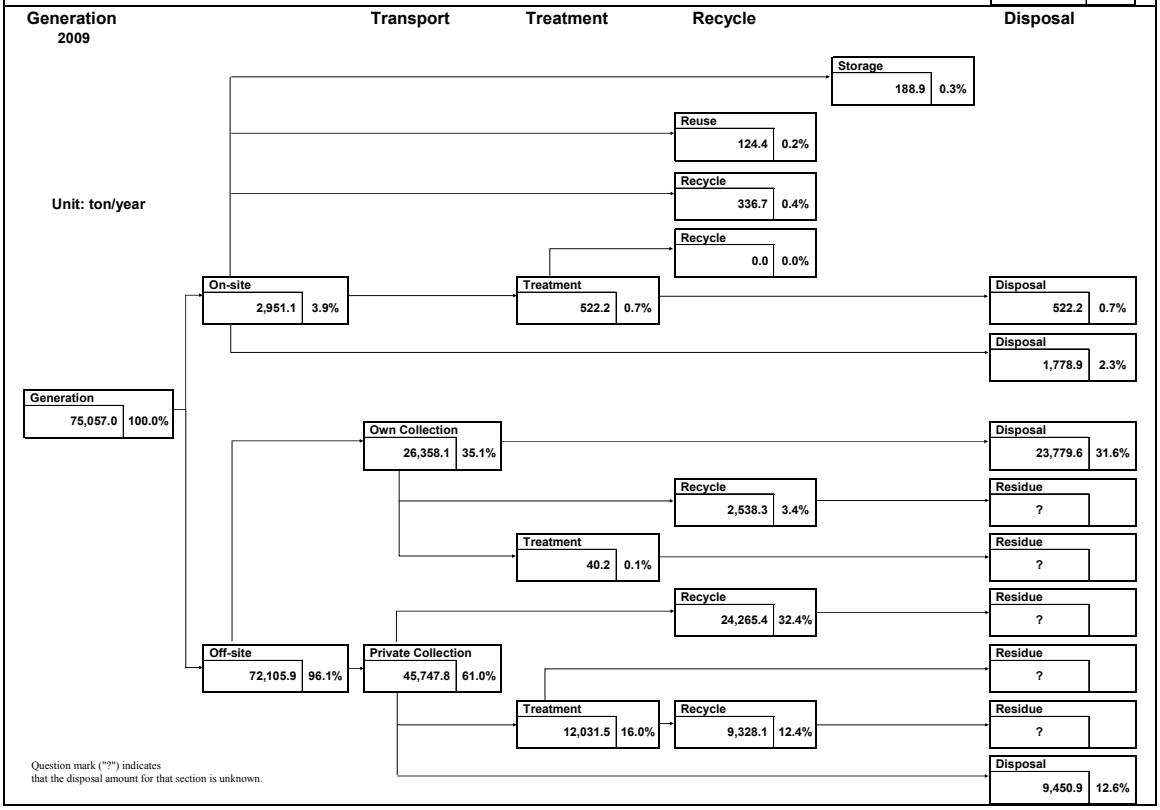
All PIM – HIW (ton/day, ton/year)



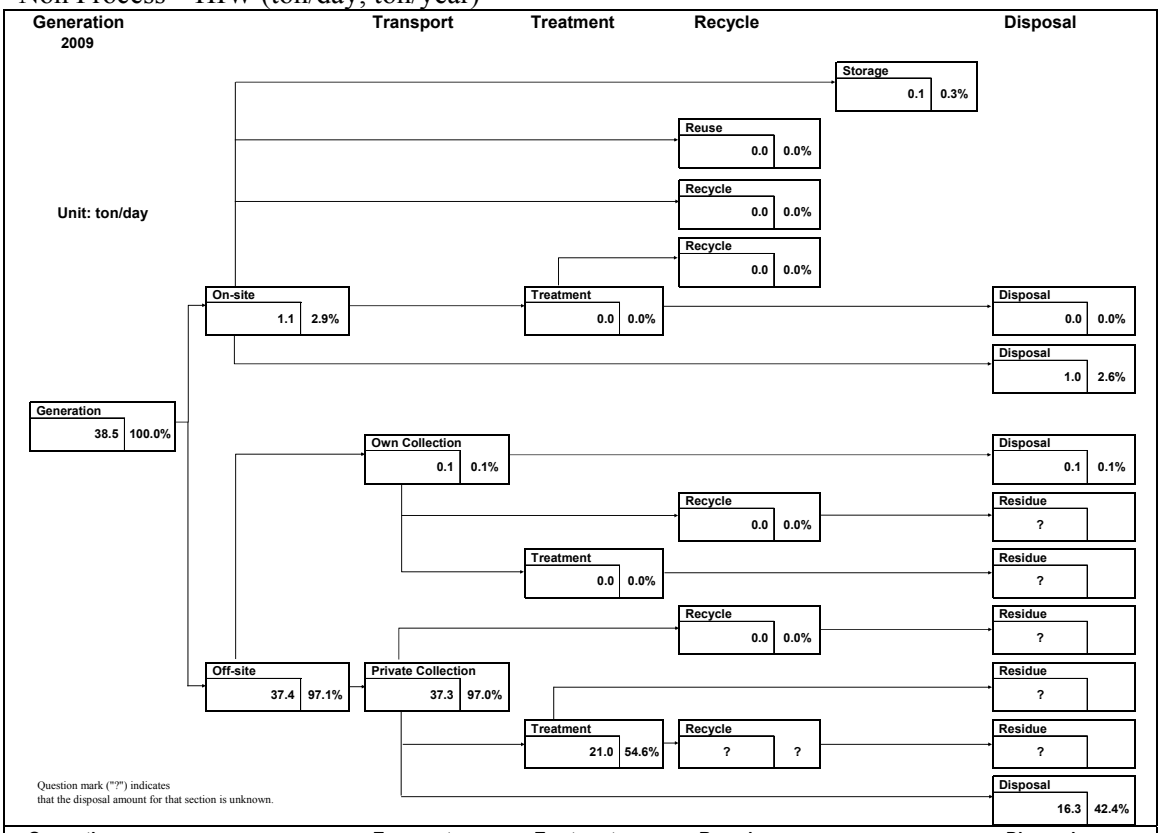


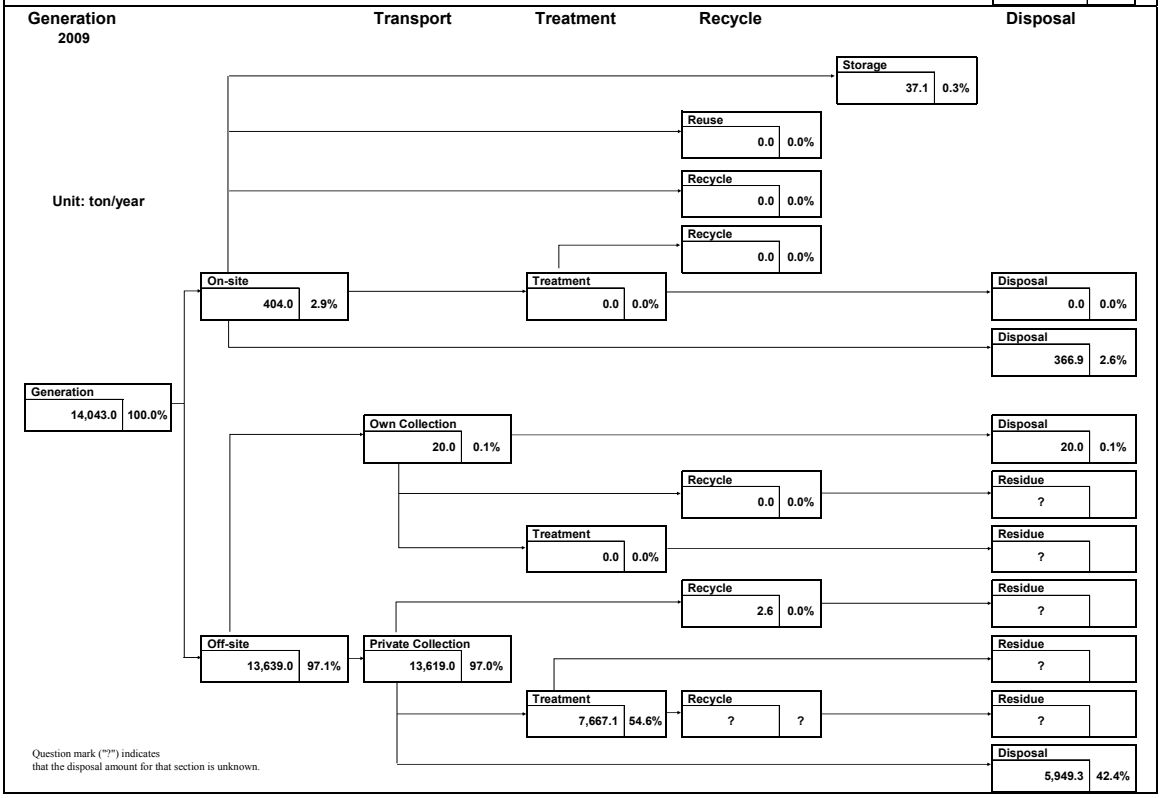
Non Process – Non HIW (ton/day, ton/year)



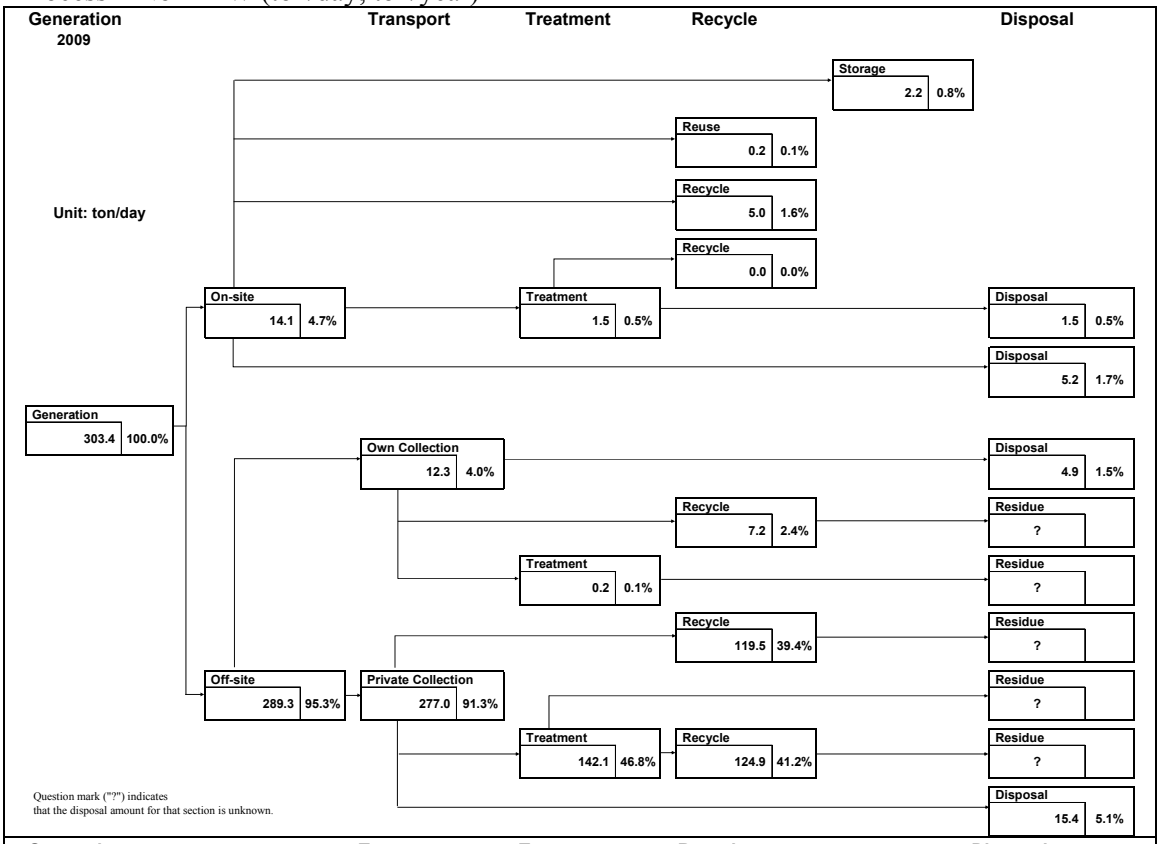


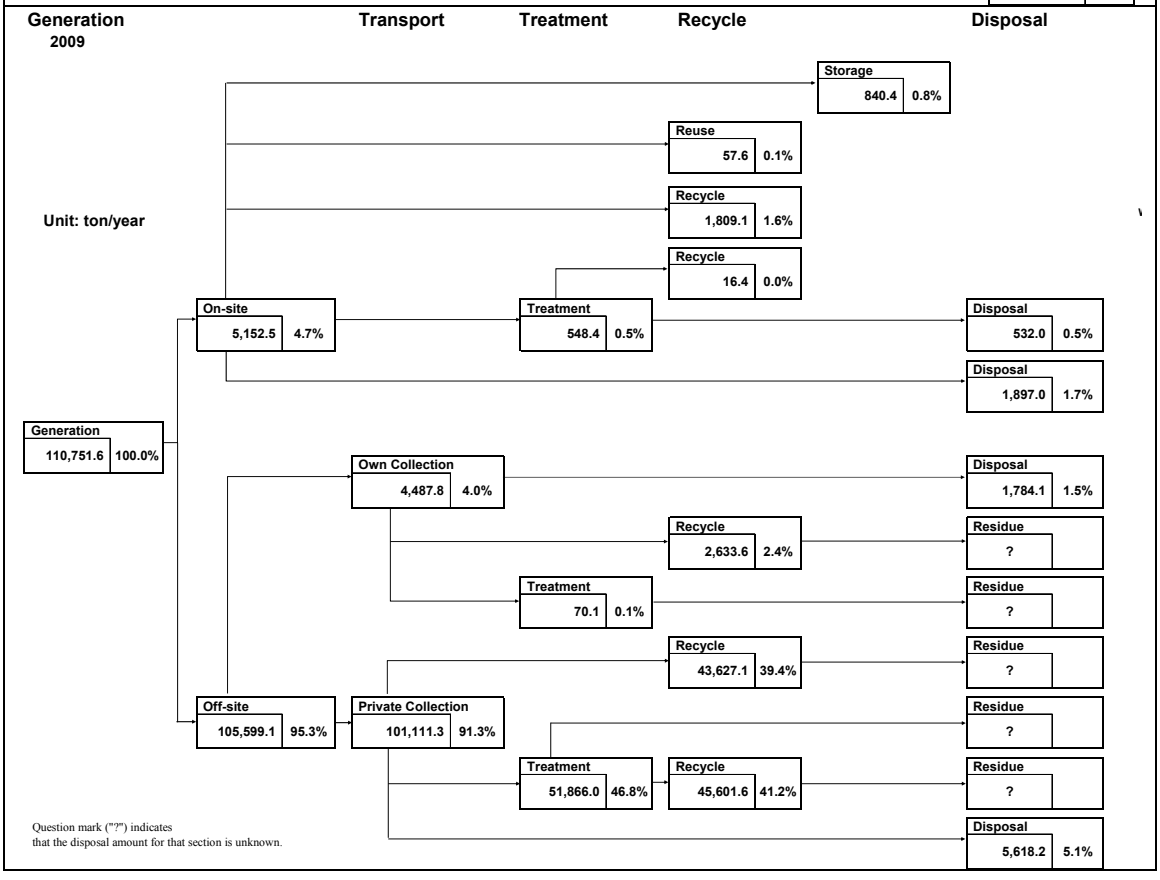
Non Process – HIW (ton/day, ton/year)



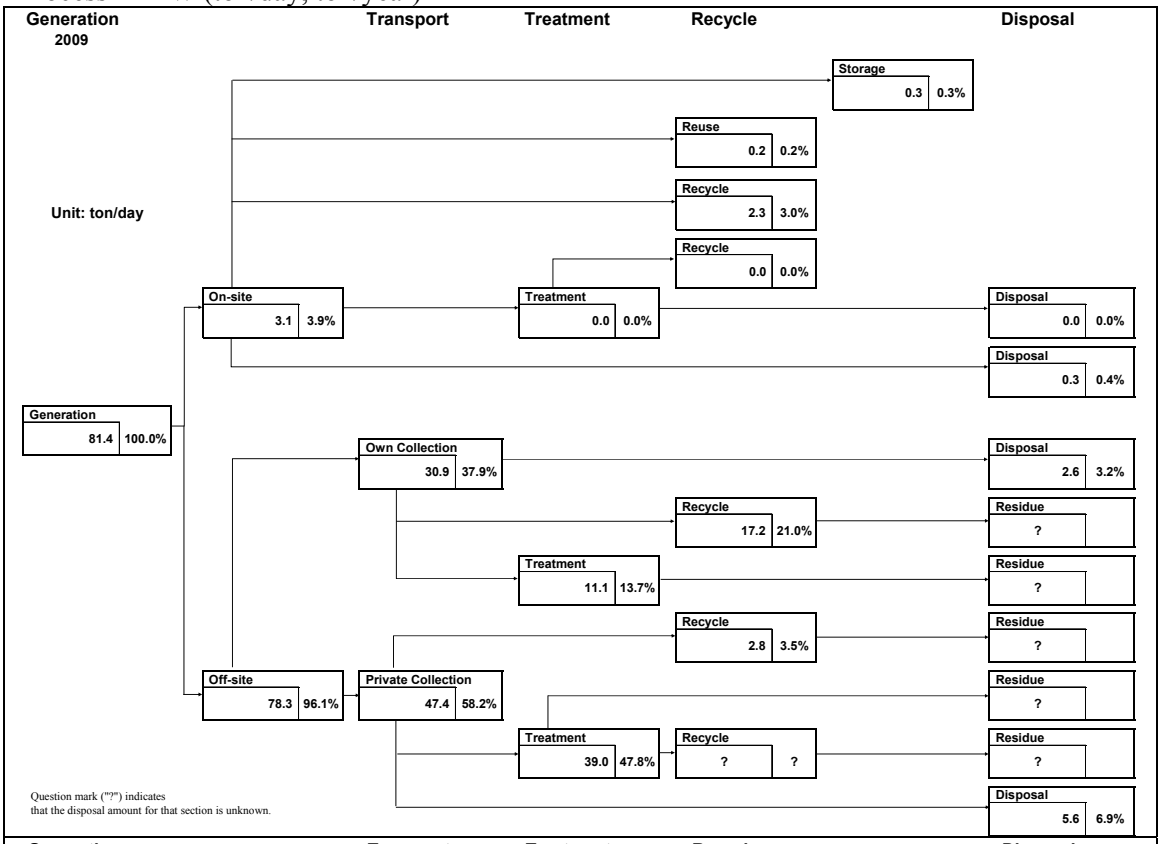


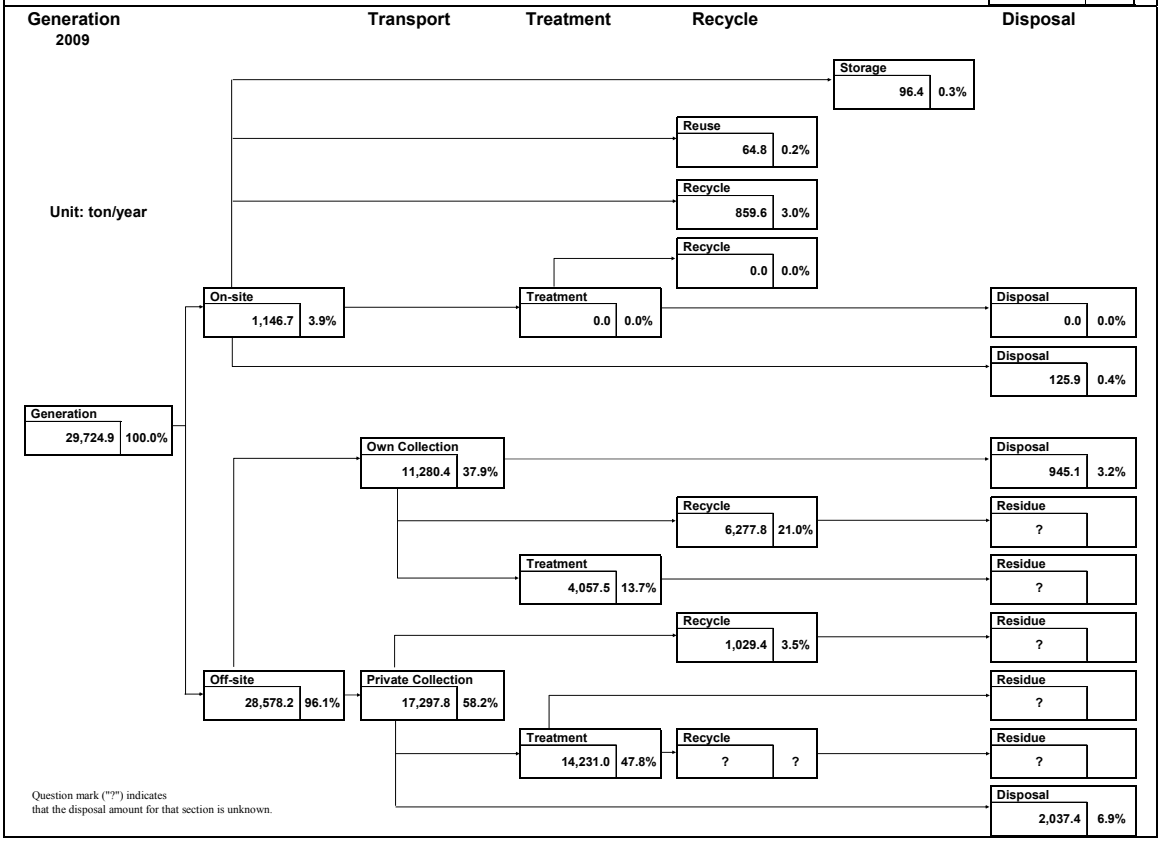
Process – Non HIW (ton/day, ton/year)





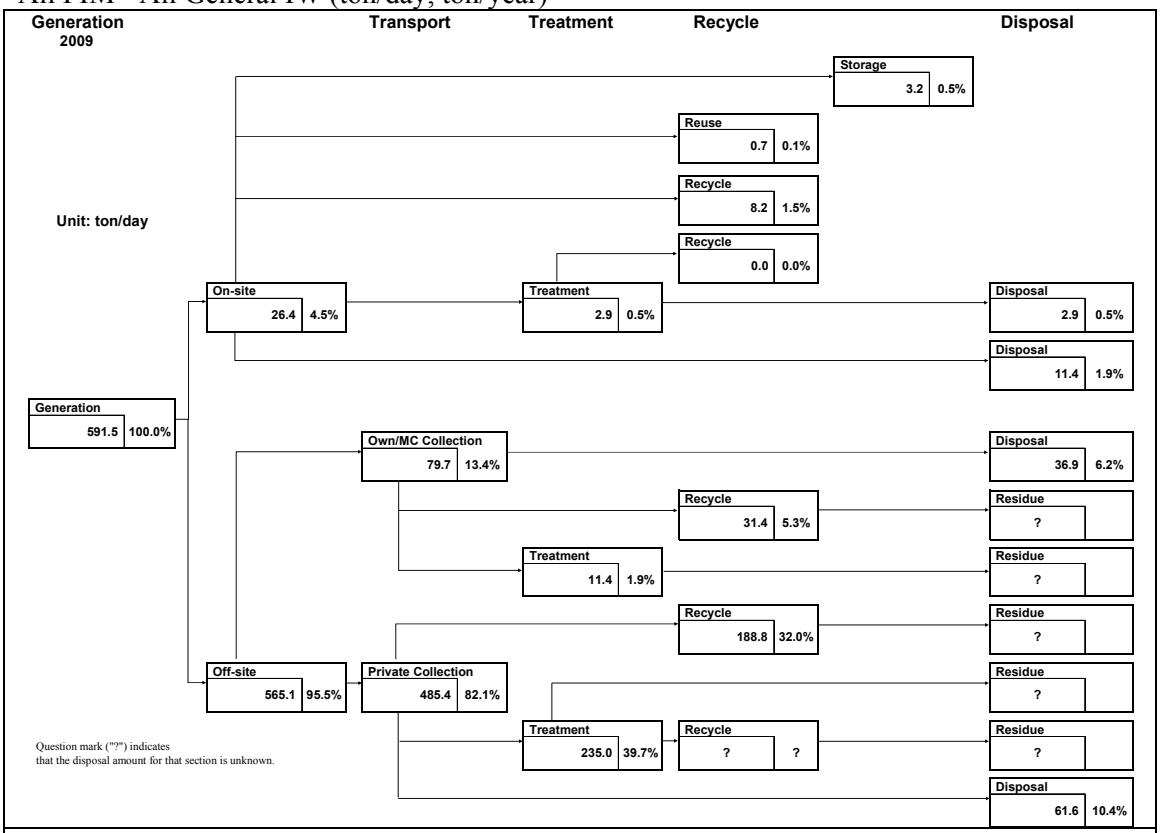
Process – HIW (ton/day, ton/year)

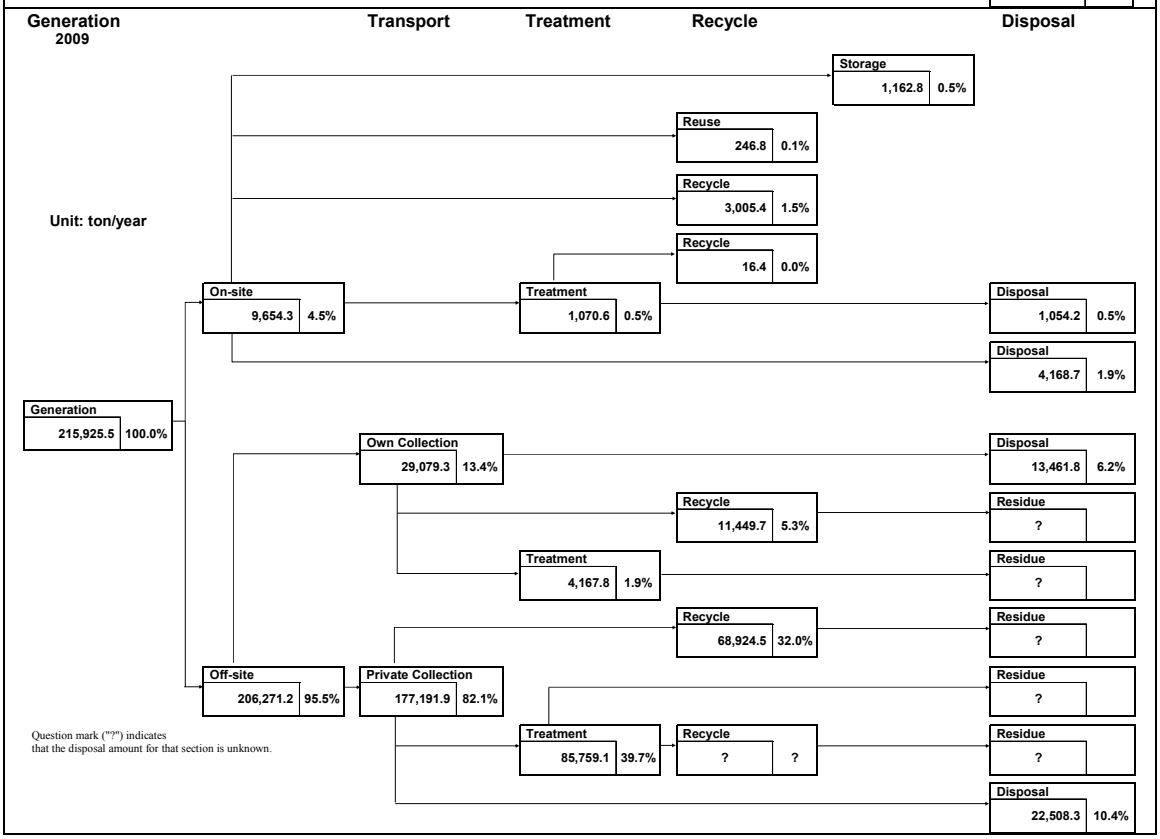




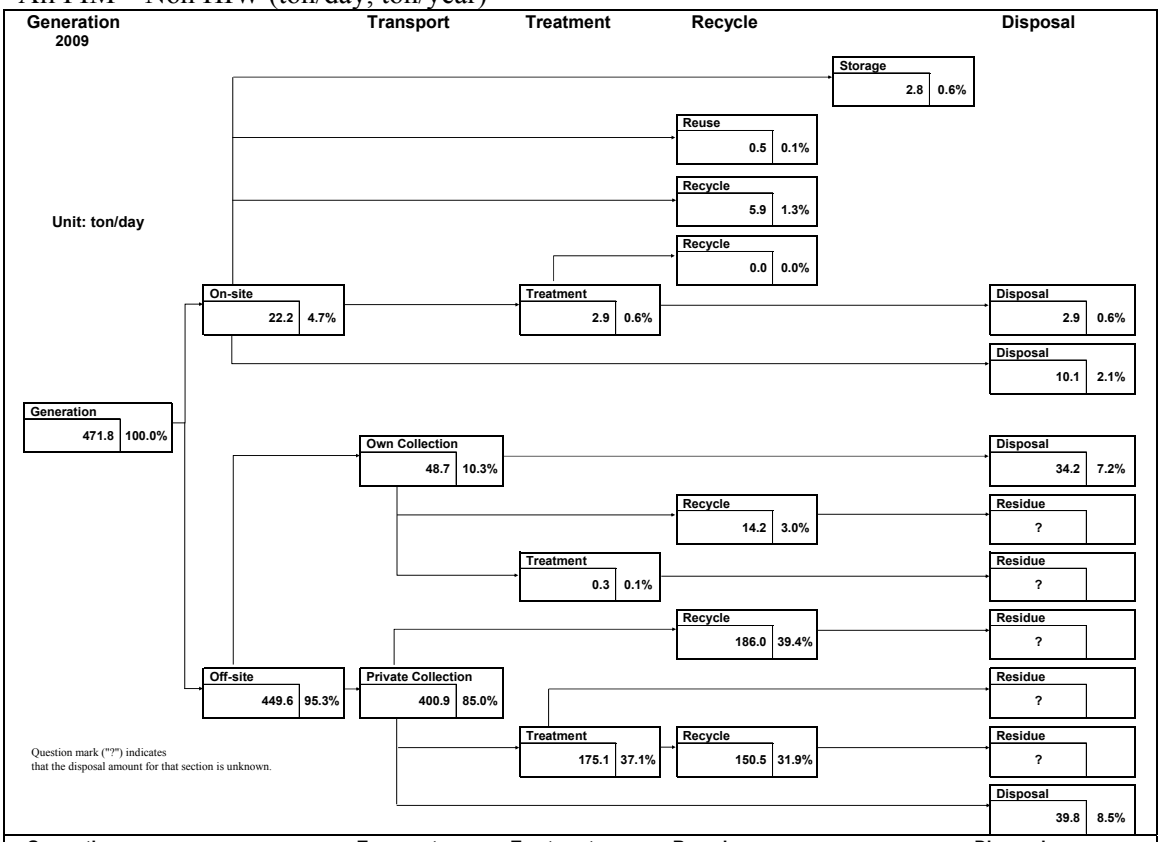
b. General IW

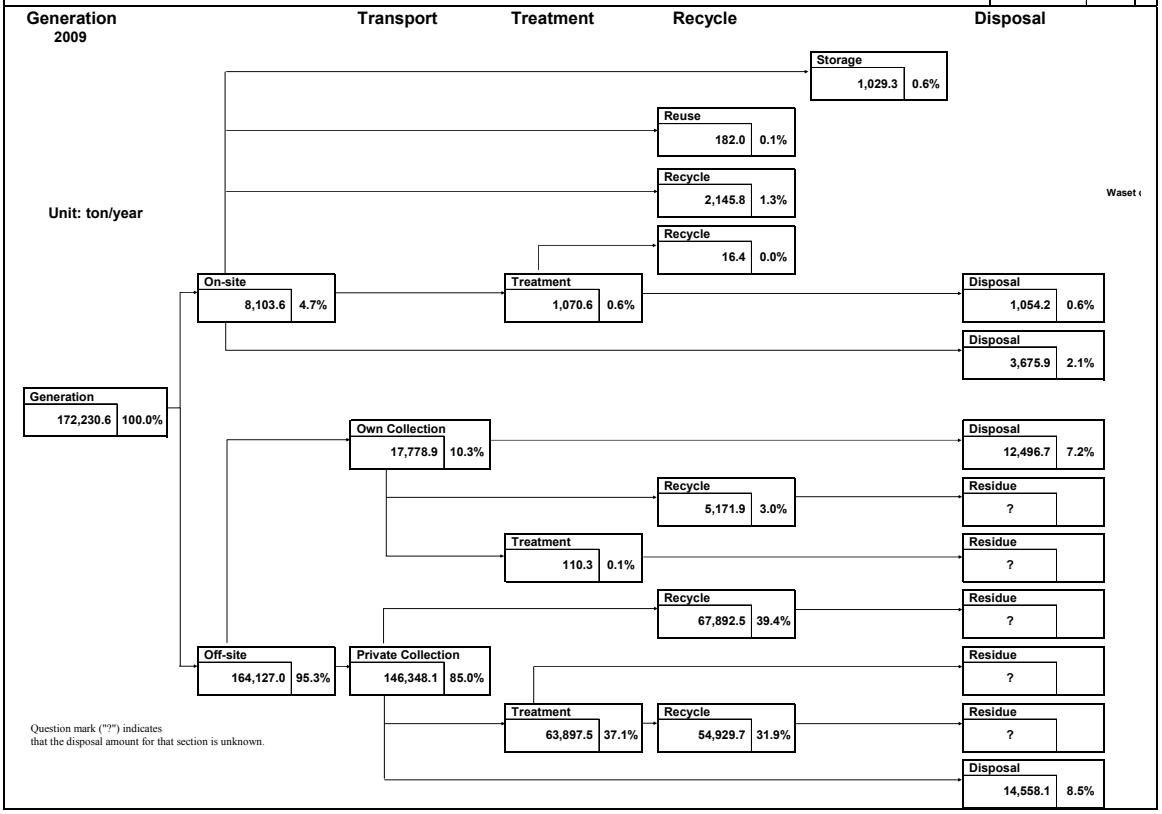
All PIM - All General IW (ton/day, ton/year)



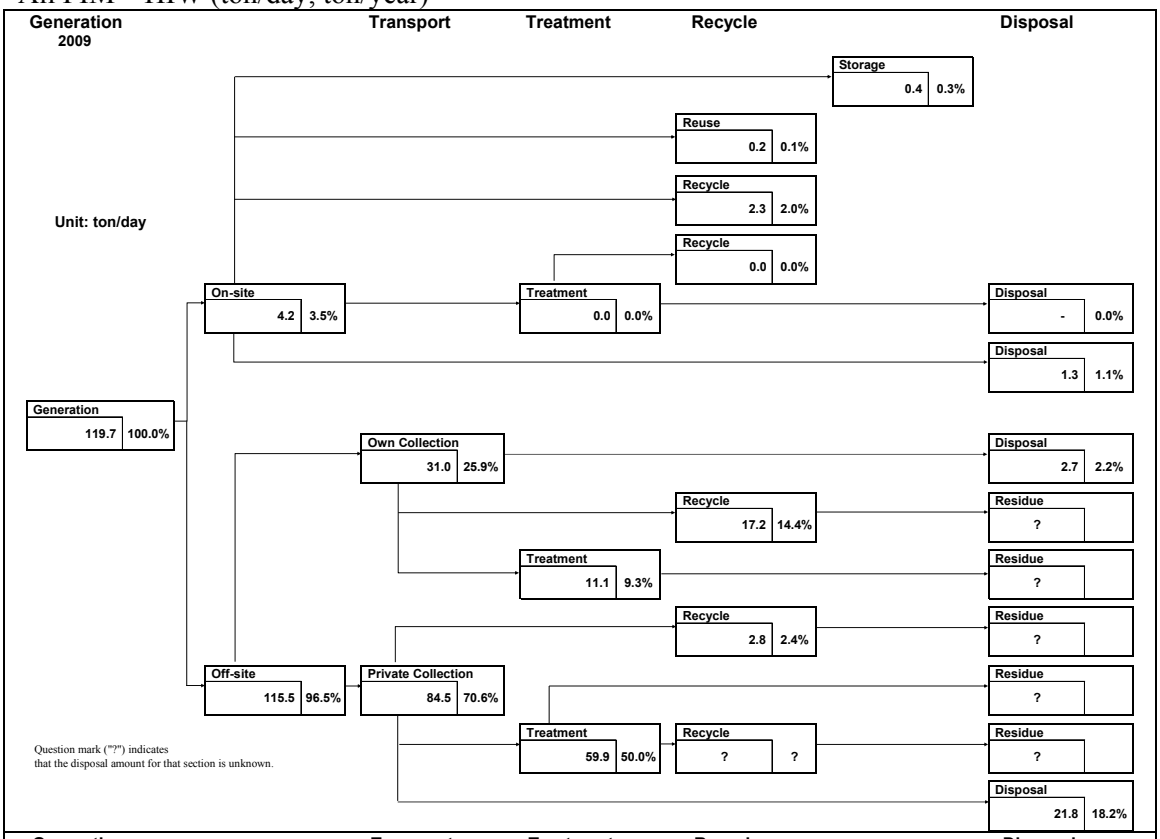


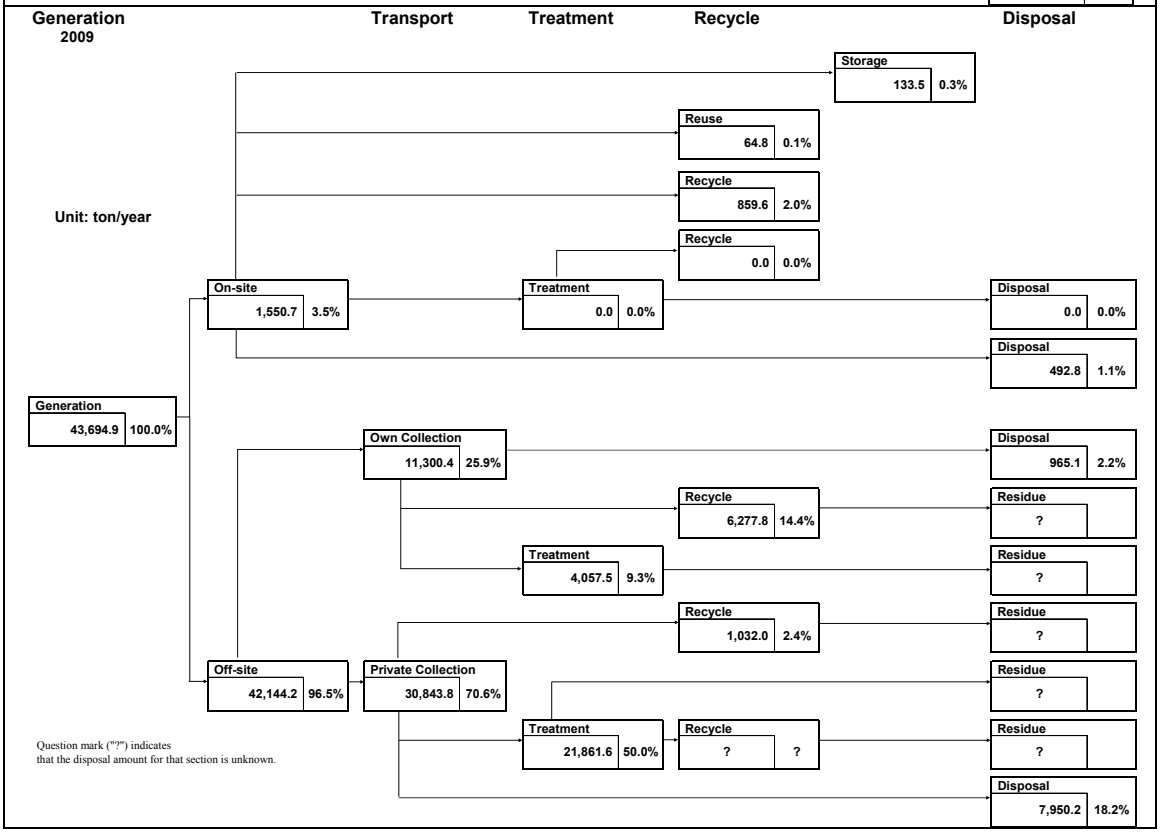
All PIM – Non HIW (ton/day, ton/year)



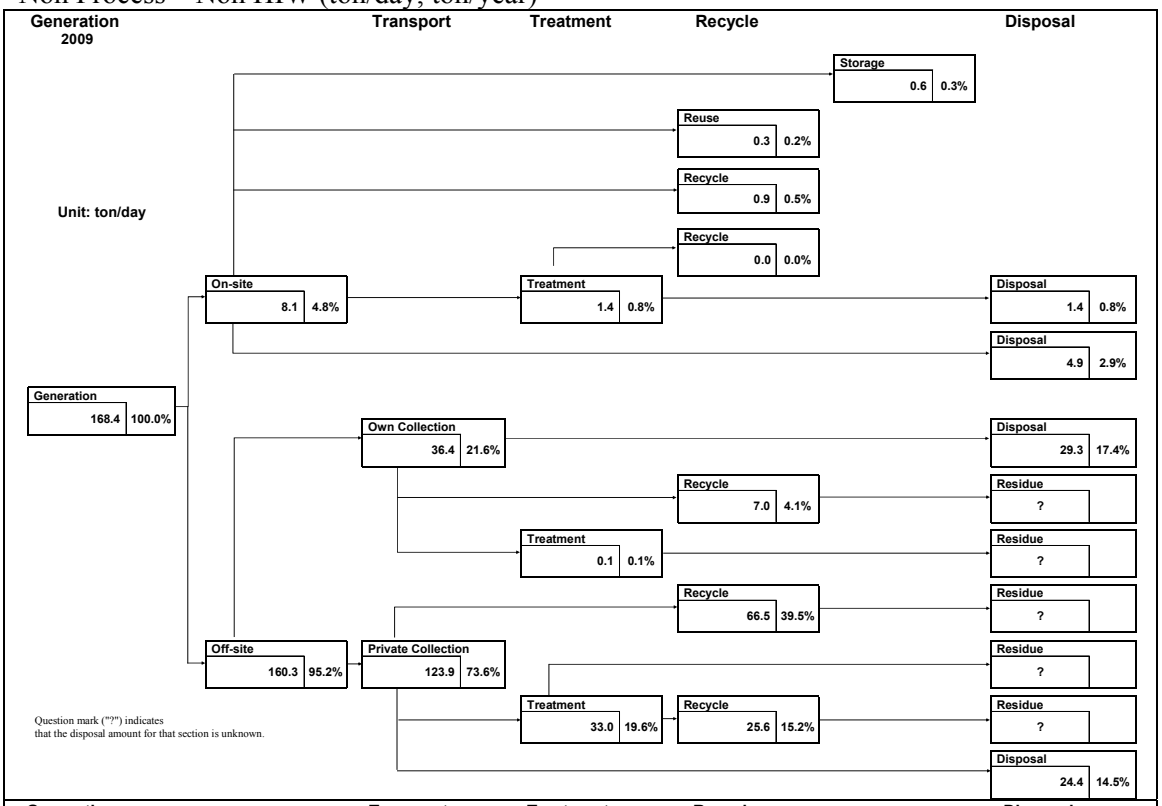


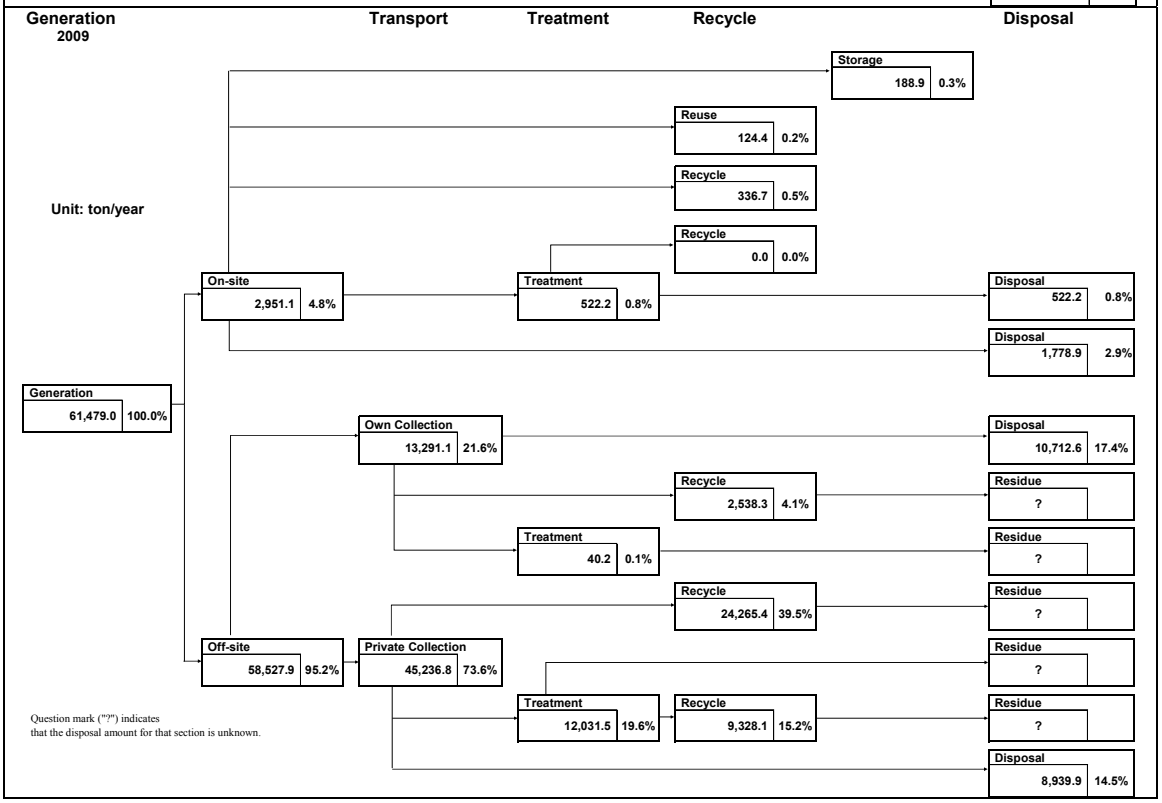
All PIM – HIW (ton/day, ton/year)





Non Process – Non HIW (ton/day, ton/year)





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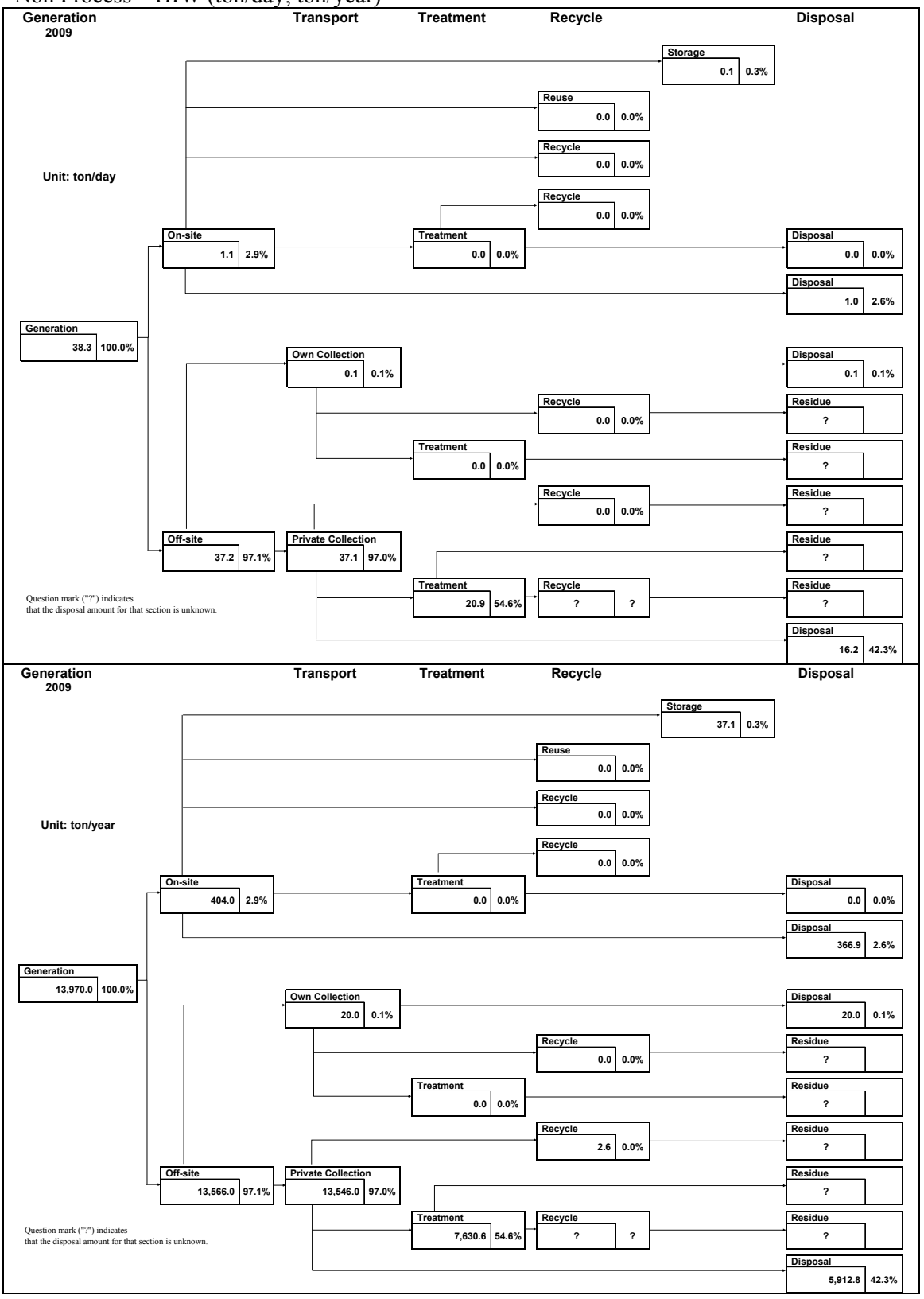

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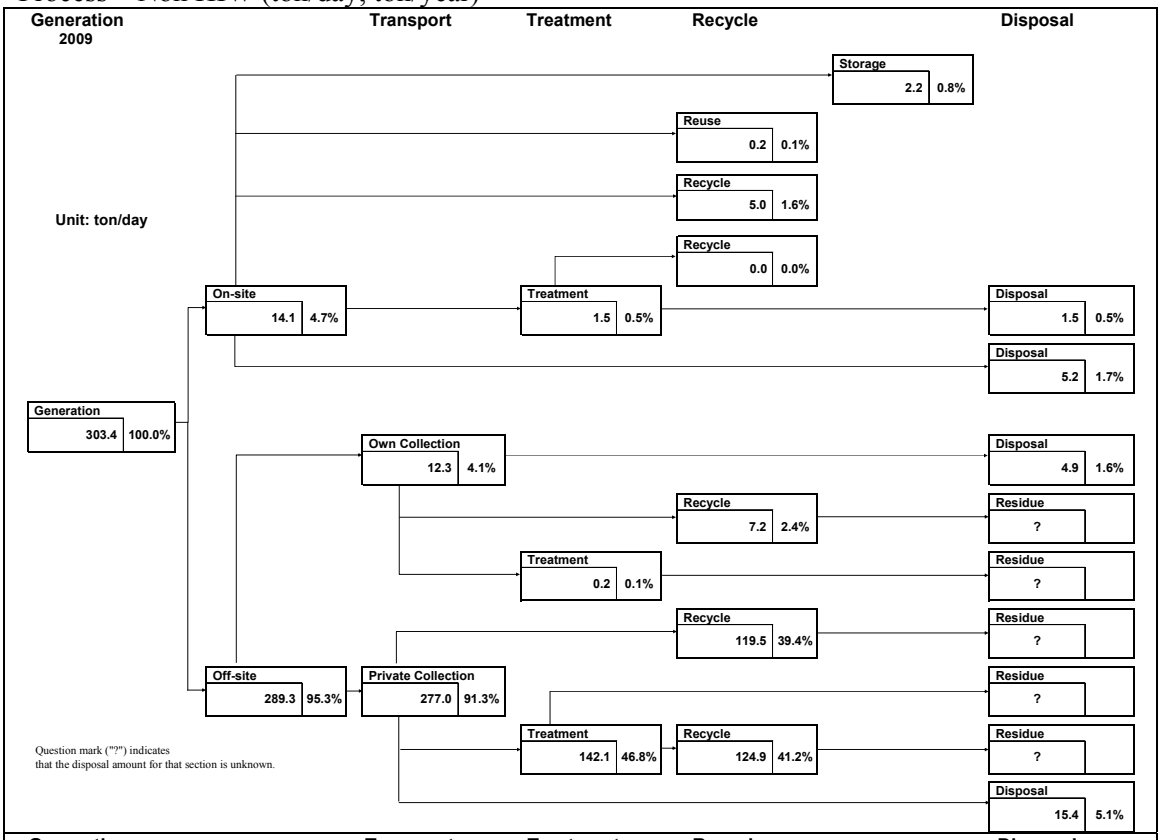

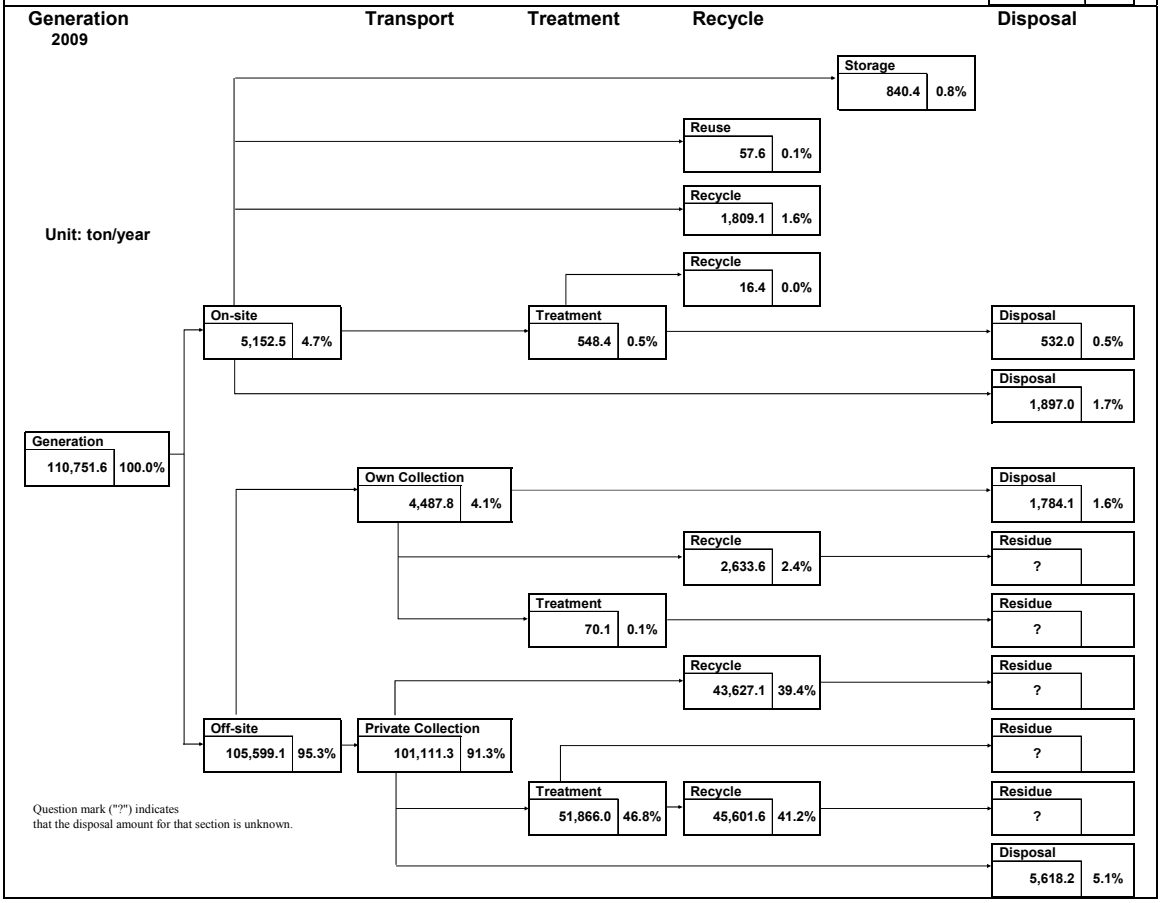

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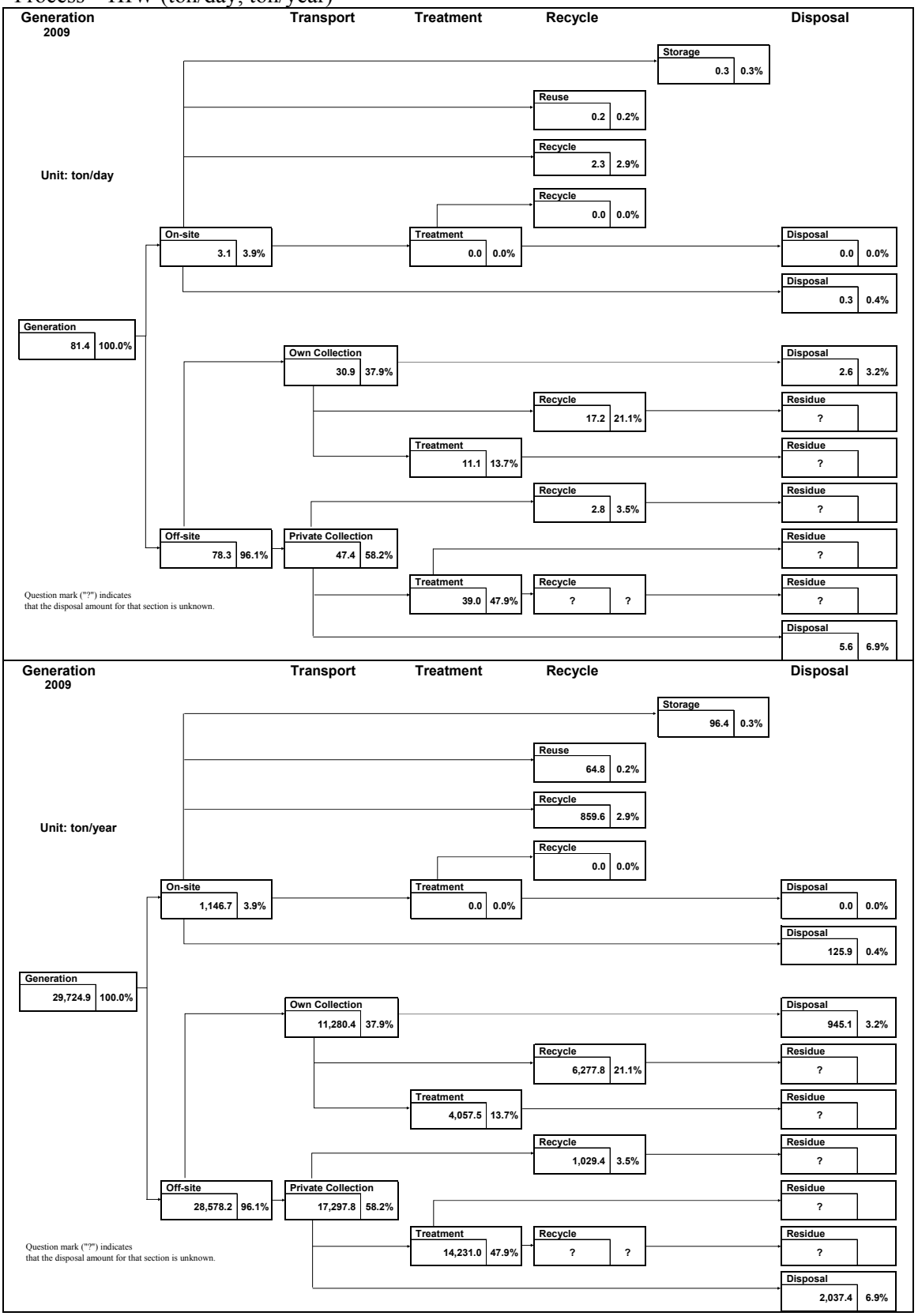
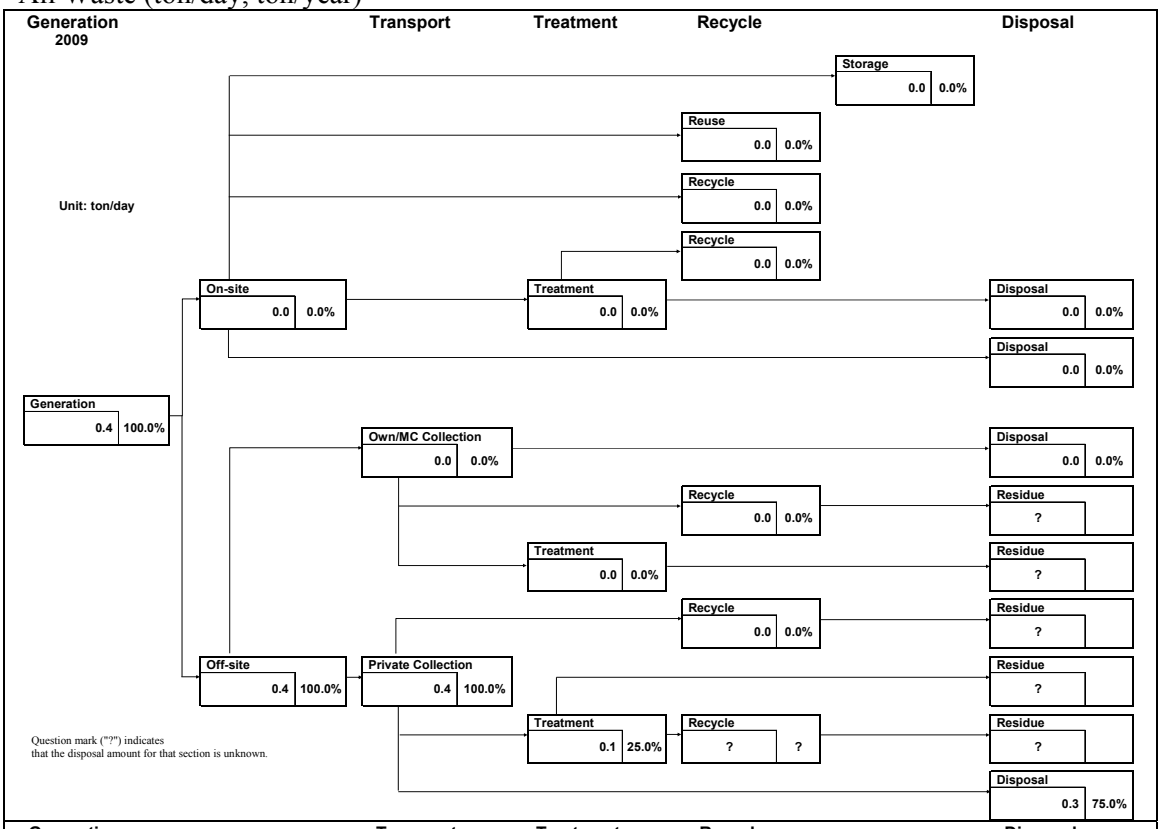
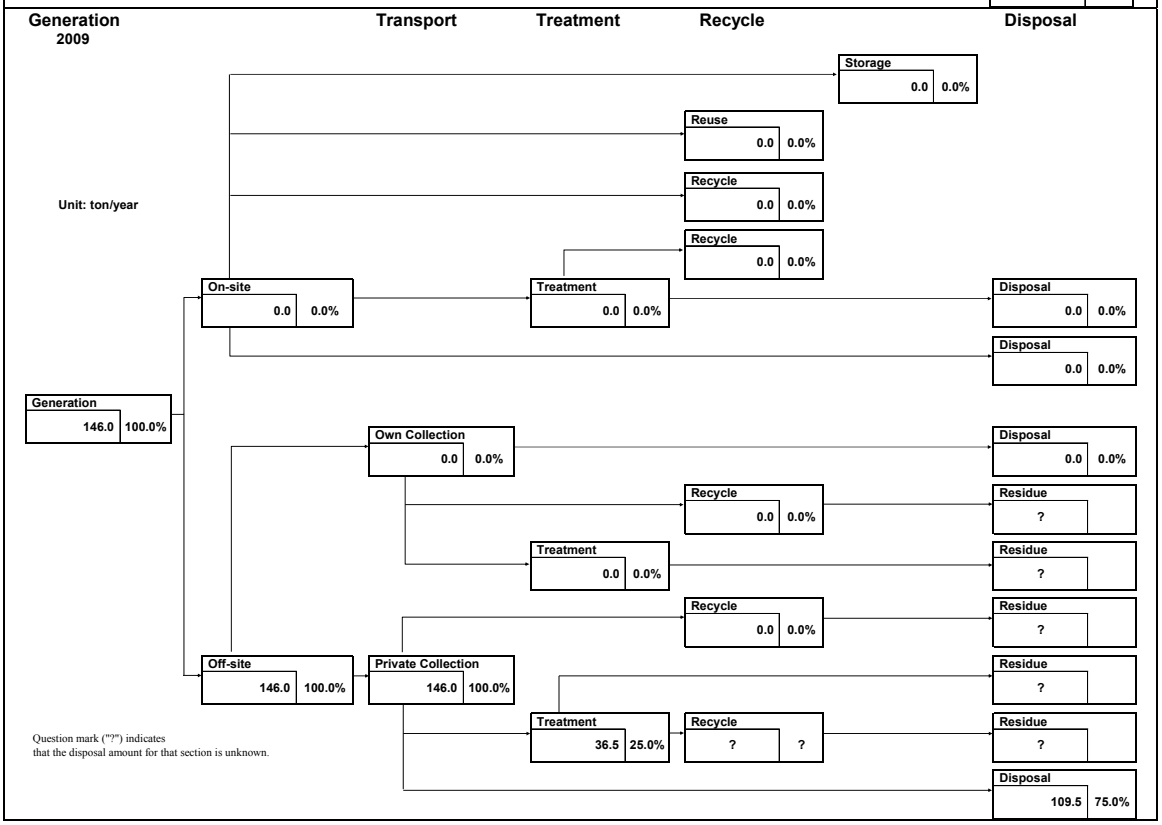


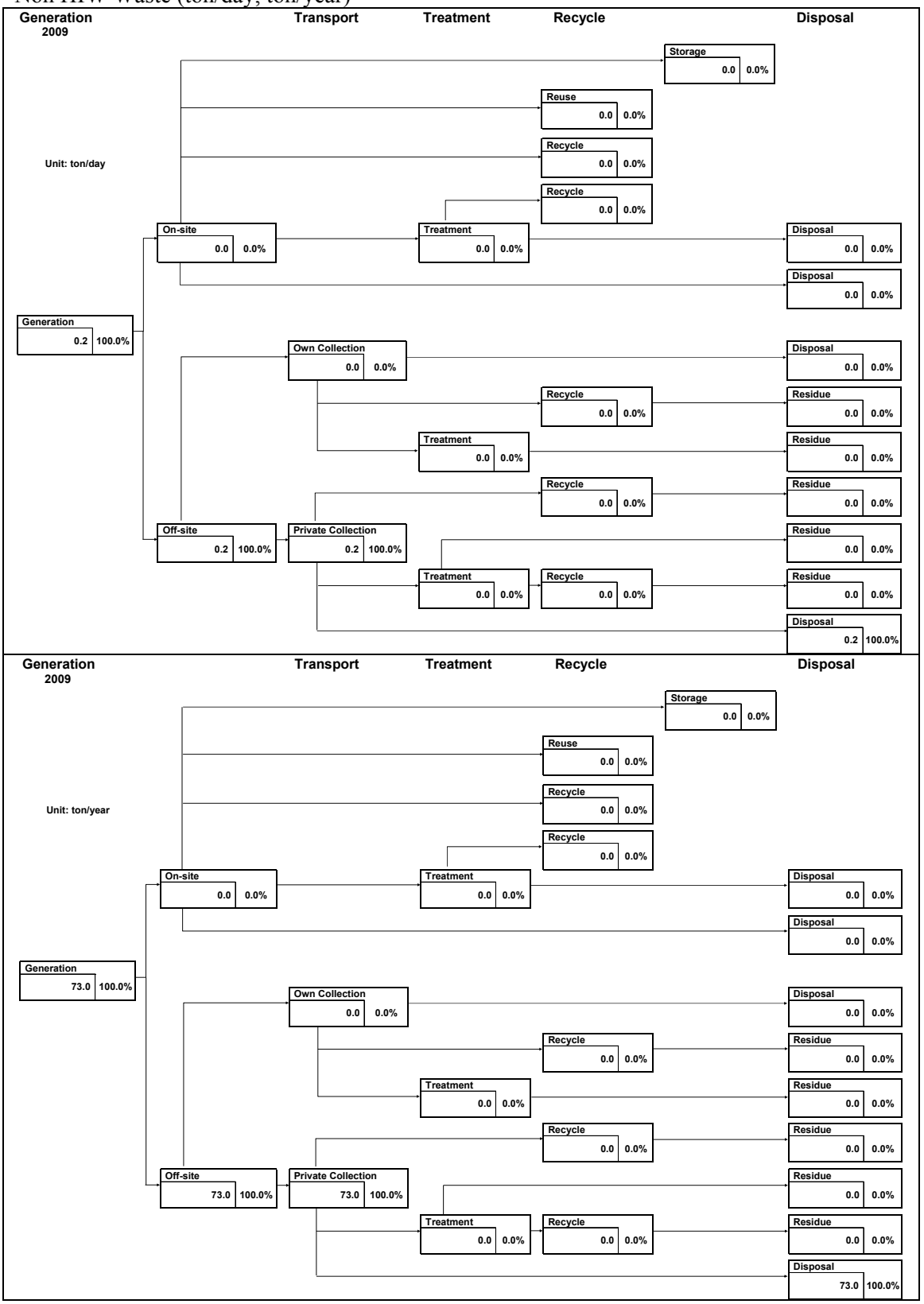
c. Health-care Waste

All Waste (ton/day, ton/year)

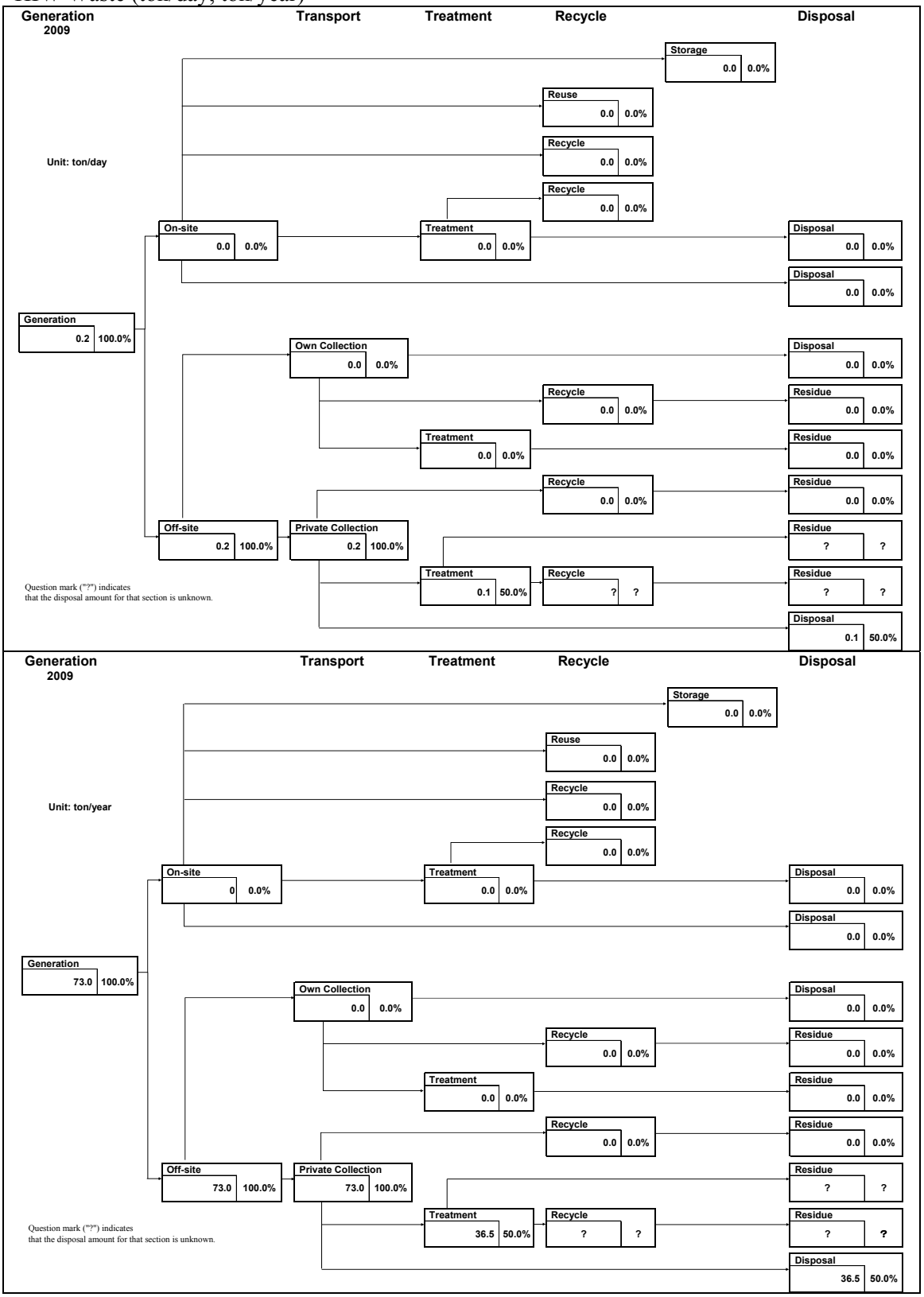




Non HIW Waste (ton/day, ton/year)

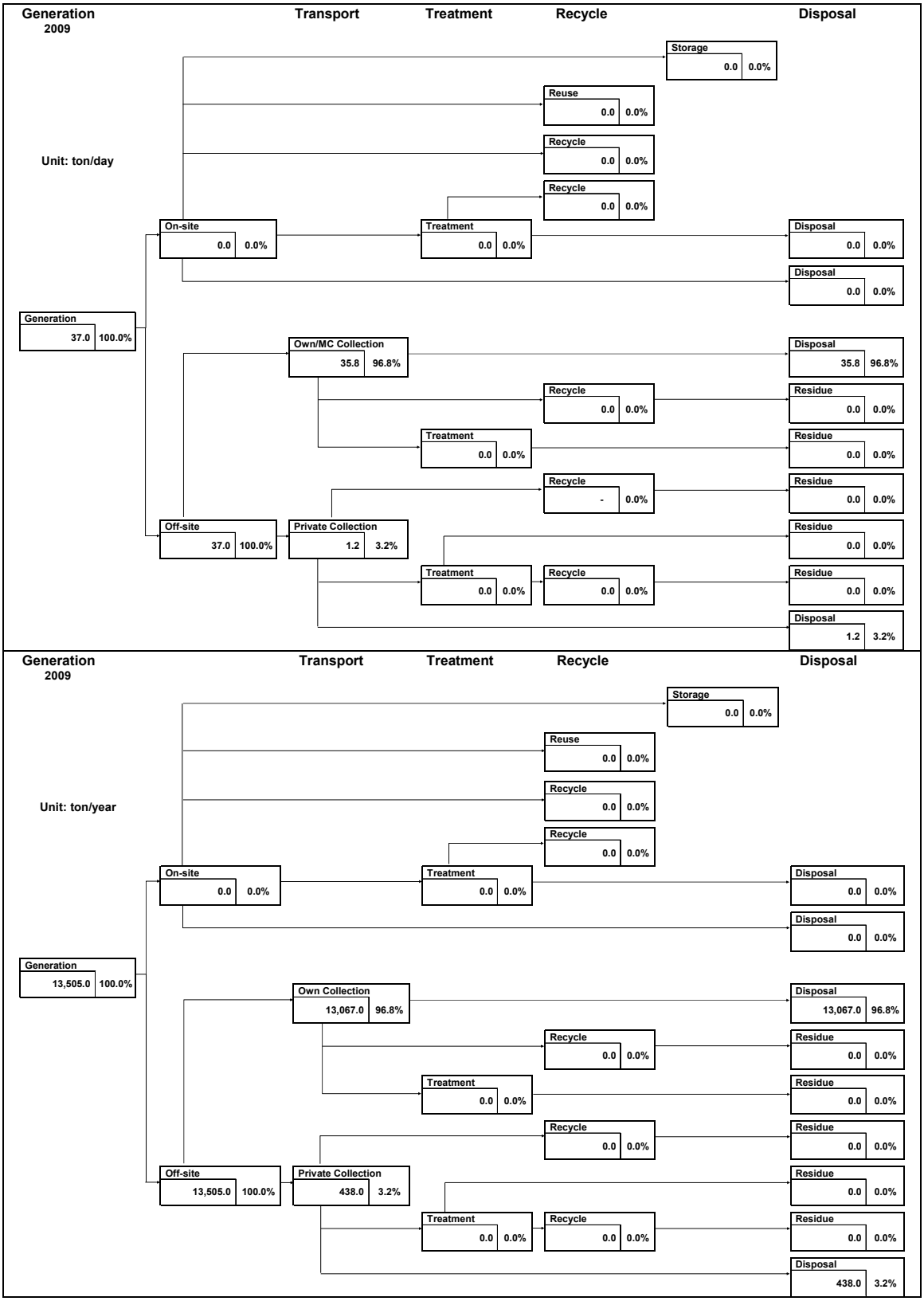


HIW Waste (ton/day, ton/year)



d. Construction Waste

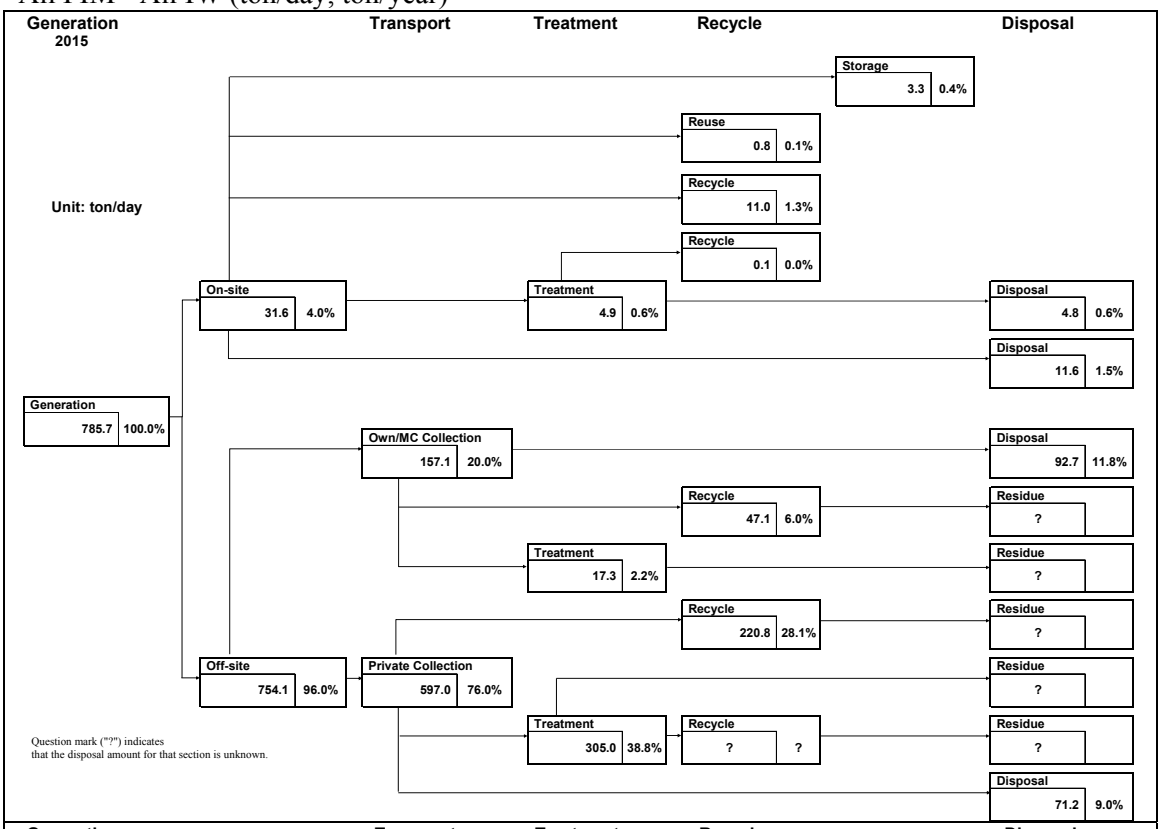
Non HIW (ton/day, ton/year)

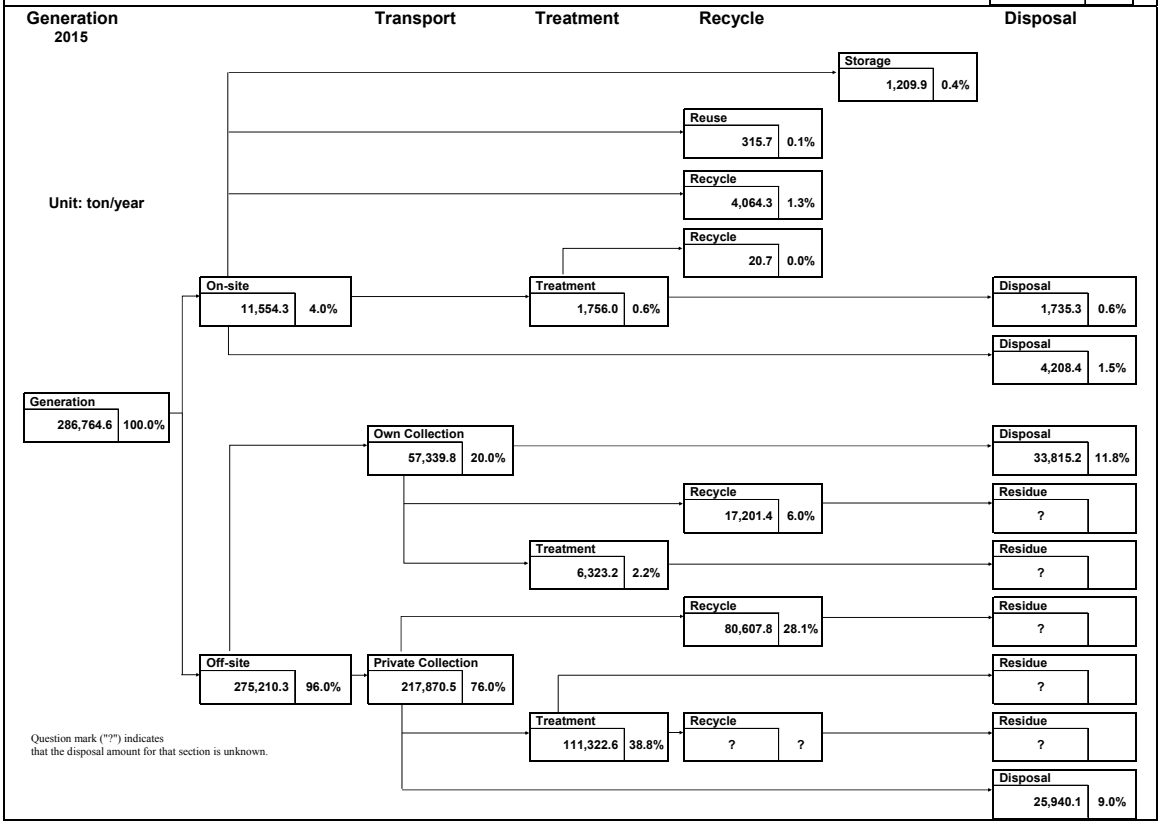


1.4 Detailed Waste stream (2015)

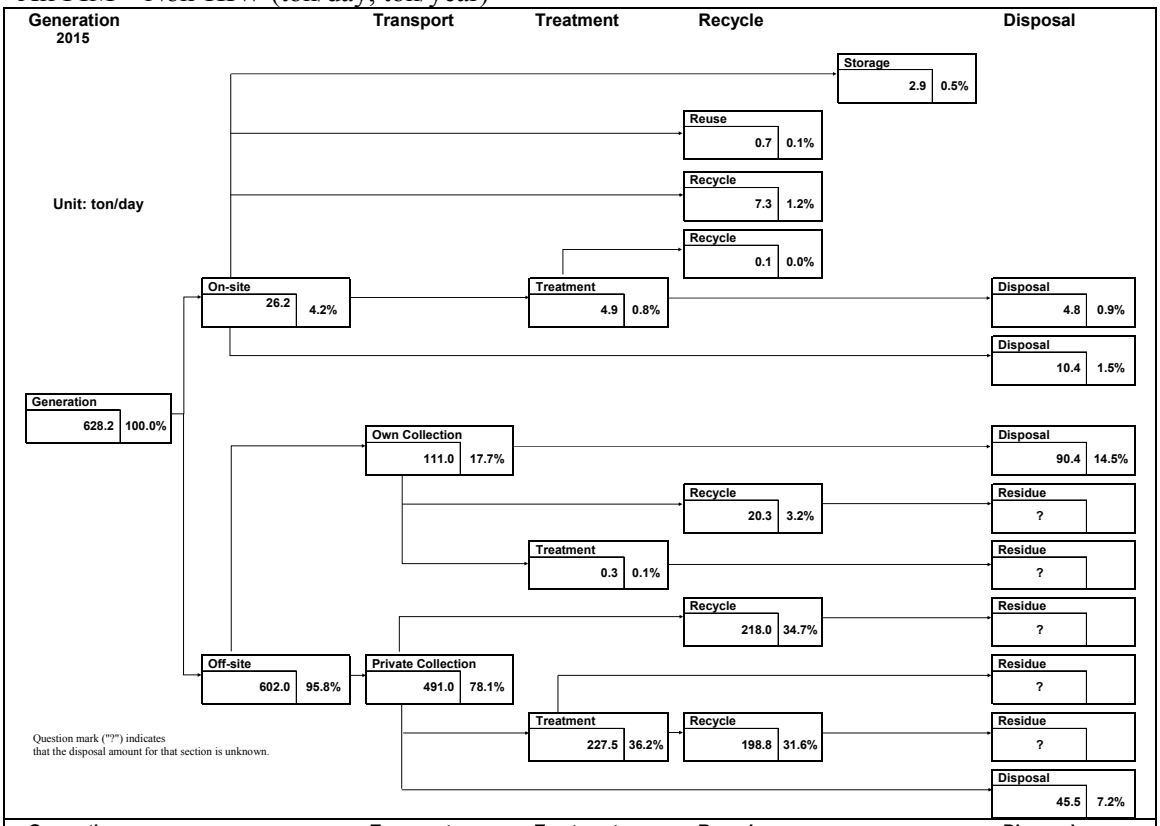
a. Industrial waste (GIW + Health-care waste + Construction waste)

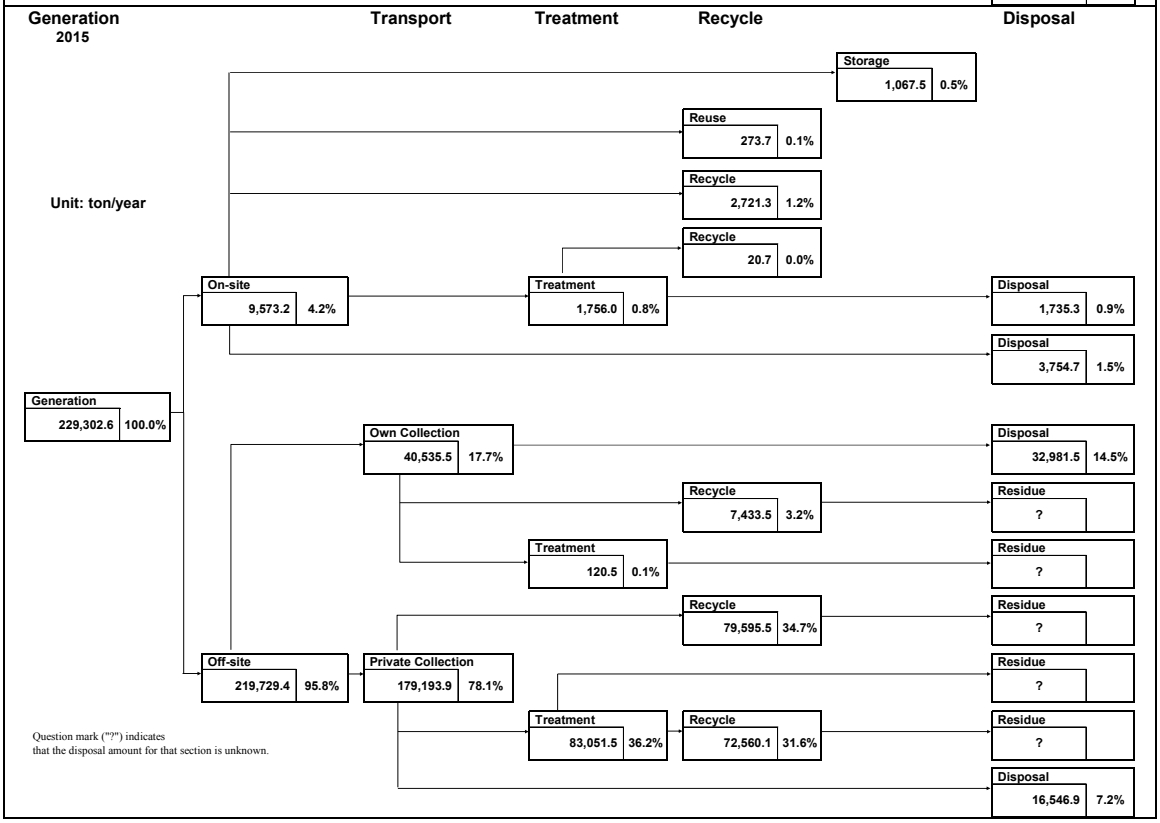
All PIM - All IW (ton/day, ton/year)



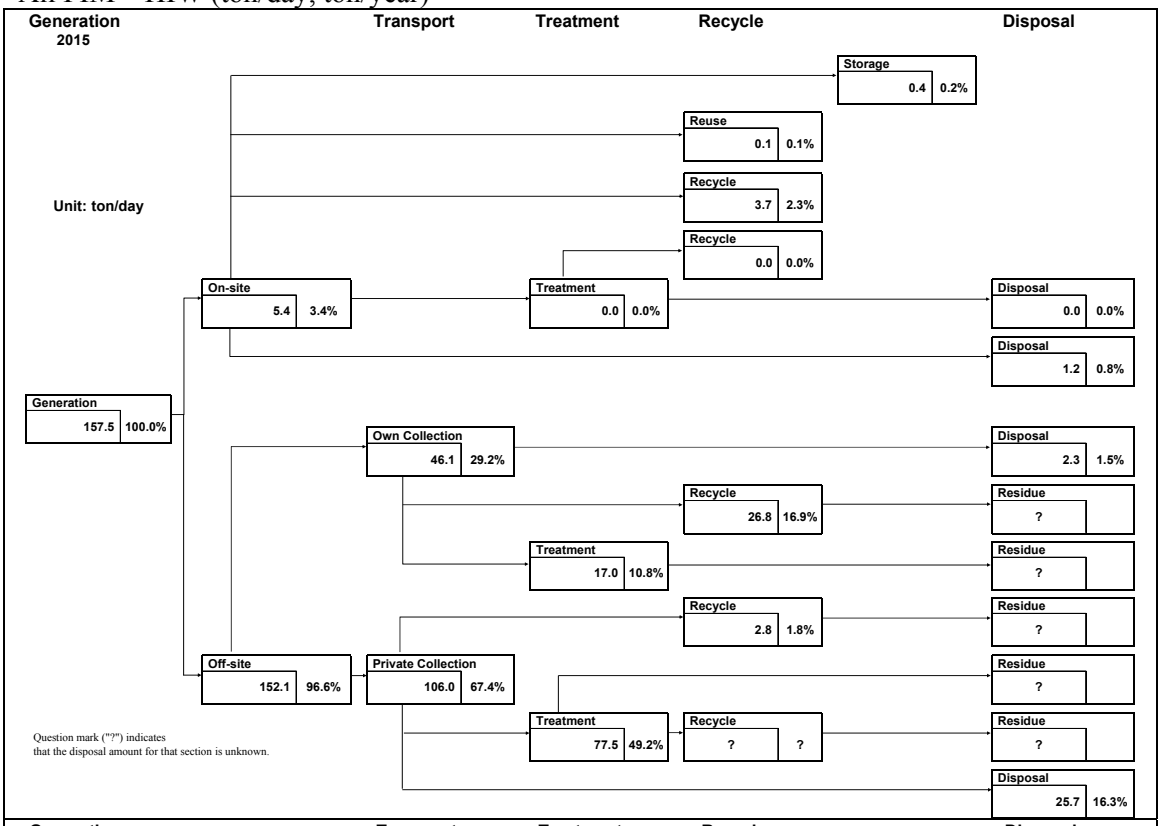


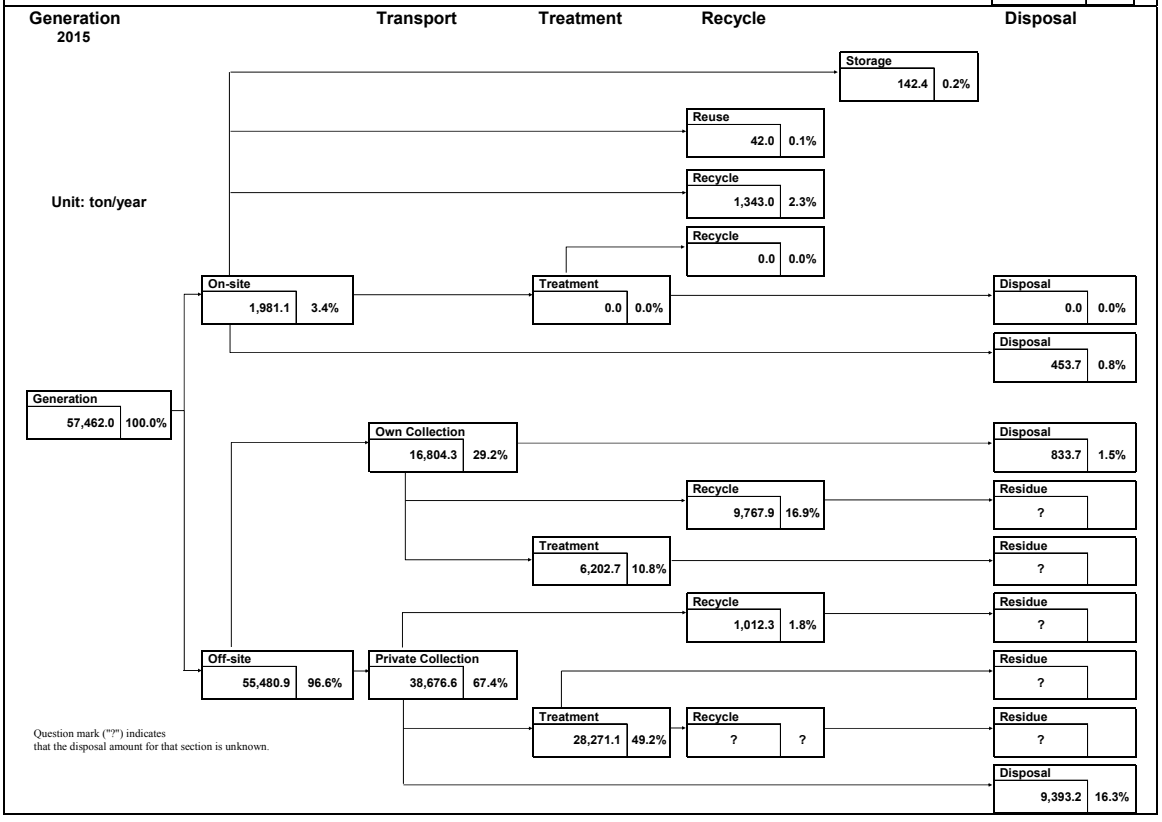
All PIM – Non-HIW (ton/day, ton/year)





All PIM – HIW (ton/day, ton/year)





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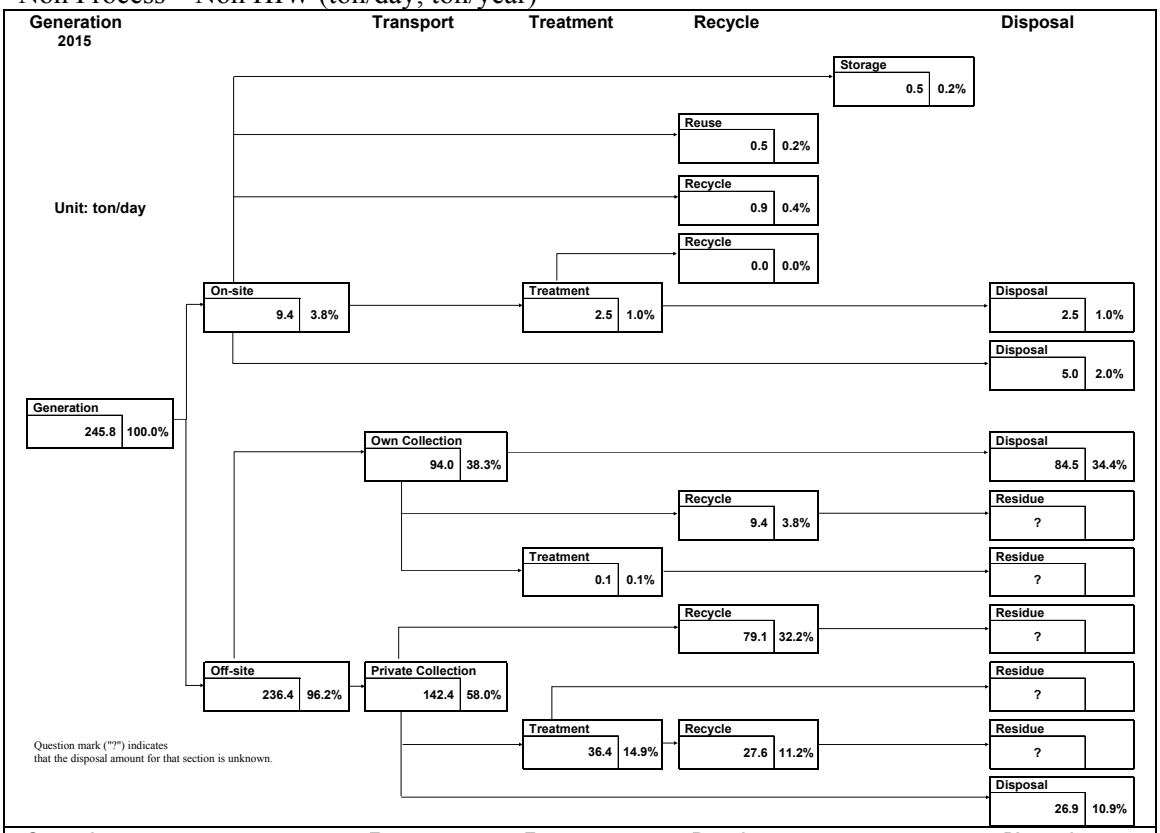

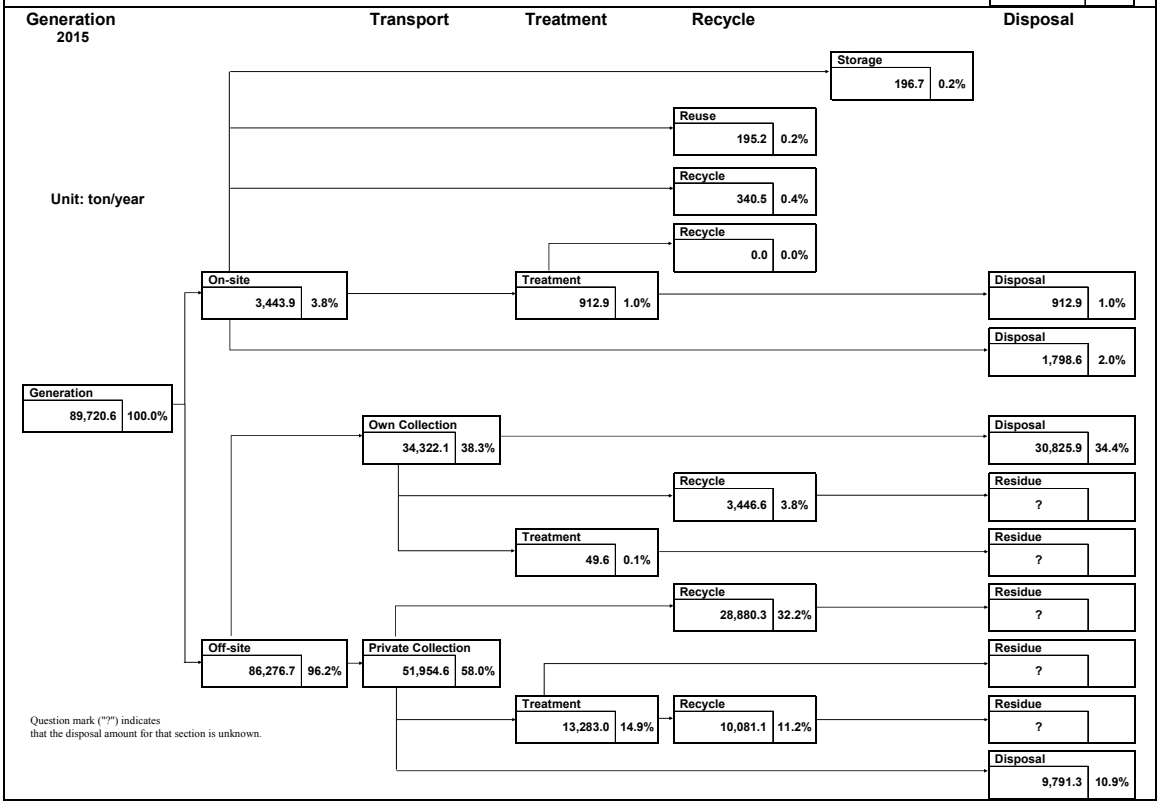

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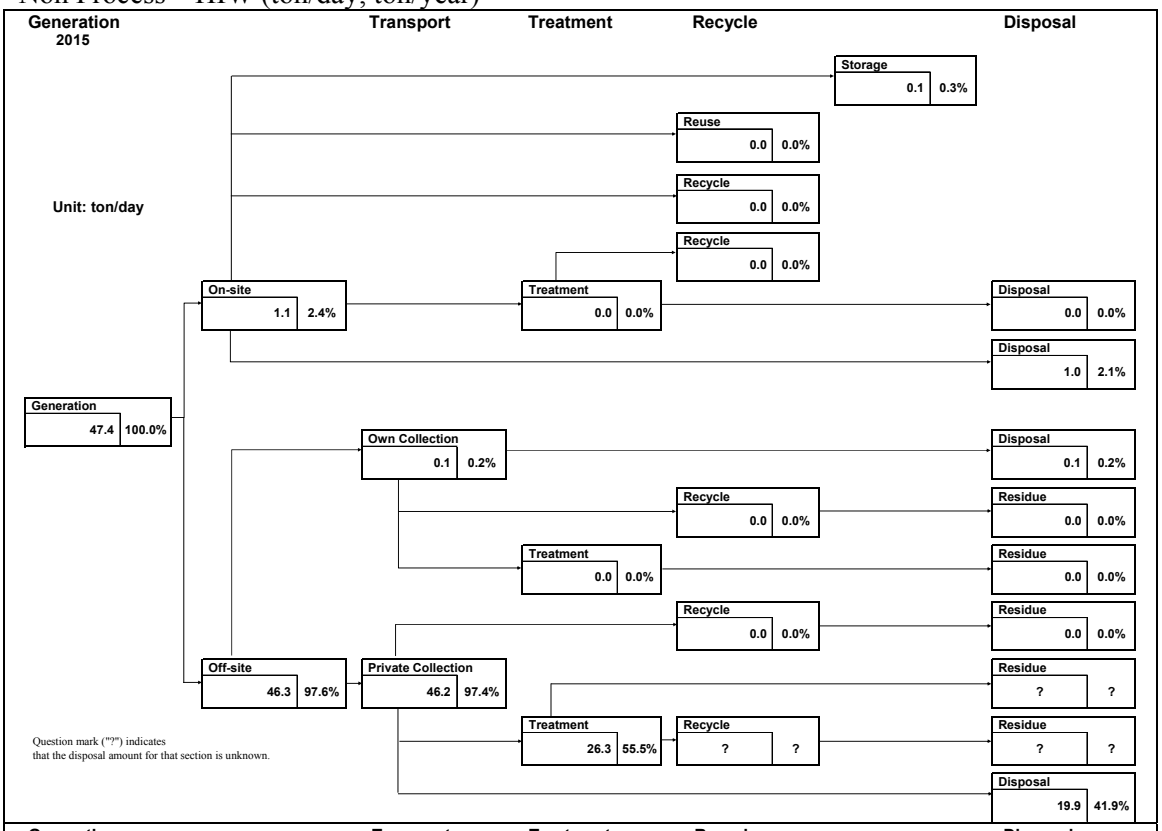

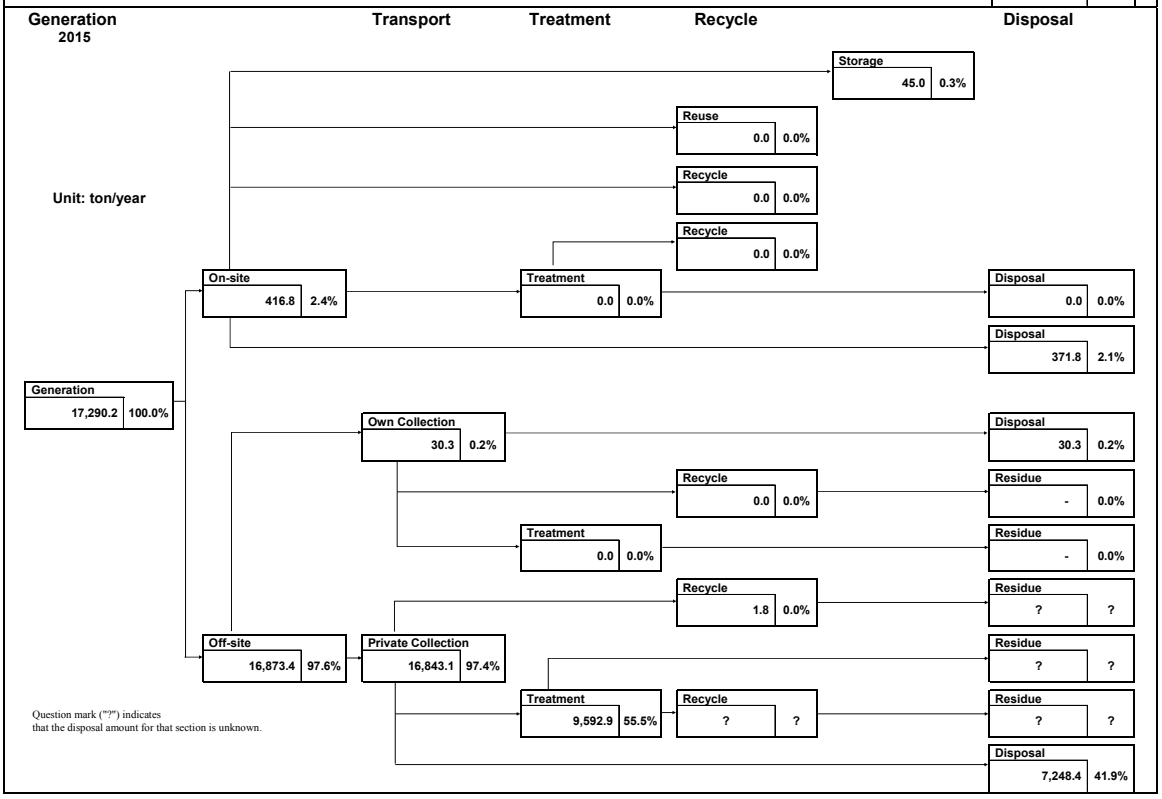

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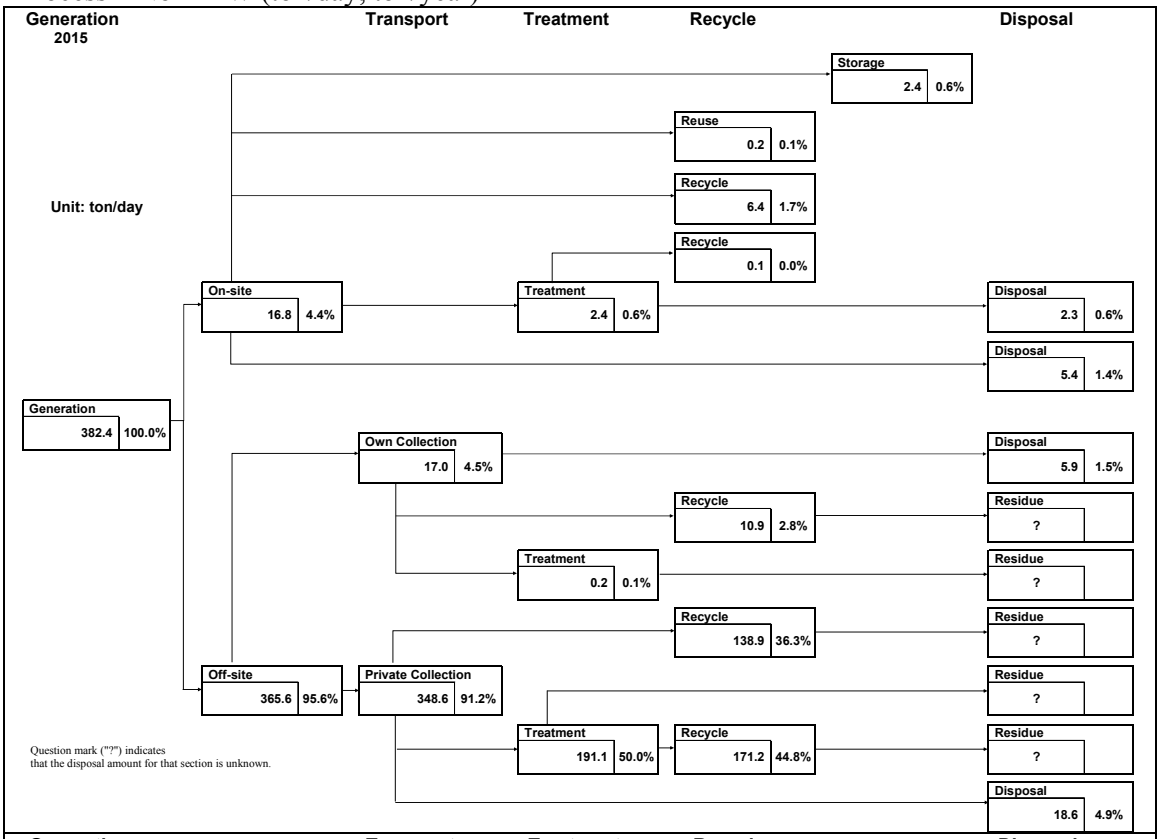

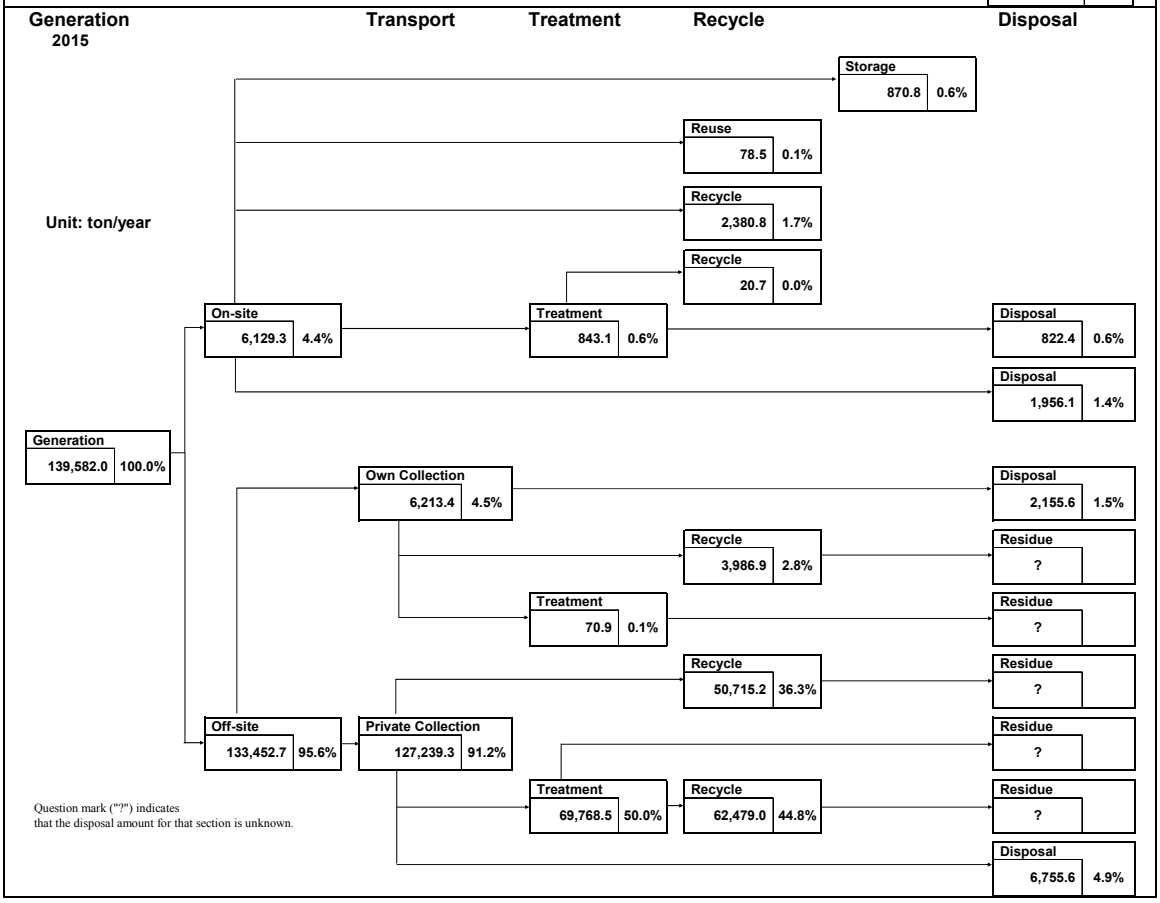

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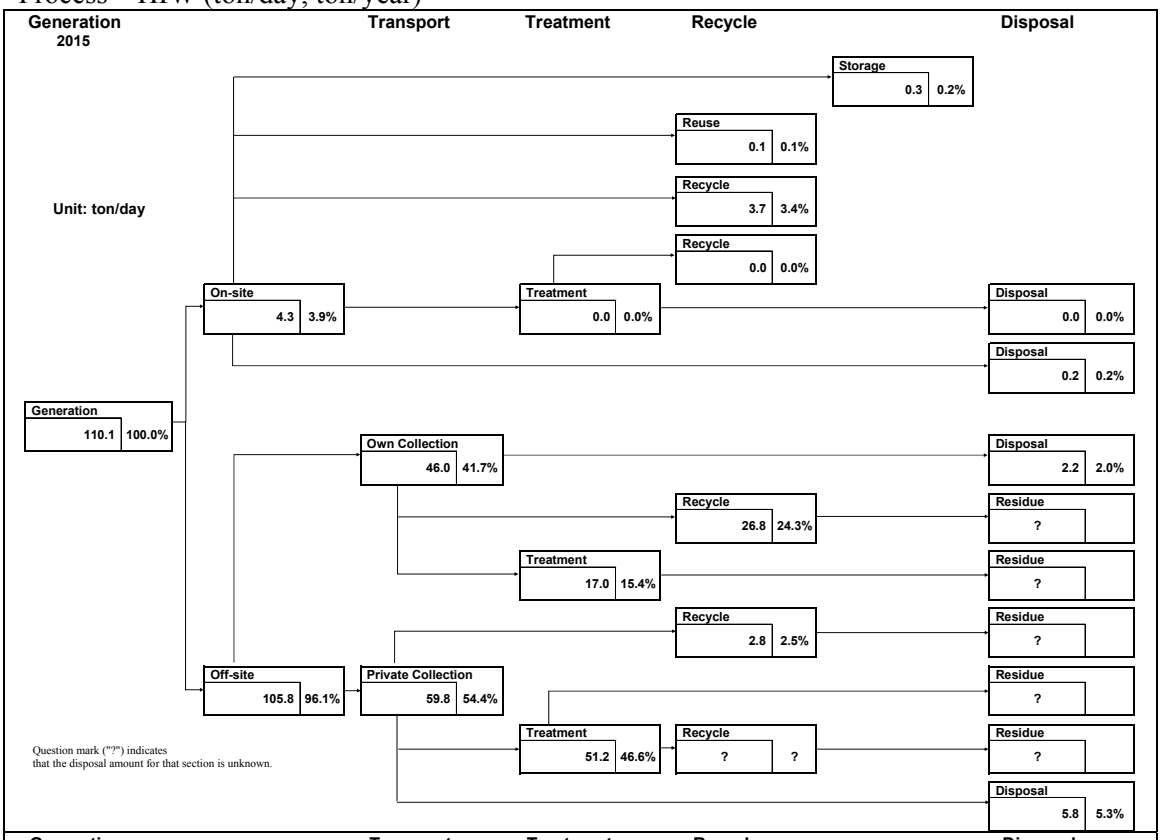
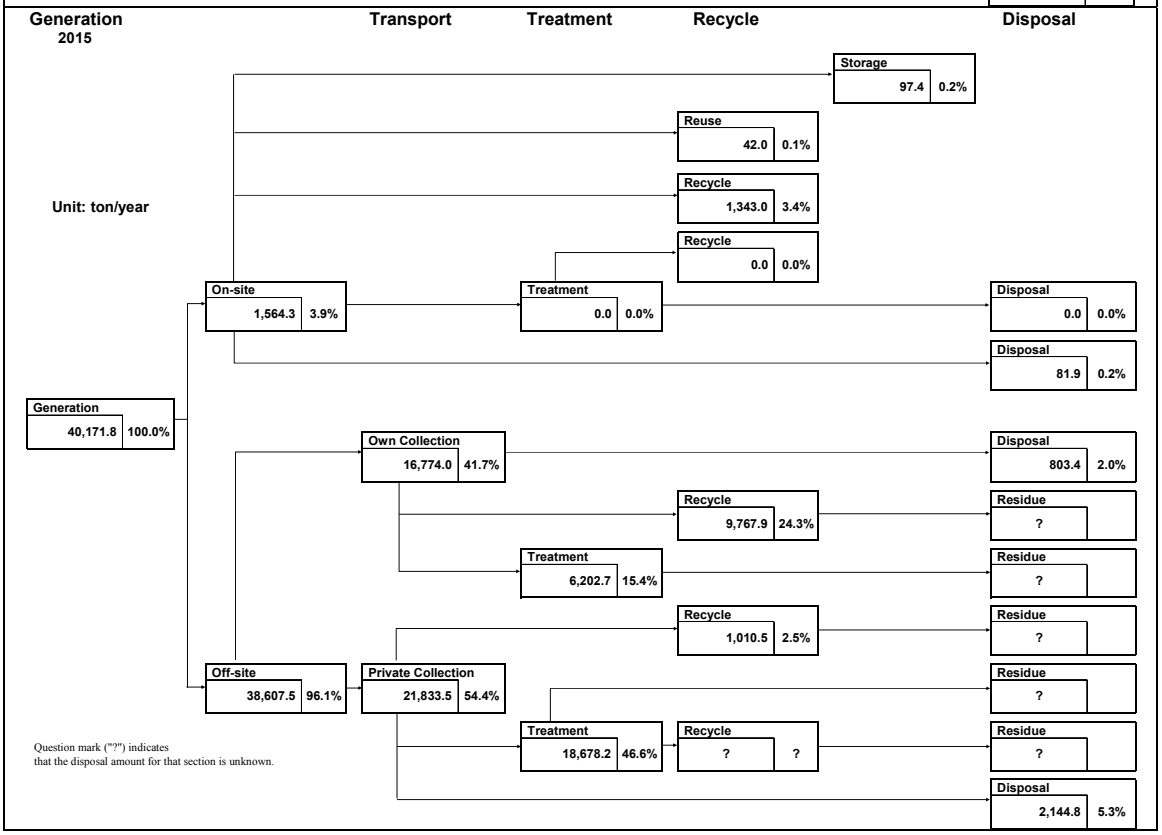
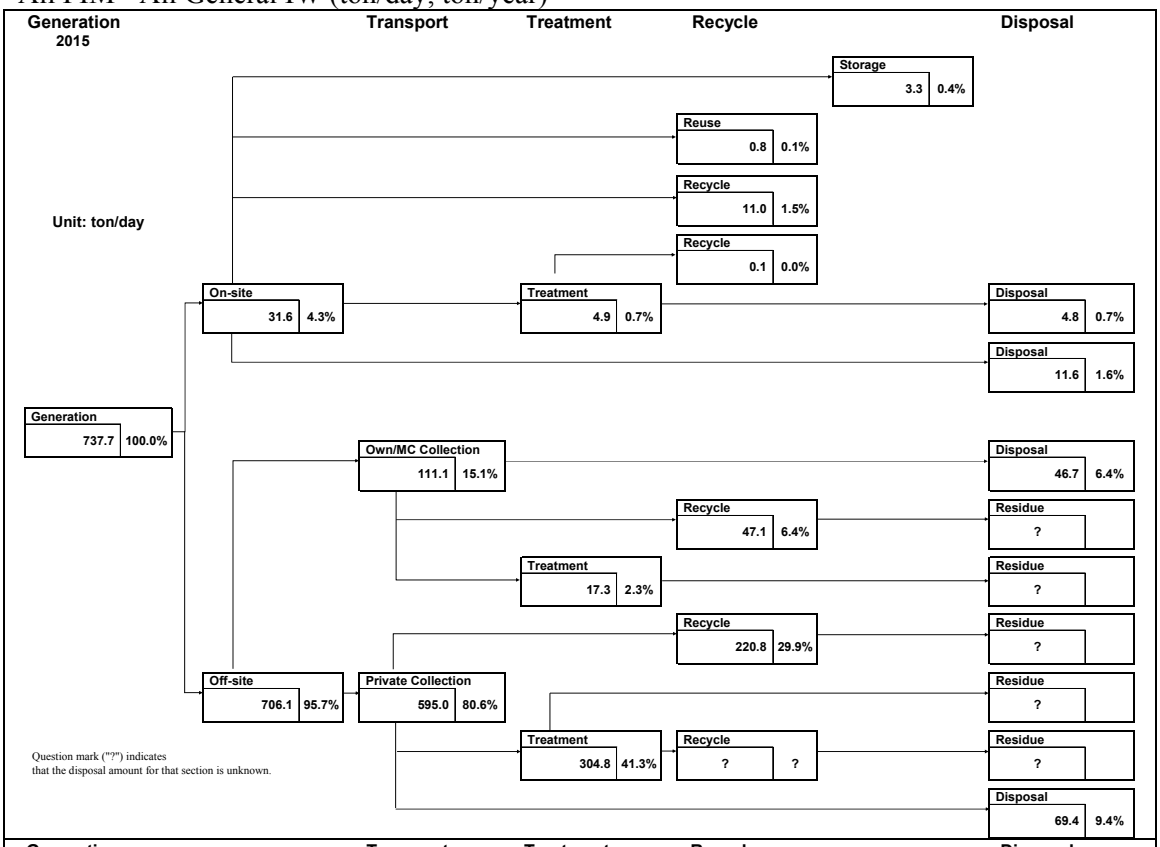
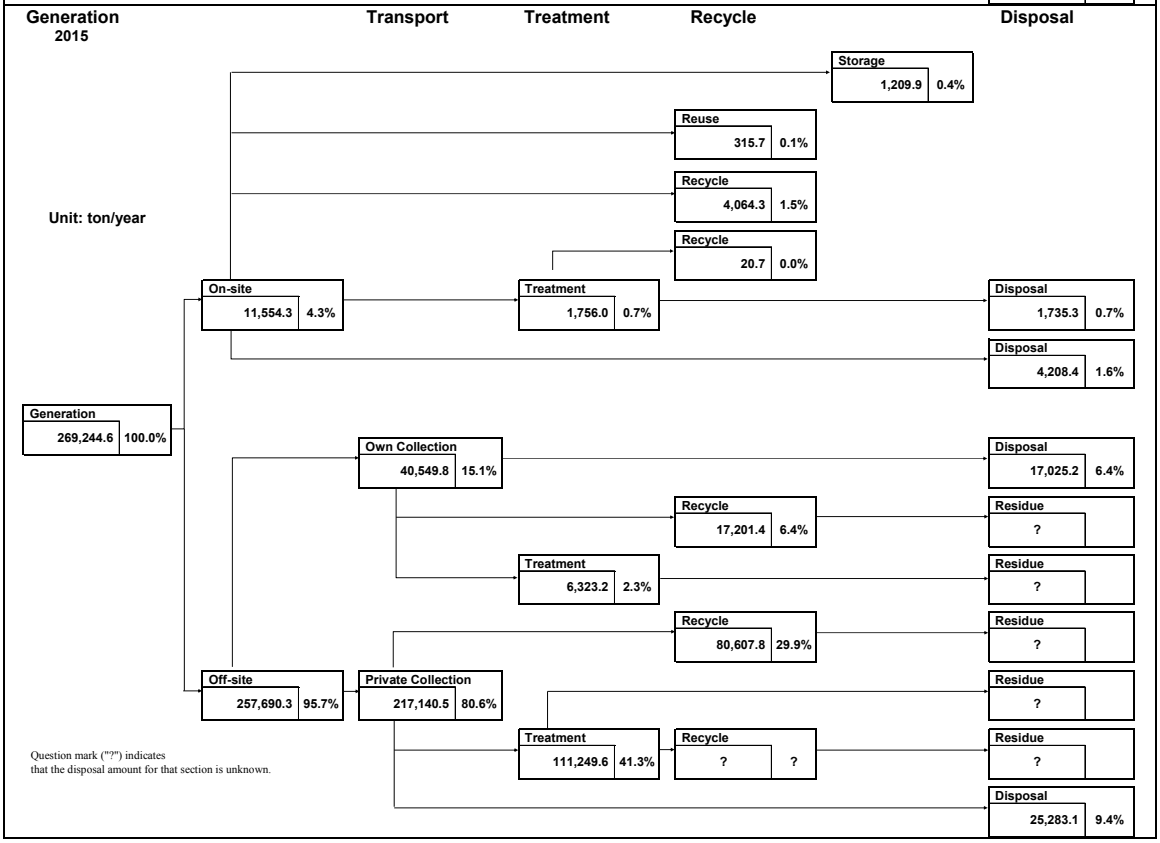




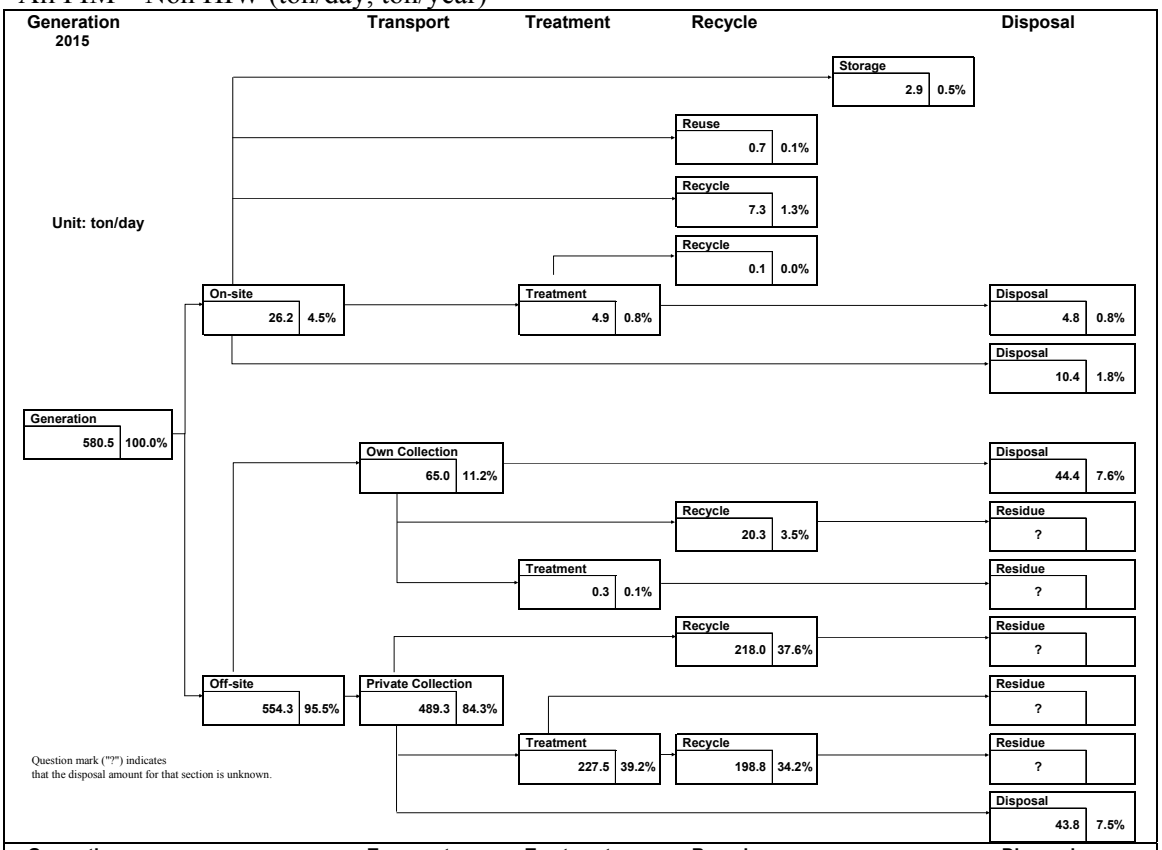
b. General IW

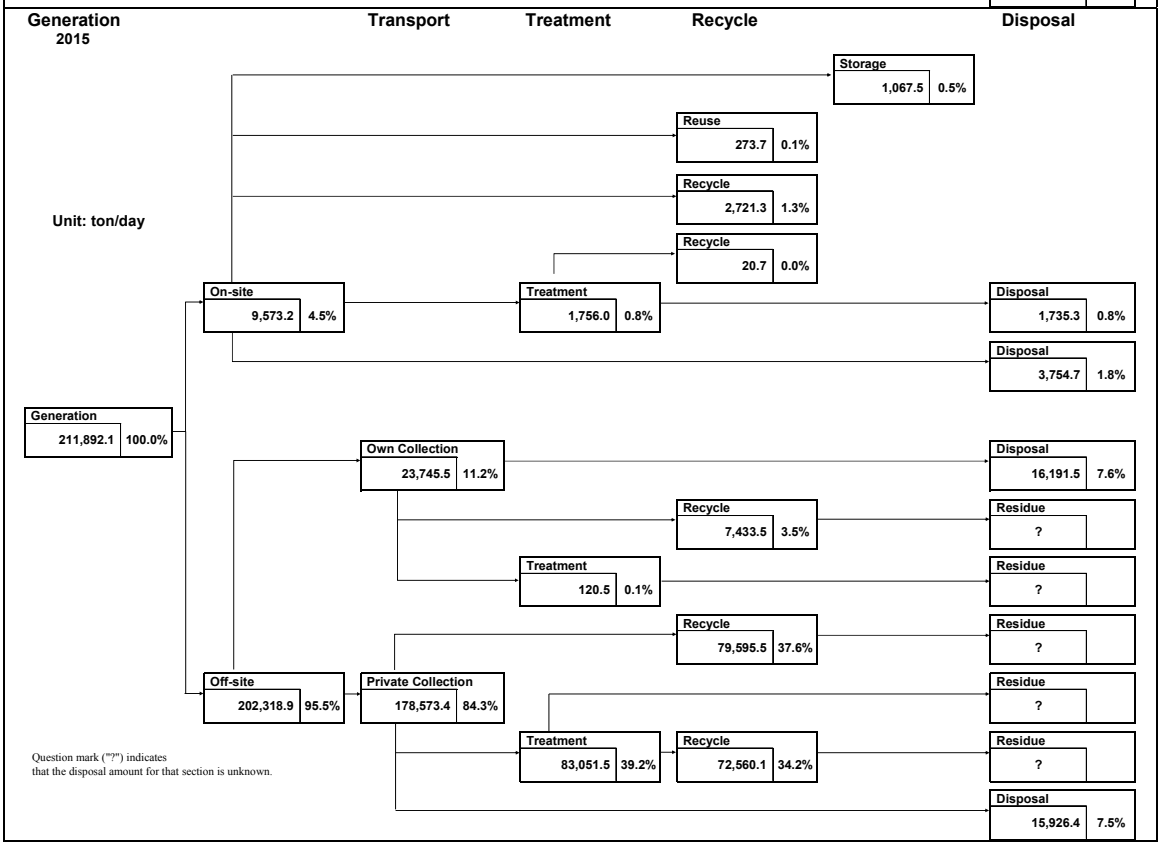
All PIM - All General IW (ton/day, ton/year)



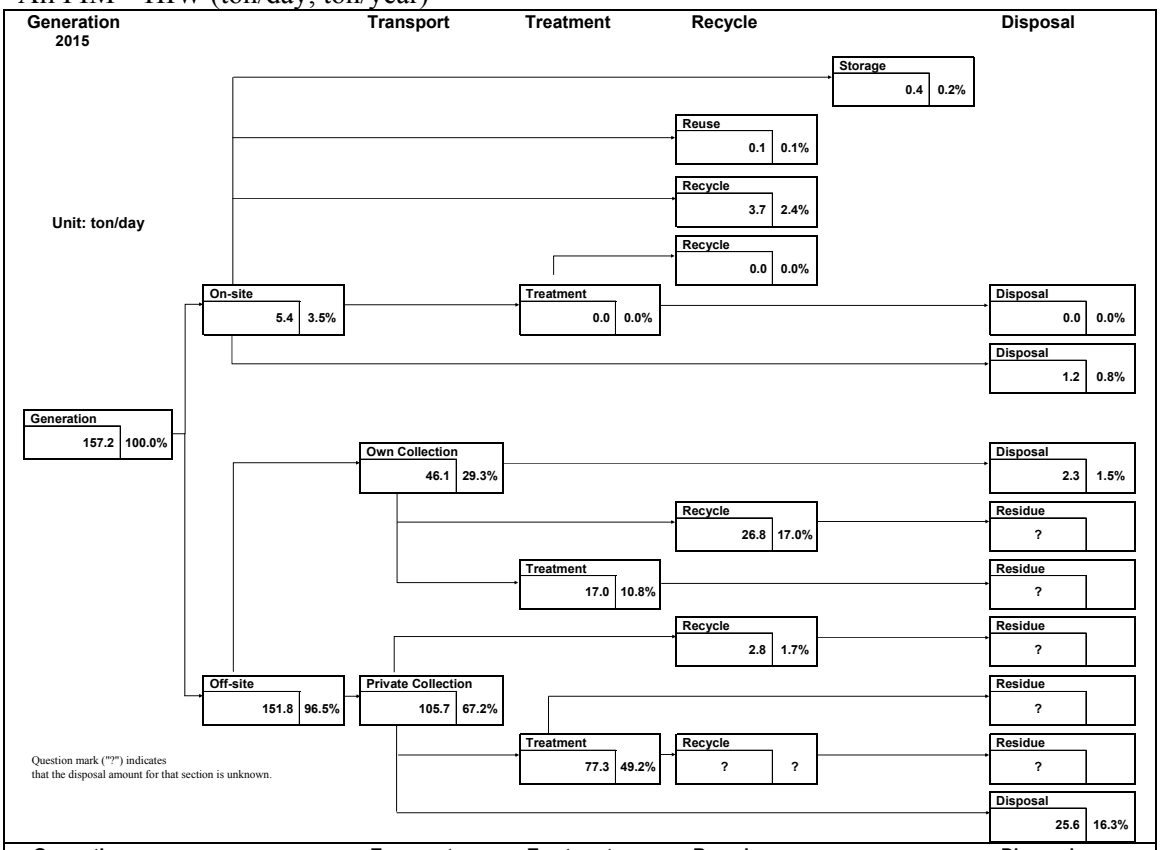


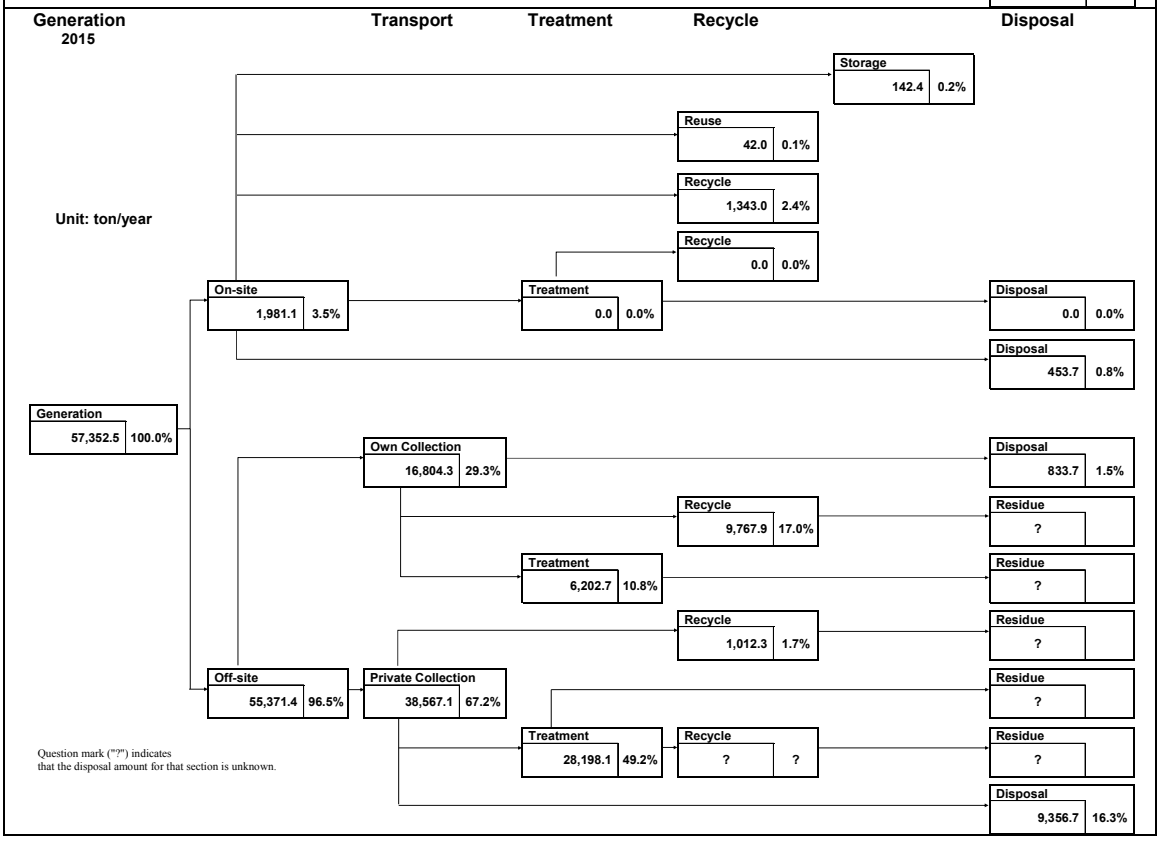
All PIM – Non HIW (ton/day, ton/year)





All PIM – HIW (ton/day, ton/year)





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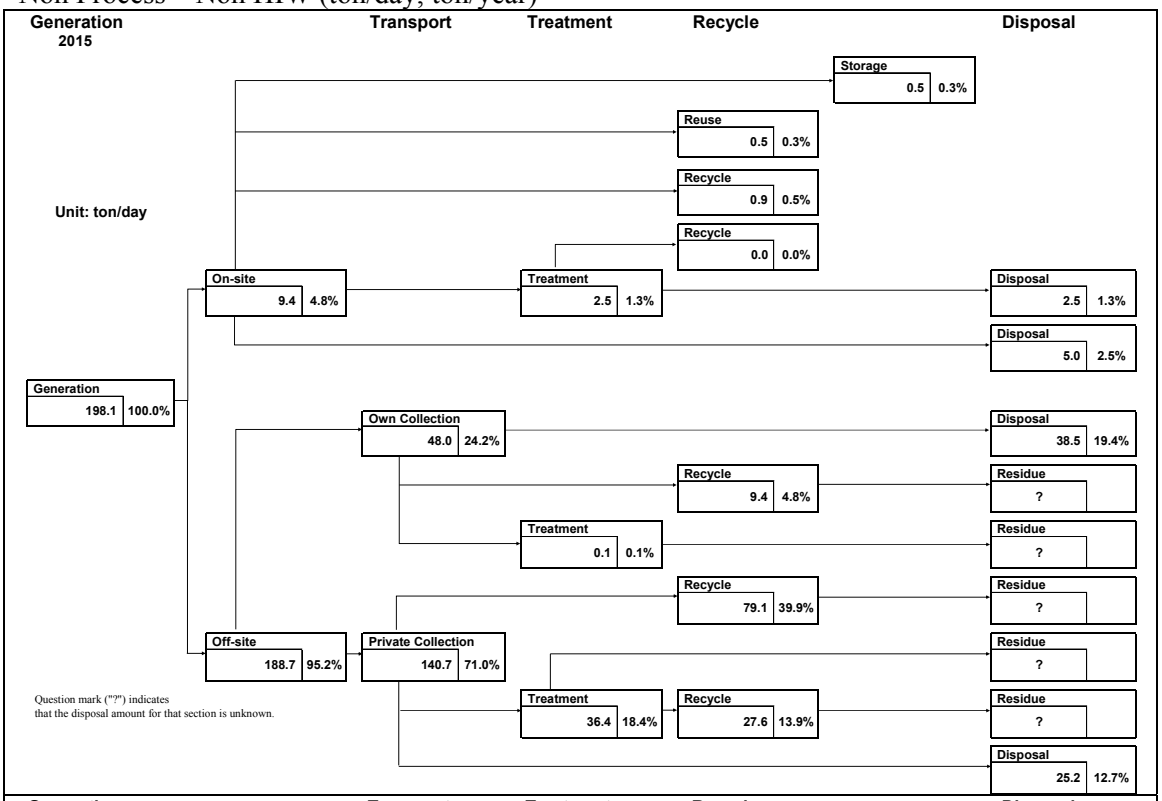

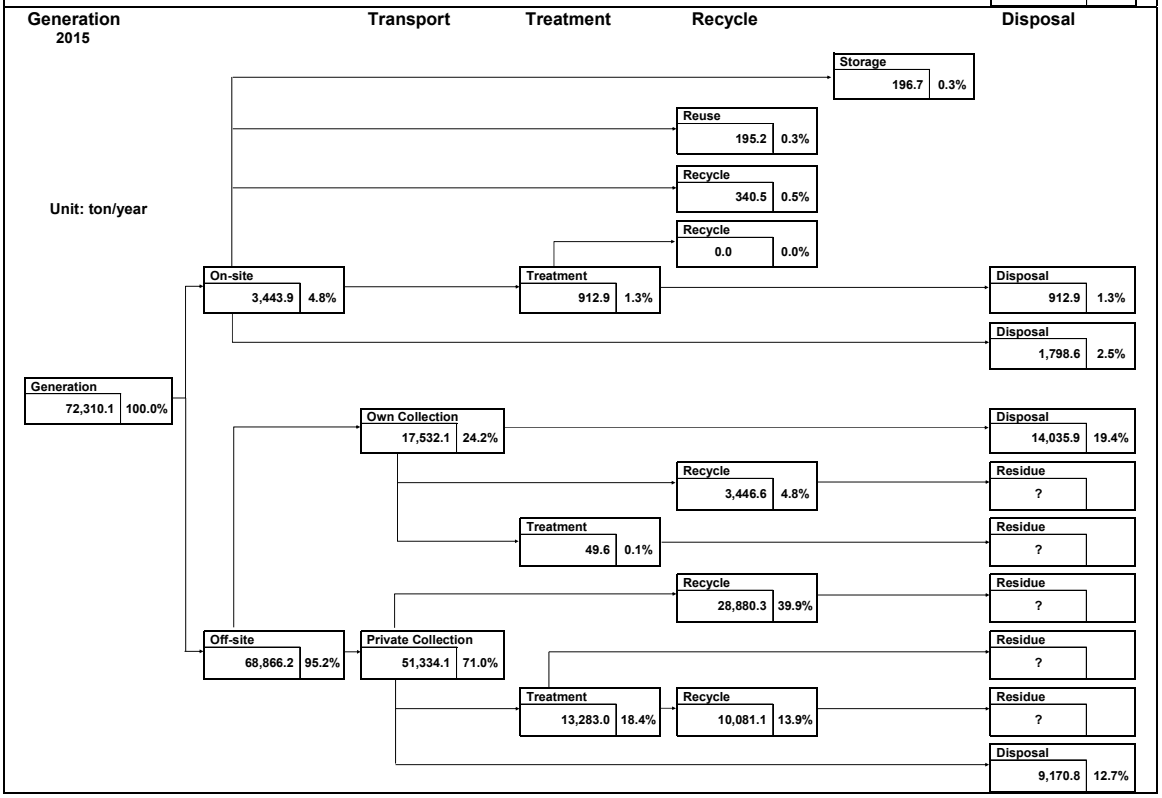

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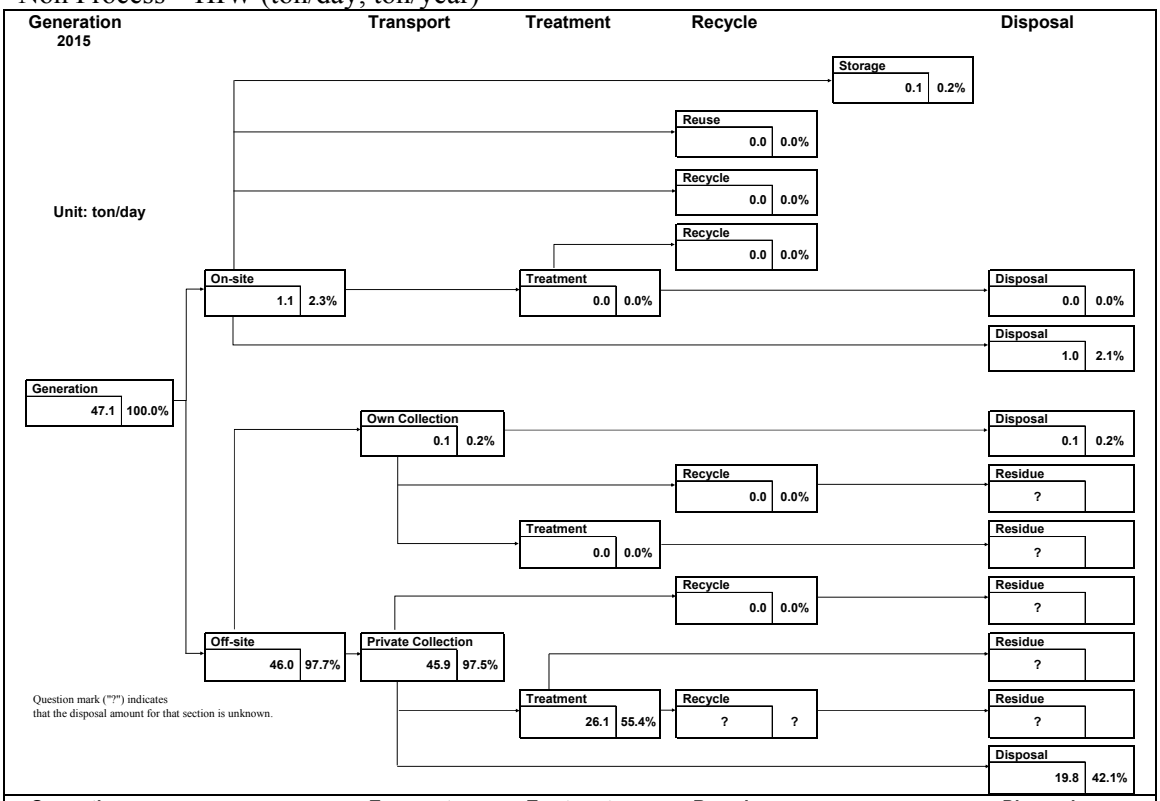

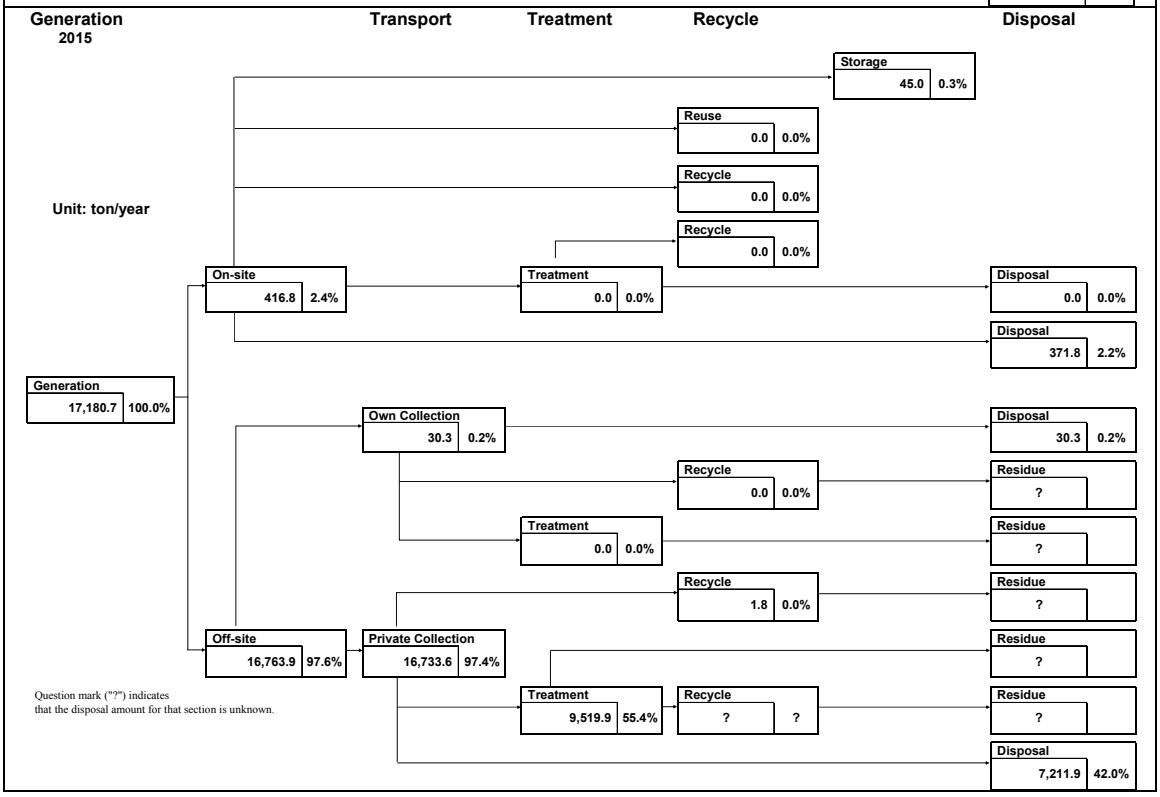

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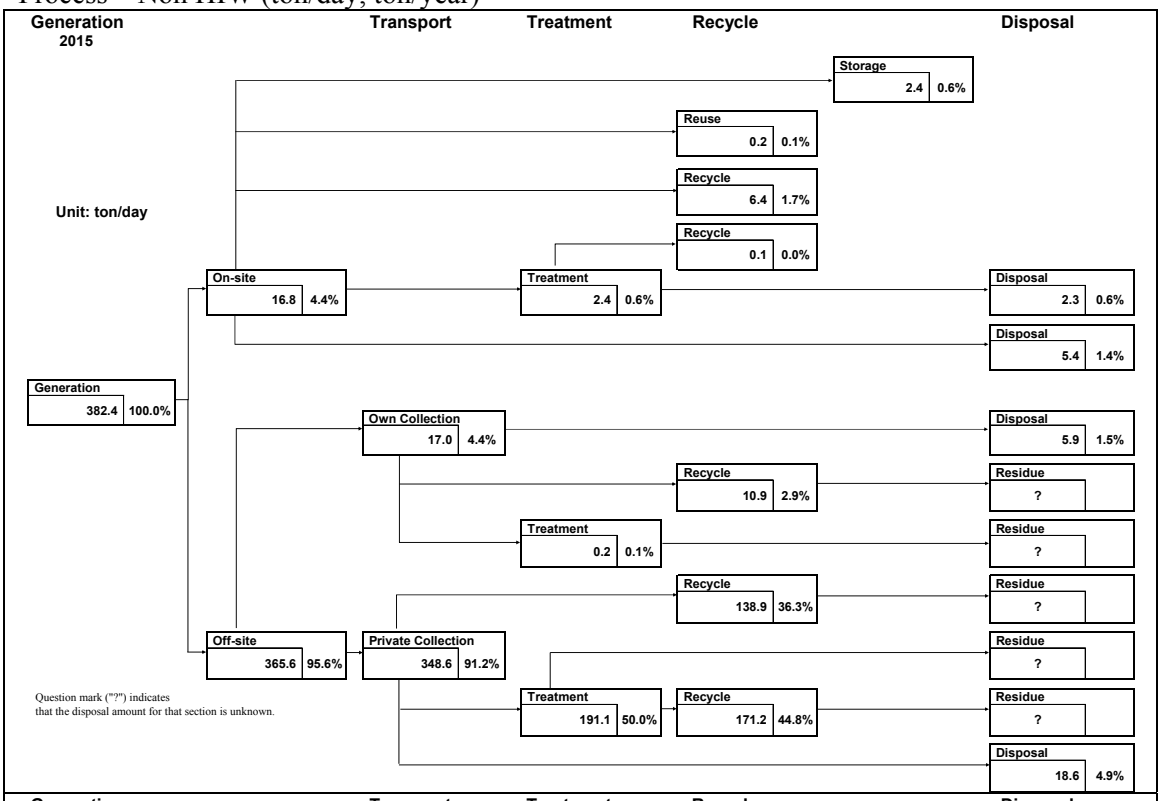

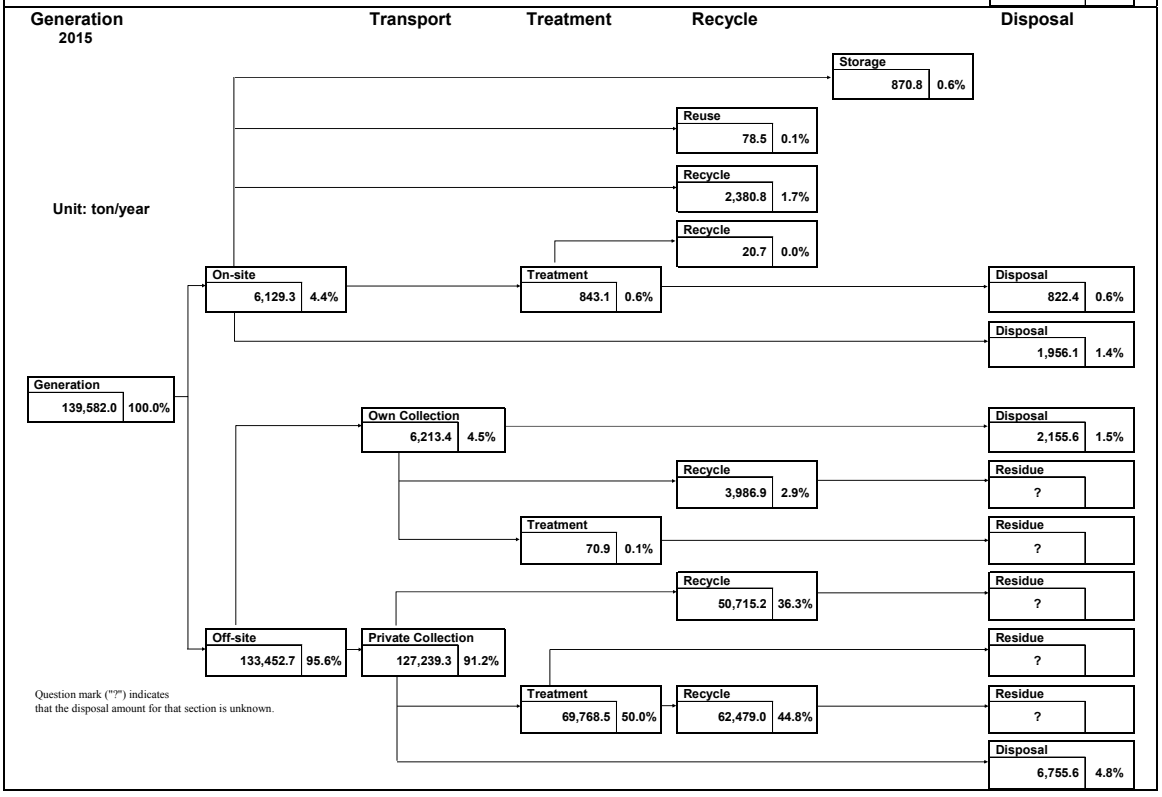

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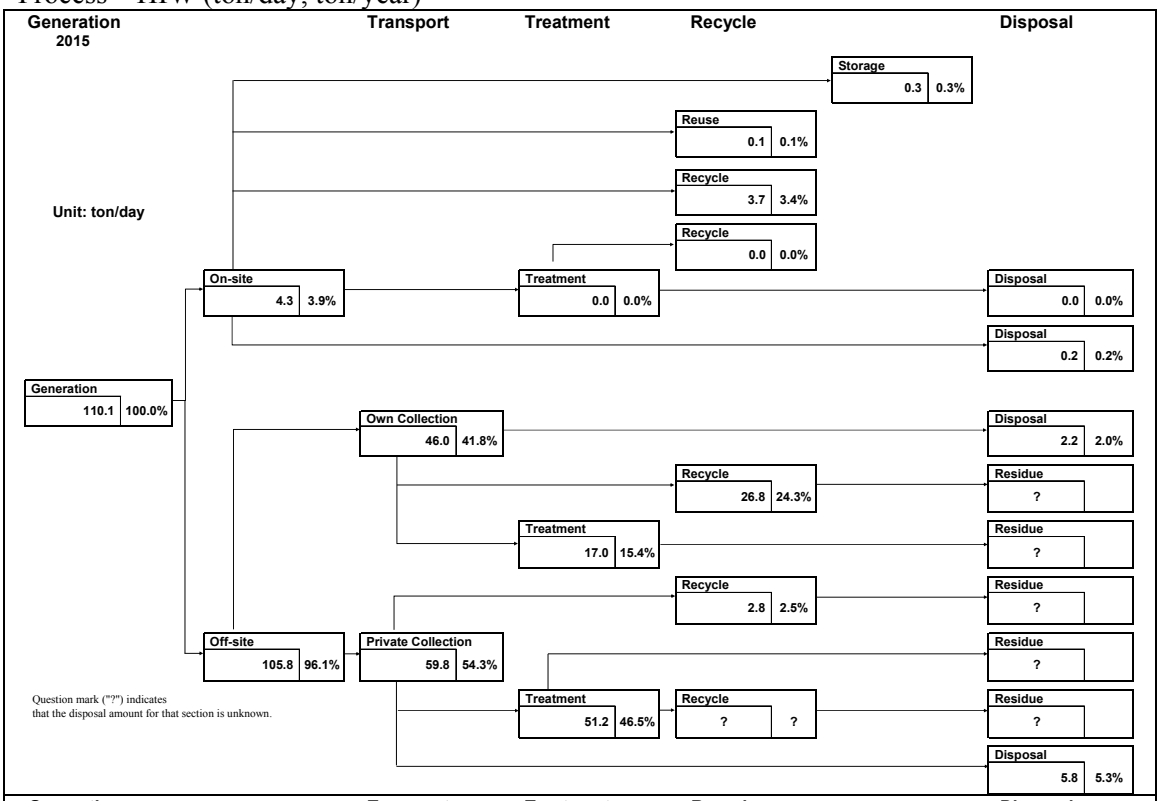
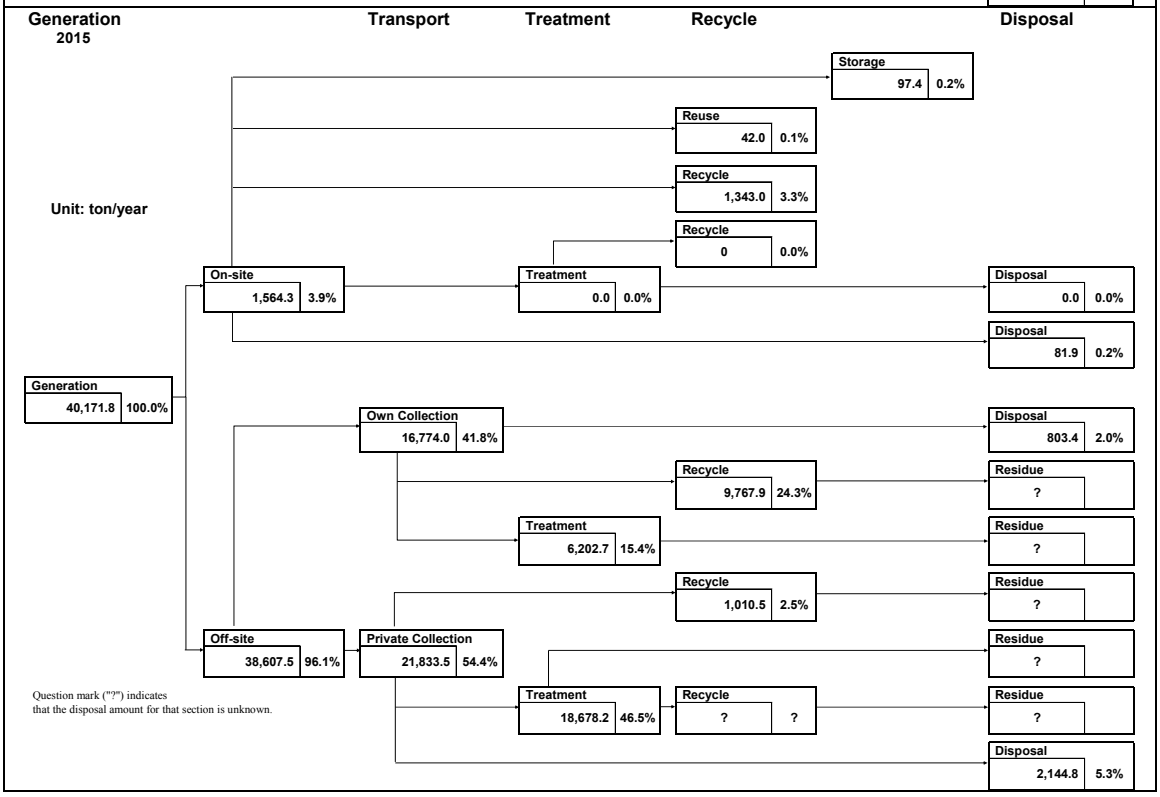
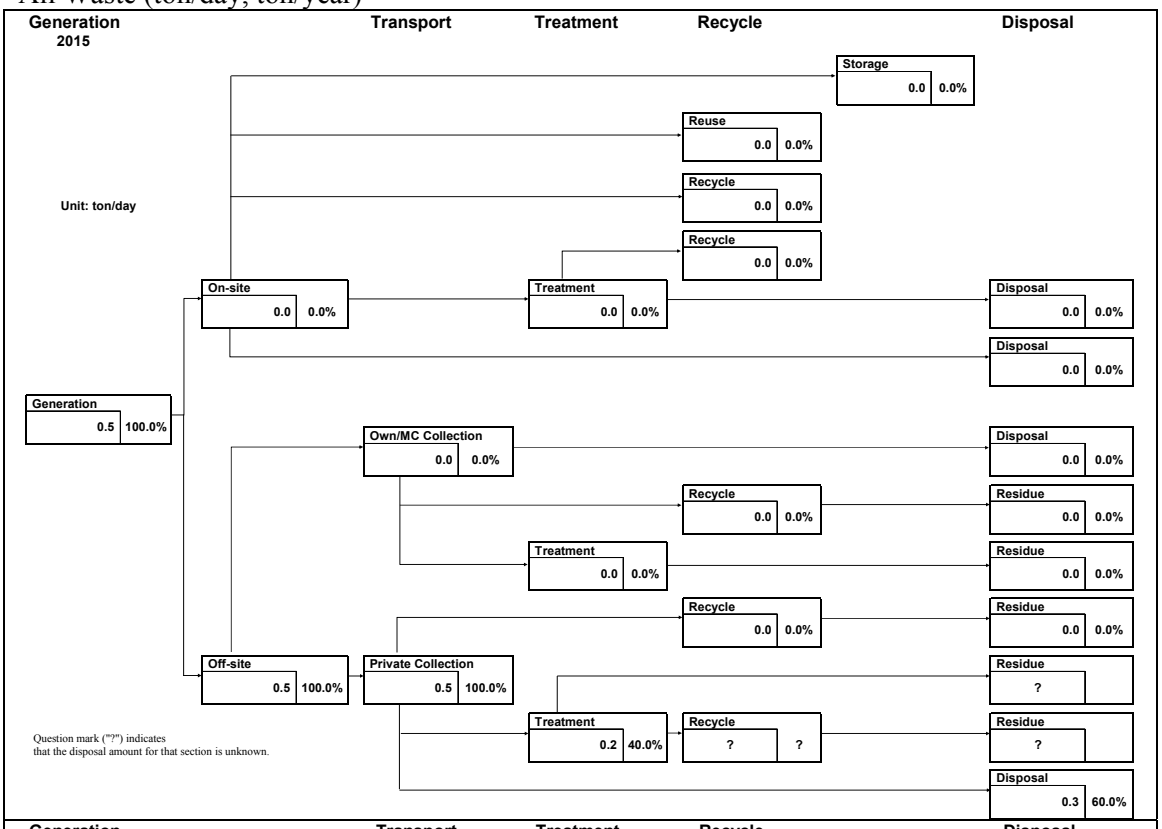
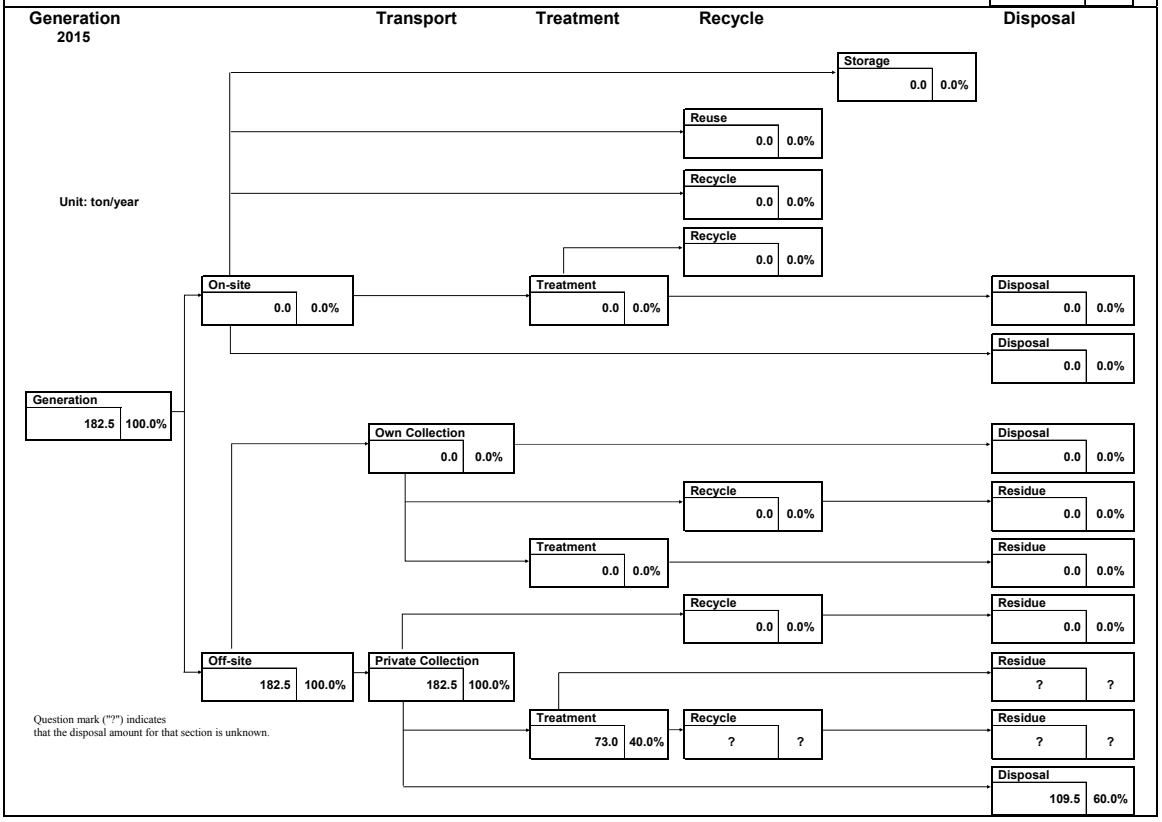




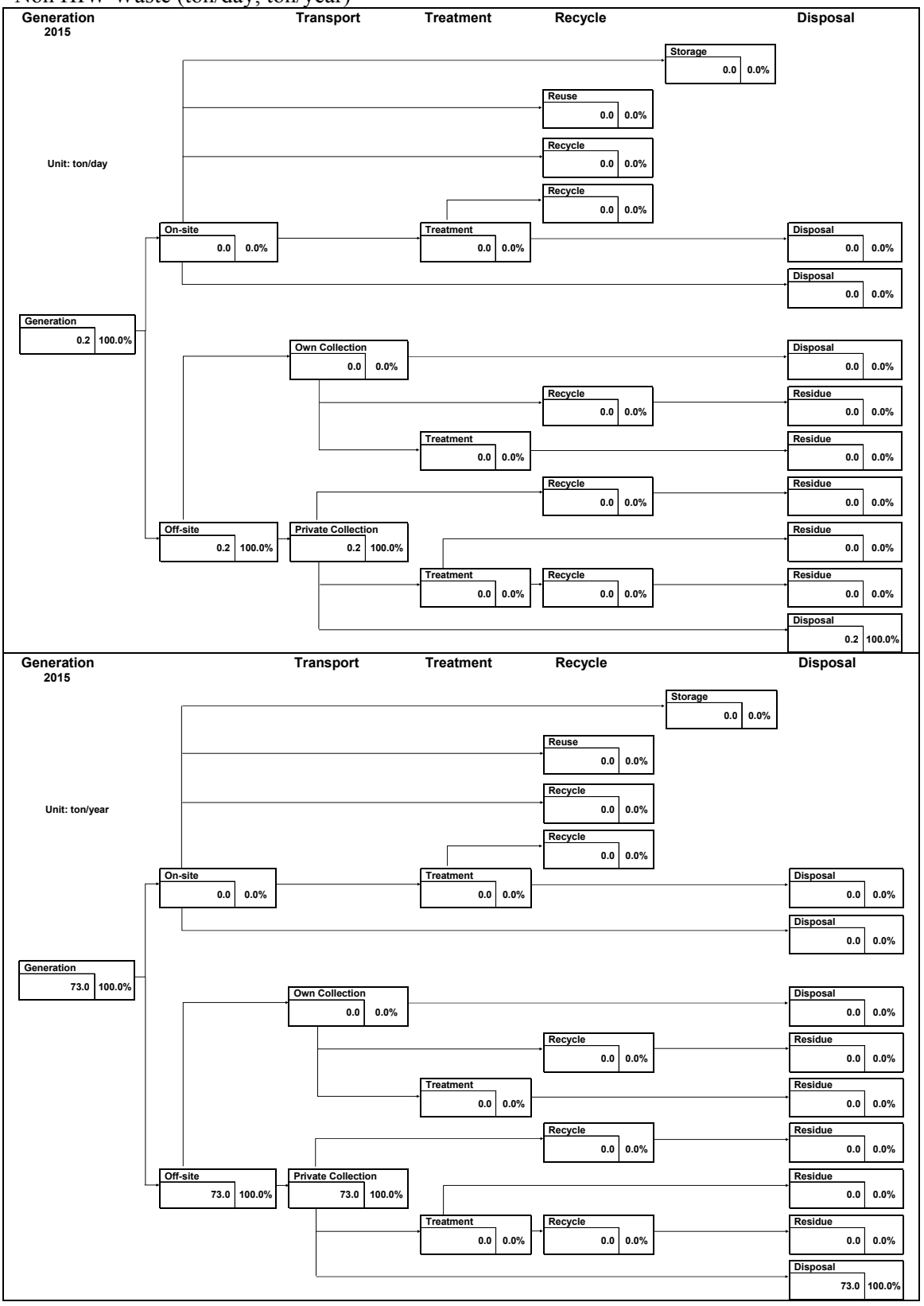
c. Health-care Waste

All Waste (ton/day, ton/year)

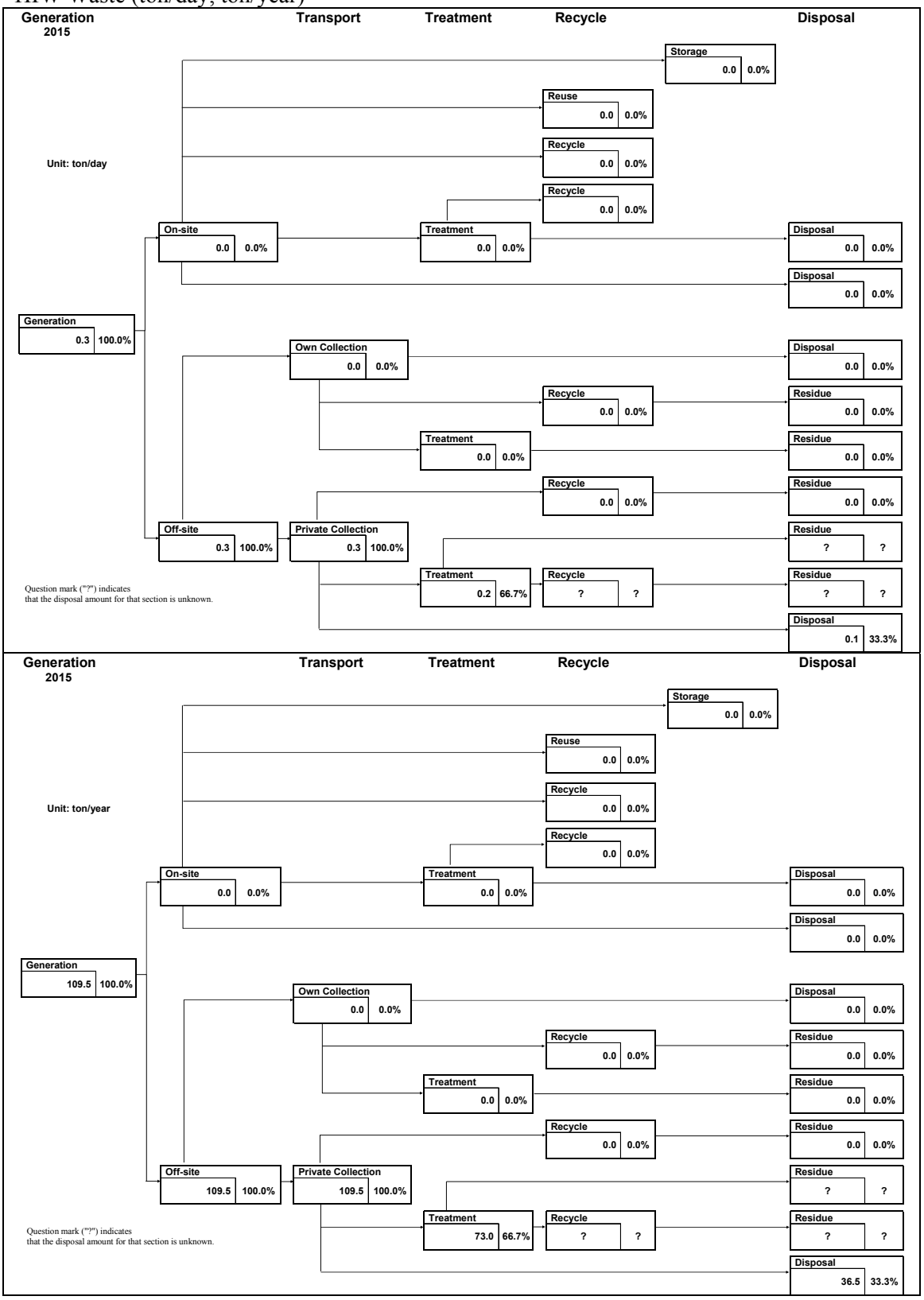




Non HIW Waste (ton/day, ton/year)

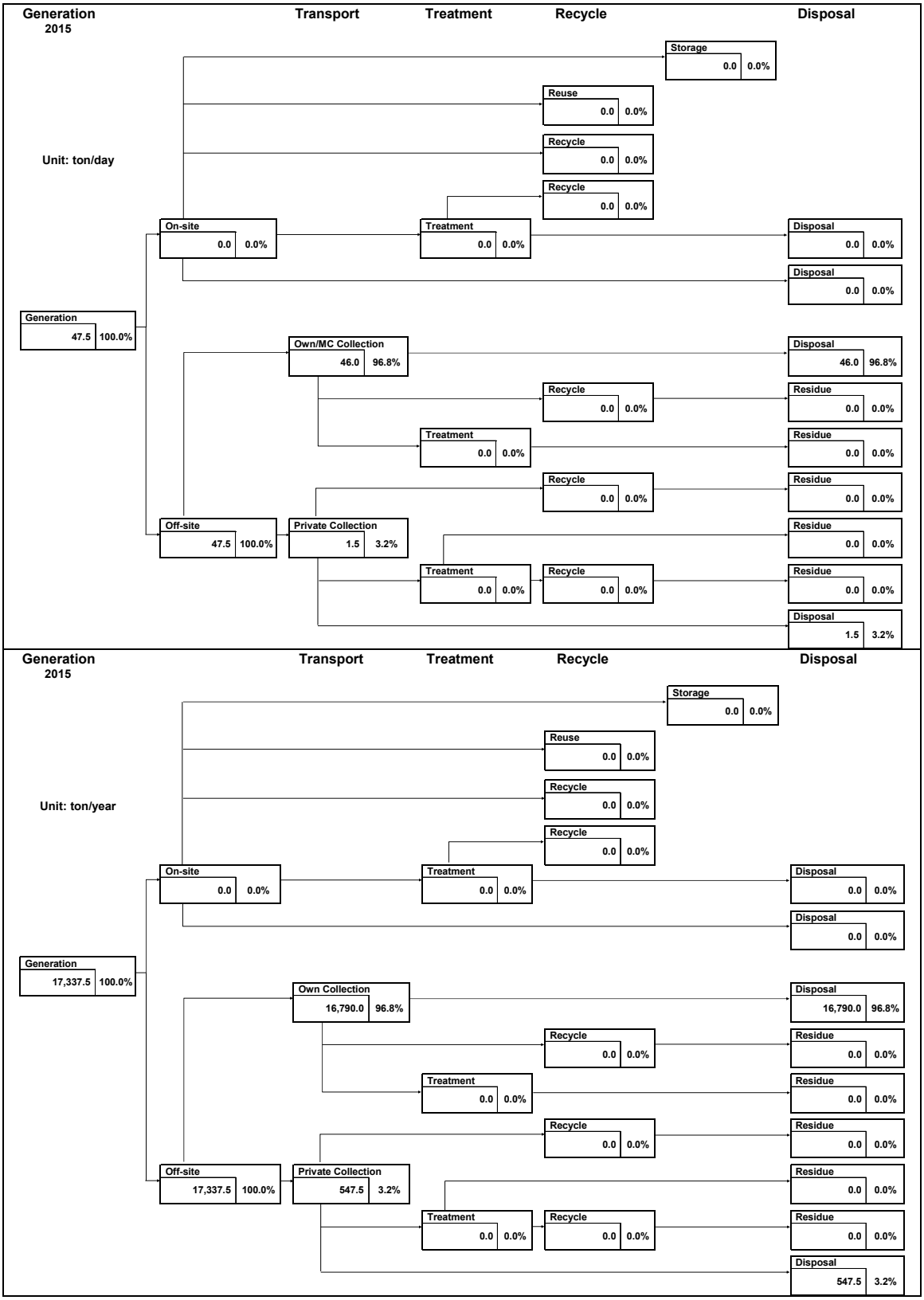


HIW Waste (ton/day, ton/year)



d. Construction Waste

Non HIW (ton/day, ton/year)



2. Workshops and Seminar

2 Workshops and Seminar

2.1 First Workshop

2.1.1 Program

Program for 1st Workshop: September 9, 2009

Workshop of the Study by JICA and SUFRAMA

Workshop One: Opinion Gathering

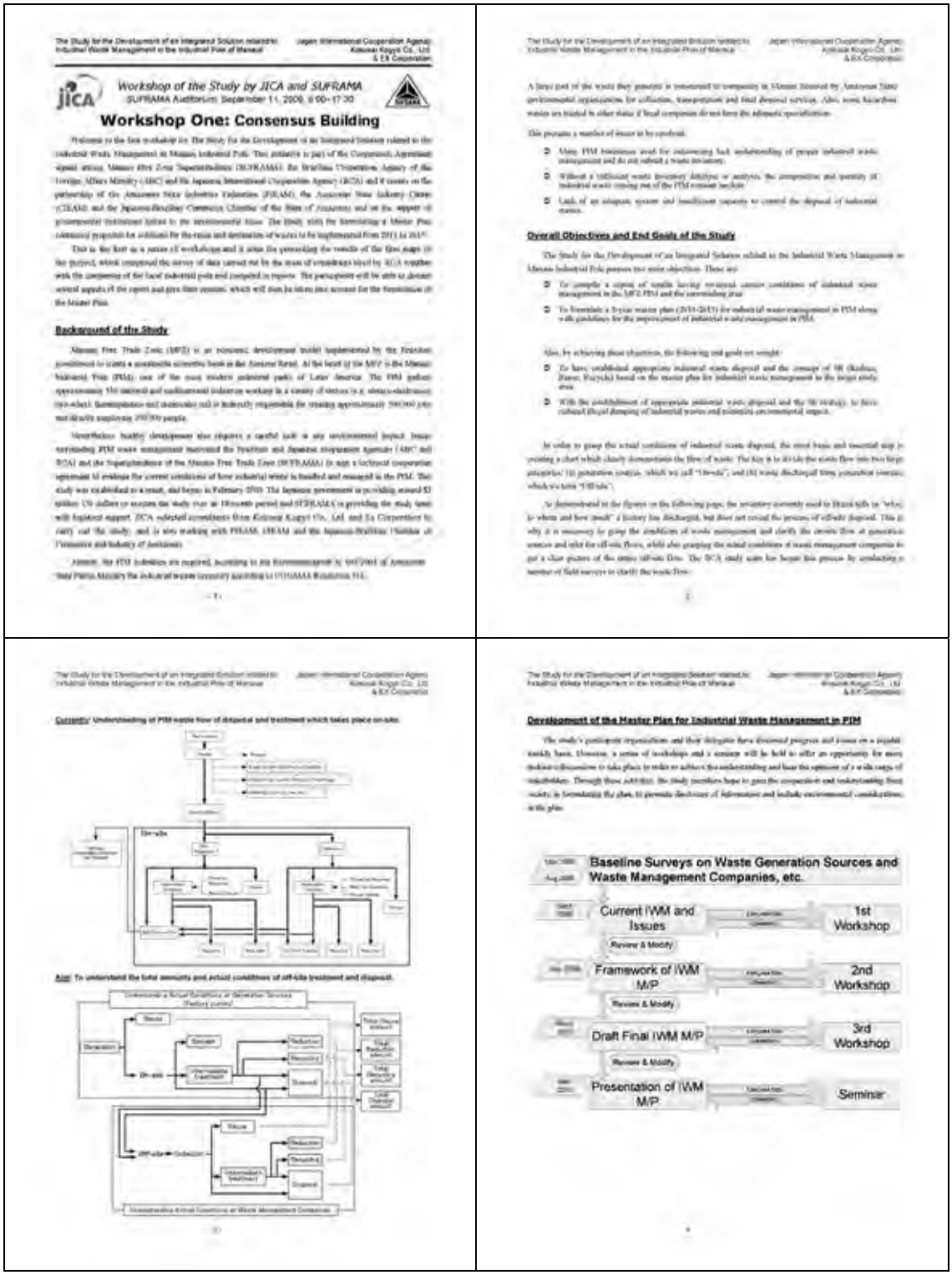
The first workshop invites the study steering committee and technical support committee members to meet with other government institutions, waste dischargers, waste management companies, environmental NGOs, local consultants and others to discuss and gather opinions on (1) the current conditions of industrial waste management and (2) a policy for improvement.

Venue		Date	Time	Objective
SUFRAMA Auditorium		September 11, 2009	8am-5.30pm	Opinion Gathering
Session	**Time**	**Title**		**Speaker**
	08:00 - 08:30	Registration		
	08:30 - 08:45	Opening Address		Dra. Flávia Grosso – Superintendente da SUFRAMA Sr. Masayuki Eguchi – Representante Senior da JICA Brazil Office
	08:45 - 08:55	Workshop objectives		Sr. Susumu Shimura (JICA)
	08:55 – 09:00	Workshop general overview		Sra. Luciana (SUFRAMA)
1	09:00 - 09:20	On-site: Current Conditions and Issues		Sr. Alexandre Kadota - FIEAM/CIEAM/CCNB
2	09:20 – 9:40	Off-site: Current Conditions and Issues		Sr. Antônio Ademir Stroski - IPAAM
3	9.40 – 10.00	PROSAMIN Study Report		Sra. Jane Crespo - PROSAMIN
4	10.00 – 10:20	Domestic & Health Waste Management		Sr. João Bosco Ladislau de Andrade, PhD. UFAM
	10.20 – 11:00	Question and Answer Session		Each Speaker
	11:00 - 13:00	*Lunch*		
	13:00 - 15:00	Workshop Groups: • On-site waste management: current conditions and issues • Off-site waste management: current conditions and issues • Improvement of policy for industrial waste management • Optional participant-suggested topic		
	15:00 - 15:30	*Break*		
	15:30 – 16:30	Group presentations (≤15 min ea.)		Group Representatives
5	16:30 – 17.00	Summary		Sr. Ernani (SUFRAMA)
	17:00 - 17:30	Closing remarks		SUFRAMA

- During the morning sessions, participants are asked to prepare any questions or suggestions which will be addressed during a question and answer session before lunch, or during the afternoon small group discussions. Please deposit questions in a collection box, which will be made available.
- The summary (session 5) at the end of the day will be prepared based on the group presentations in the afternoon.

2.1.2 Presentation Materials

Handout for 1st Workshop: September 11, 2009



Workshop of the Study by JICA and SUFRAMA
SUFRAMA Auditorium: September 11, 2009, 9:00~17:30

Workshop One: Consensus Building

Background of the Study

Overall Objectives and End Goals of the Study

Currently: Understanding of PIM waste flow of disposal and treatment which takes place on-site

Aim: To understand the total amounts and actual conditions of off-site treatment and disposal.

Development of the Master Plan for Industrial Waste Management in PIM

Baseline Surveys on Waste Generation Sources and Waste Management Companies, etc.

Current IWM and Issues — 1st Workshop

Review & Modify

Framework of IWM M/P — 2nd Workshop

Review & Modify

Draft Final IWM M/P — 3rd Workshop

Review & Modify

Presentation of IWM M/P — Seminar

Opening Presentation for 1st Workshop (Sept 11, 2009): Workshop Objectives

Workshop Objectives

September 11, 2009
Susumu SHIMURA
JICA Study Team Leader

For the Study for the Development of an Integrated Solution Related to Industrial Waste Management in the Industrial Pole of Manaus

Background of the Study

- **MFZ is an economic development model to create a sustainable economic basis in the Amazon forest.**
- **Healthy development of PIM/MFZ requires a careful look at any environmental impact.**
- **Issues surrounding PIM industrial waste management (IWM) motivated the Brazilian and Japanese cooperation agencies (ABC and JICA) and the SUFRAMA to sign a technical cooperation agreement to have a study to establish appropriate IWM in PIM/MFZ in November 26th, 2008.**
- **This study was established as a result, and began in February 2009.**

Objectives and Goals of the Study

1. **Objectives**
   - **To identify the current conditions of industrial waste management (IWM) in the PIM/MFZ**
   - **To formulate a master plan for IWM and a guideline for the improvement of IWM**
2. **Goals**
   - **To establish appropriate industrial waste disposal and the 3Rs (Reduce, Reuse, Recycle)**
   - **To reduce illegal dumping of industrial wastes and minimize adverse environmental impact.**

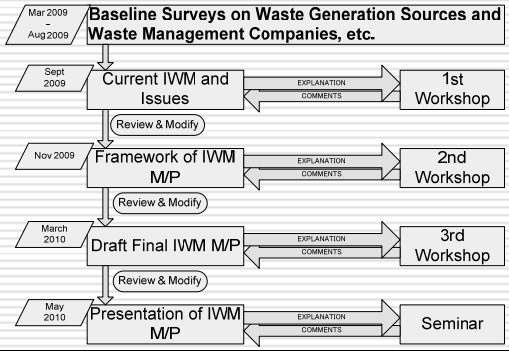
Objectives of the Workshop (1)

- **Policy => The M/P shall:**

1. **be formulated on the initiative of the Brazilian counterpart => Brazilian Initiative**
2. **be understood by and obtain the cooperation of members of society => Social Understanding and Cooperation**
3. **be considerate of environmental protection wherever possible => Environmental Consideration**
4. **be practicable => Practicability**

- **To conduct the policy, we will have three workshops and one seminar.**

Objectives of the Workshop (2)



Objectives of the Workshop (3)

- **The First Workshop aims to**

1. **Present findings of the Study on current conditions and issues of IWM in PIM/MFZ to as many as stakeholders; and**
2. **Discuss with policy for improvement**

- **We are expecting your active participation to the workshop**

Thank you very much for your attention

- **Please feel free to contact us at any time:**
  E-mail: susumu_shimura@kkc.co.jp

  Tel: 2231-7281

Presentation 1 for 1st Workshop (11 Sept., 2009): Onsite Waste Management

Session 1

Current Conditions and Issues on On-site Industrial Waste Management (ISW)

September 11, 2009

Counterpart to JICA Study Team

For the Study for the Development of an Integrated Solution Related to Industrial Waste Management in the Industrial Pole of Manaus

1

Agenda

1. **Work Procedure**
2. **Health waste management**
3. **Construction waste management**
4. **Radioactive waste management**
5. **Industrial waste management**

2

1. Work Procedure (1)

- **CONAMA Resolution 313 requires specified industries to report (using a waste inventory) on management conditions for industrial waste (IW) generated through industrial activity, including health, construction and radioactive waste.**
- **However, in JICA study wastes generated in a factory are categorized into the followings:**

1. **Health waste**
2. **Construction waste**
3. **Radioactive waste**
4. **Industrial waste other than the above wastes**

1. Work Procedure (2)

- **Reasons: Those wastes have their own categorizations and management requirements:**

1. **Health waste: ABNT NBR 12808, RDC 306-ANVISA, CONAMA Resolution 358**
2. **Construction waste: CONAMA Resolution 307**
3. **Radioactive waste: CNEN-NE-06**
4. **Industrial waste other than the above wastes: CONAMA Resolution 313**

4

2. Health waste management (1):

Category of Health Waste

Category of Health Waste
Class A: Infectious Waste
A.1 Infectious waste
A.2 Blood and derivates
A.3 Surgical, anatomopatologic and exudates
A.4 Piercing or cutting
A.5 Contaminated animal
A.6 Patient care
Class B: Special Waste
B.1 Radioactive waste
B.2 Pharmaceutical waste
B.3 Hazardous chemical waste
Class C: Common Waste

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3. Health waste management (2): Number of factories which have a medical facility (clinic)

The study identified the number of the factories with a clinic => 124 of 334 contacted

- **Number of factories in operation in PIM/MFZ => 440 at present**
- **Nine (9) factories were surveyed to know generation rate (GR) of health waste.**
- **Generation amount (GA) of health waste is calculated => GA = GR (440 x 124/334)**

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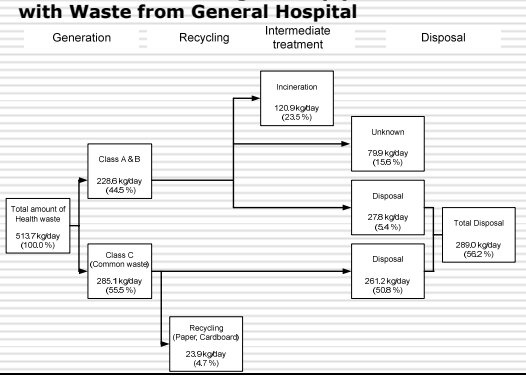
2. Health waste management (3):

Health Waste Generation Rate and Amount Unit: kg/day

Generation Category	Generation Rate	Generation Amount of all Factories in PIM	Generation Amount of a General Hospital	Generation Amount of Whole PIM
Class A	0.957	156.4	26.2	182.6
Class B	0.271	44.3	1.7	46.0
Hazardous Waste Total	1.228	200.7	27.9	228.6
Class C	1.171	191.3	94.0	285.3
Health Waste Total	2.399	392.0	121.9	513.9

7

2. Health waste management (3): Waste Flow with Waste from General Hospital



2. Health waste management (3): Current Issues (1)

1. **Establishment of health waste management system in PIM**

- ☐ More than 1/3 of the factories in PIM have a clinic.
- ☐ Factories and a hospital in PIM generate considerable amount of hazardous health wastes, 228.6 kg/day.
- ☐ This is due to over 100,000 people working in PIM/MFZ.

Country/City	Study Year	Population	Generation Amount (kg/day)	Unit Generation (g/person/day)
Chile / Santiago	1995	5,642,000	20,000	3.54
Turkey / Adana	1998	1,196,620	4,401	3.68
Turkey / Mersin	1998	643,850	1,539	2.39
Azerbaijan / Baku	2000	2,051,200	12,892	6.28
Cambodia / Phnom Penh	2003	1,199,414	961	0.80
Sri Lanka / Kandy	2002	110,049	530	4.81
Mongol / Ulaanbaatar	2005	866,591	1,600	1.85
PIM in Manaus	2009	117,253*1	229	1.95

*1: Total number of employees in 440 factories operating in PIM/MFZ

2. Health waste management (4): Current Issues (2)

2. **On-site health waste management**

- ☐ On-site health waste management has been established at almost acceptable level. It of the general hospital seems to be well-established.
- ☐ However, the following issues were observed in the clinics of the factories:

a. Standard containers set in the ABNT NBR 12809 are not used in more than half of clinics.
b. Although hazardous health wastes (HHWs) are separately stored according to the class and type of the HHWs, some clinics (2/8) discharged them mixed together for collection service.

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2. Health waste management (5): Current Issues (3)

3. **Identification of off-site health waste management**

- ☐ The medical institution survey could not identify the off-site health waste management due to insufficient manifest system and lack of discharger's responsibilities.
- ☐ Class C wastes are managed by municipal waste collection service. But off-site HHWM is questioned on the following aspects:

a. Some clinics (3/9) did not answer the off-site disposal method of HHW they discharged.
b. Some of the HHW are disposed of at special pit at the landfill.
c. Many HHWs are treated by the incinerators. But whether the incineration is properly operated or not is question.

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3. Construction waste management (1): Number of factories which had construction work in past year

a. **CONAMA Resolution 307 categorized construction wastes into 4 items.**
b. **However, the Study categorized into 44 items.**
c. **The study identified the factories which had construction work in past year (from June 2008 to May 2009). => Number of factories in operation in PIM/MFZ x Nos. of factories had construction work/Nos. of factories interviewed = 440 x 123/334**

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3. Construction waste management (2): Construction Waste Generation in PIM/MFZ (1)

Waste No	Description of Waste	GR (kg/day)	TGA (ton/day)	Portion (%)
1	Excavated soil	9.04	1.46	4.0
2	Concrete debris	14.75	2.39	6.5
3	Asphalt debris	17.12	2.77	7.5
4	Brick debris	0.83	0.13	0.4
6	Tile and ceramic	0.003	0.00	0.0
11	Plastic/vinyl sheet	0.12	0.02	0.1
12	Iron-bar, steel materials	0.07	0.01	0.0
13	Small metal waste	0.16	0.03	0.1
17	Plaster boards	0.01	0.00	0.0
20	Wood debris	0.37	0.06	0.2
21	Timber form	0.06	0.01	0.0
22	Scaffolding material	0.34	0.06	0.1
23	Interior timber	0.32	0.05	0.1
24	Packing (cardboard)	0.26	0.04	0.1
29	Machine oil	0.02	0.00	0.0
33	Ash	0.05	0.01	0.0
44	Mixed construction waste	184.66	29.92	80.9
	Total	228.18	36.97	100.0

3. Construction waste management (3): Construction Waste Generation in PIM/MFZ (2)

- ☐ **Waste Generation in accordance with CONAMA Resolution 307**

1. **Class A (Reusable or recyclable as aggregate): 36.8 tons/day**
2. **Class B (Recyclable as non-aggregate): 0.2 tons/day**
3. **Class C (Uneconomical recyclables): 0.0 tons/day**
4. **Class D (Hazardous waste): 0.0 tons/day**

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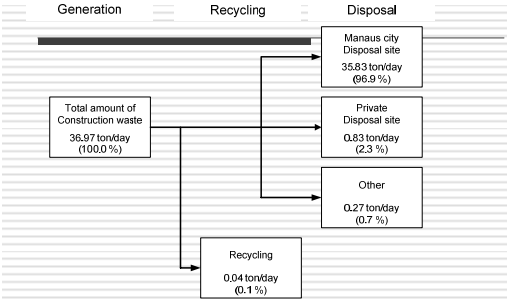
3. Construction waste management (4): Construction Waste Flow in PIM/MFZ

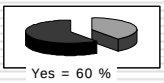


Recycling rate is very low.

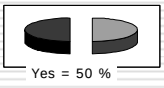
15

3. Construction waste management (5): Issues (1)

1. **Results: 60% of construction work got a construction license.**



2. **Results: 50% of construction work made a construction waste management plan according to CONAMA Resolution 307.**



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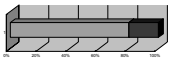
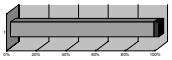
3. Construction waste management (6): Issues (2)

3. **Results: Recycling rate is very little only 0.1% because over 80% of mixed wastes are discharged and disposed of at Manaus City Landfill. Almost all (96.9%) of the waste were disposed of at Manaus City Landfill.**



Mixed waste = 80 %



Manaus city landfill = 96.9 %

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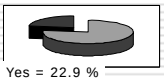
3. Construction waste management (7): Issues (3)

4. **22.9% (11 items of 48 in total) use a manifest for discharge of the waste.**



Yes = 22.9 %

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4. Radioactive waste survey (1)

- **8 institutions of 14 ones in MFZ, which use radioactive materials and have a license of CNEN, were surveyed.**
- **No radioactive waste are generated.**

Purpose of use (Type)	Number of target
Nuclear measurers - control of nuclear measuring processes in DI	5
Analytical Techniques in DI	2
Nuclear medicine outside DI	1
Total	8

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4. Radioactive waste survey (2): Radioactive materials management in PIM (1)

- **All 7 factories in DI surveyed have license of the use of radioactive materials.**
- **The purpose of the use is to control production process and control of the products.**
- **Details are as follows:**

Specify	Answer
Filling level inspection/ measurement	4
Measurement of the PVC sailcloth in the process	1
Products dimension control	1
Verification of the solder	1

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4. Radioactive waste survey (3): Radioactive materials management in PIM (2)

- **Radioactive materials management of 7 factories in DI is well established.**
- **Those are used in the controlled area.**
- **Storage of radiation sources is as follows:**

Storage of Radiation Sources	Answer	%
It is stored inside of the controlled area with special container.	2	28.6
It is stored inside of the controlled area and installed inside of the X-ray equipment.	3	42.8
It is installed in a level measurement device	1	14.3
It is installed in a device within the controlled area	1	14.3
Total	7	100.0

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5. IWM (1): Category of 134 Factories Surveyed

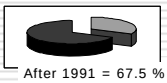
134 factories surveyed shares 30.5% in Total number of those operation in PIM/MFZ.

Sample Population = 134

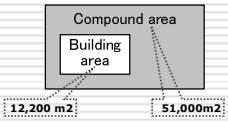
Factory code	Distrito Industrial			Outside			Total number of factory (A)	Surveyed number of factory	
	Number of Factory			Number of Factory				Number (B)	% (B/A)
	Part 1	Part 2	Sub-total	Part 1	Part 2	Sub-total			
F01	3		3	12		12	15	2	13.3
F02									
F03	6		6	3	7	10	16	4	25.0
F04	64	1	65	51	5	56	121	45	37.2
F05	2		2				2		
F06	19		19	9		9	28	9	32.1
F07	23	2	25	19	3	22	47	16	34.0
F08		1	1	2	3	5	6	1	16.7
F09	1		1	3	1	4	5	2	40.0
F10	7		7	6		6	13	7	53.8
F11	2		2	1		1	3		
F12				4	9	13	13	2	15.4
F13	13	2	15	15	4	19	34	7	20.6
F14	31	2	33	35	7	42	75	22	29.3
F15				1		1	1		
F16				2		2	2		
F17	15		15	16	2	18	33	14	42.4
F18		1	1	2	3	5	6		
F19	7		7	5	8	13	20	3	15.0
Total	193	9	202	186	52	238	440	134	30.5

5. IWM (2): Feature of 134 factories surveyed (1)

1. **67.5% (83/123 Fac.) is established after 1991.**
2. **Average compound (121 Fac.) and building (116 Fac.) areas are 51,000m² and 12,200 m² respectively.**
3. **Total number of employees is 34,395 persons (125 factories) and Average number of employees is 276 persons.**



After 1991 = 67.5 %



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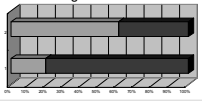
5. IWM (3): Feature of 134 factories surveyed (2)

4. **Installation rates of industrial and domestic wastewater treatment facilities are 26.6 % and 54.3 % respectively.**

Industrial waste water = 26.6 %

Domestic = 54.3 %

5. **Rate of installation of storage space of dangerous substances on the ground is 60.6 % (77/127 Fac.) + underground 19.6 %(21/107 Fac.)**



On the ground = 60.6 %

Underground = 19.6 %

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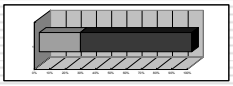
5. IWM (4): Feature of 134 factories surveyed (3): Rate of Pollution Control Facilities

Pollution control facilities	%
a. Bolier	12.4 %
b. Incinerator	2.3 %
c. Dust collector	12.5 %
d. Air Control faciliries	13.5 %
e. Plating process	2.4 %
f. Powder paining process	9.3 %
g. Water paining process	14.3 %
h. Metal coating proces	7.8 %

5. IWM (5): Feature of 134 factories surveyed (4)

6. Waste Inventory (WI)

- **All factories in PIM shall submit WI.**
- **26.9% (35/130 Fac.) replied no need to submit its WI.**
- **11.6 % (11/95 Fac.) replied "need to submit its WI" do not submit WI**
- **In total 35.4% (46/130 Fac.) do not submit WI.**



No Obligation = 26.9 %

No Submit WI = 35.4 %

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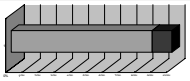
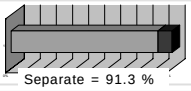
5. IWM (6): Feature of 134 factories surveyed (5)

7. Separate Discharge of Non-Production and Production Process Waste => Yes: 87.7% (114/130 Fac.), No: 12.3% (16/130 Fac.)



Separate = 87.7 %

8. Separate Discharge of Non-HIW and HIW => Yes (100% + Partly): 91.3% (116/127 Fac.), No: 8.7% (11/127 Fac.)



Separate = 91.3 %

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5. IWM (7): Feature of 134 factories surveyed (6)

Base : population= 11	%
1. We don't know the difference between Non-HIW and HIW.	0.0 %
2. The volume of waste is too small to separate.	81.8 %
3. The production process makes it difficult to separate Non-HIW and HIW.	27.3 %
4. The collection service does not require to separate Non-HIW and HIW.	18.2 %
5. It is troublesome and waste of time to separate Non-HIW and HIW.	9.1 %
6. It seems unnecessary to separate Non-HIW and HIW.	0.0 %
7. It is difficult to separate Non-HIW and HIW.	0.0 %
8. Even though Non-HIW and HIW are separated, there are no ways to utilize them.	9.1 %

5. IWM (8): Feature of 134 factories surveyed (7)

9. Health service in the factory => Yes: 40.6% (52/128 Fac.) <= Yes: 37.1% (124/334 Fac.) by Medical institution survey

Health service = 40.6 %

Number of Survey =37.1 %

10. Generation of radioactive wastes => No: 100% (126 Fac.) <= No: 100% (8 Fac.) by radioactive waste survey

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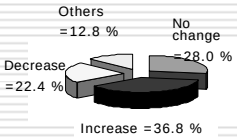
5. IWM (9): Future Management of IW (1)

1. Generation of IW => No change: 28.0% (35/125 Fac.), Increase: 36.8% (46/125 Fac.), Decrease: 22.4% (28/125 Fac.).



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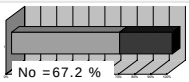
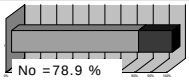
5. IWM (10): Future Management of IW (2)

2. 3Rs plan for IW => No: 67.2% (84/125 Fac.), Yes: 32.8% (41/125 Fac.)



No =67.2 %

3. Improvement plan for IWM in the factory => No: 78.9% (97/123 Fac.), Yes: 21.1% (26/123 Fac.)

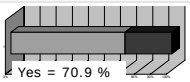


No =78.9 %

31

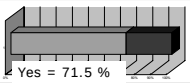
5. IWM (11): Waste Exchange (WE) (1)

1. Knowledge of WE => Yes: 70.9% (90/127 Fac.), No: 29.1% (37/127 Fac.)



Yes = 70.9 %

2. Interest of WE => Yes (Very much + Eventually): 71.5% (90/126 Fac.), No: 28.5% (36/126 Fac.)



Yes = 71.5 %

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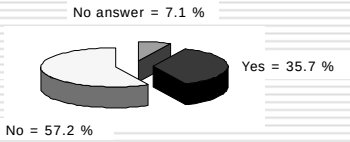
5. IWM (12): Waste Exchange (WE) (2)

3. **Involvement of WE at present => Yes: 35.7% (45/126 Fac.), No: 57.2% (72/126 Fac.), No answer: 7.1% (9/126 Fac.)**



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5. IWM (13): Financial Matters and Evaluation of Current IW System (1)

1. **Payment to transportation company => 188,400 R$/year (Average of 44 Fac.)**
2. **Expenditure of on-site (in the factory) IWM => 138,500 R$/year (Average of 17 Fac.)**

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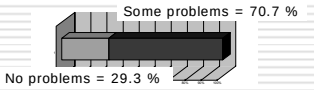
5. IWM (14): Financial Matters and Evaluation of Current IW System (2)

3. **Current IW System => No Problems: 29.3% (36/123 Fac.), Some Problems: 70.7% (87/123 Fac.)**



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5. IWM (15): Financial Matters and Evaluation of Current IW System (2)

Base : Population = 87	%
1. We do not know the difference between hazardous and non-hazardous industrial waste.	0.0 %
2. We do not segregate hazardous from non-hazardous industrial waste.	5.7 %
3. There are no or only limited services available for industrial waste treatment	33.3 %
4. High cost of industrial waste treatment.	55.2 %
5. Reuse and recycling of industrial waste is non-existent or limited.	41.4 %
6. There are no reliable and licensed companies offering treatment and/or disposed service, in Manaus.	31.0 %

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5. IWM (16): Industrial Waste Generation Amount in PIM (440 Factories)

- **Health and construction waste and wastewater are excluded.**
- **IW generation amount: 696.4 ton/day**

1. Non-HIW: 557.0 ton/day
1.1 Non-process: 192.4 ton/day
1.2 Process: 364.6 ton/day
2. HIW: 139.4 ton/day
2.1 Non-process: 21.0 ton/day
2.2 Process: 118.4 ton/day

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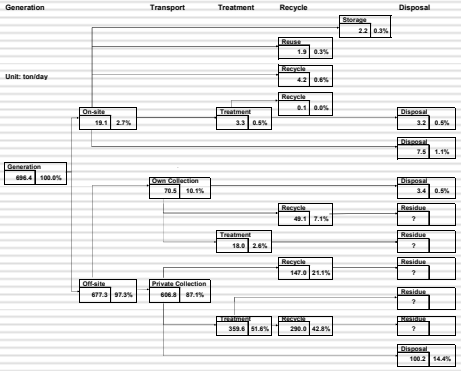
5. IWM (17): All Industrial Waste Flow in PIM (1)



5. IWM (18): All Industrial Waste Flow in PIM (2)

- **Rate of on-site management waste is very low. => 2.7% (19.1ton/day of 696.4)**
- **Rate of on-site reuse/recycling is low. => 0.9% (6.1ton/day of 696.4)**
- **Most of IW are collected by WMCs. => 87.1% (606.8ton/day of 696.4)**
- **10.1%(70.5ton/day of 696.4) of IW transported by factories by themselves.**
- **Only 14.9% (103.6ton/day of 696.4) of IW are disposed of at landfill.**
- **Majority of IW go to Treatment (54.2%: 377.6ton/day), followed by Recycle (28.2%: 196.1ton/day).**

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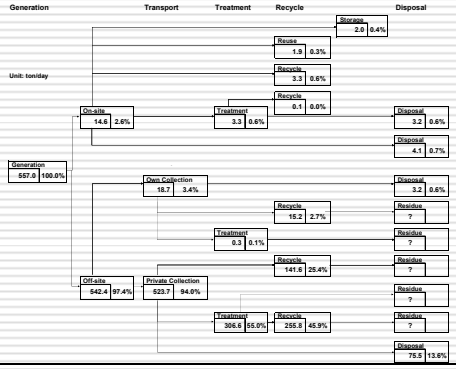
5. IWM (19): All Industrial Waste Flow in PIM (3)

- **Residues amount from Treatment & Recycle (573.7ton/day in total) is not informed by factories.**
- **It might be disposed of at landfills.**
- **It will be checked by WMCs survey results.**

40

5. IWM (20): All Non-HIW Flow in PIM (1) 557.0 ton/day



5. IWM (21):
All Non-HIW Flow in PIM (2) 557.0 ton/day

- **Rate of on-site management => 2.6%**
1. **Rate of on-site reuse/recycling => 0.9%**
- **Rate of off-site management => 97.4%**
1. **Rate of WMCs collection => 94.0%**
2. **Rate of factory transportation => 3.4%**
3. **Rate of off-site treatment => 55.1%**
4. **Rate of off-site recycling => 28.1%**
5. **Rate of off-site final disposal => 14.2%**

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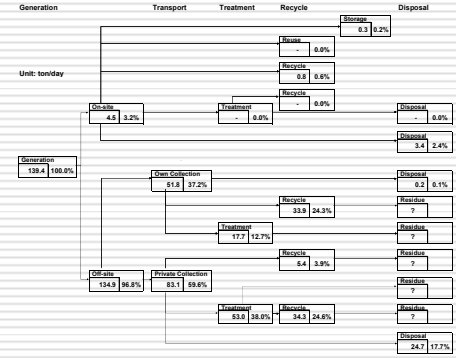
5. IWM (22): All HIW Flow in PIM (1) 139.4 ton/day



5. IWM (23):
All Non-HIW Flow in PIM (2) 139.4 ton/day

- **Rate of on-site management => 3.2%**
1. **Rate of on-site reuse/recycling => 0.8%**
- **Rate of off-site management => 96.8%**
1. **Rate of WMCs collection => 59.7%**
2. **Rate of factory transportation => 37.2%**
3. **Rate of off-site treatment => 50.7%**
4. **Rate of off-site recycling => 28.2%**
5. **Rate of off-site final disposal => 17.8%**

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Thank you very much for your attention

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Presentation 2 for 1st Workshop (11 Sept., 2009): Offsite Waste Management

Session 2

Current Conditions and Issues on Off-site Industrial Waste Management(IWM)

September 11th, 2009

Antonio Ademir Stroski
Instituto de Proteção Ambiental do Amazonas (IPAAM)

For the Study for the Development of an Integrated Solution Related to Industrial Waste Management in the Industrial Pole of Manaus

1

Agenda

2

1. Waste Management Company Survey

3

1.1 Content of the Survey
Objectives & Questions in the questionnaire

1. Objective
   - To understand the waste management practices of the target WM companies
   - To investigate the flow of waste as handled by target WM companies
2. Main Questions
   - General Questions
     Company profile, Type of WM business and etc
   - Common Questions
     Problems and issues, Opinions in terms of promotion of waste management industry and etc.
   - Questions for preparation of Waste Flow
     Amount and type of wastes, Method, Capacity, fee and etc

4

1.1 Content of the Survey
Target WMCs and Results

- The waste management companies (WMCs) targeted in this survey are mainly those which have IPAAM-issued environmental licenses (Operation licenses) in terms of waste management activities.
- 17 companies refused to the survey and another 17 companies were unidentified.Finally 35 companies were surveyed.
- The surveyor found another 50 WM companies. Total number of surveyed companies was 85 at the end of August. 62 companies have some kind of licenses in terms of waste management, 23 companies don't have license.
- Surveyed companies are classified to following four business categories. Collection & Transportation,Treatment, Final Disposal, Reuse/Recycle/Recover

5

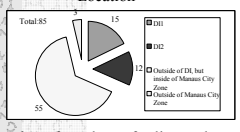
1.2 Results of the Survey
General Information (1)

- 96% (82/85 Respondents) are located inside Manaus city zone.
- 39% (32/82 Res.) are small or very small companies. Number of employees of each company is less than 10.
- 91% (21/23 Res.) non-licensed companies are above small and very small companies.
- 29% (23/79 Res.) are companies that have wide area(more than 10,000 m^2)
- 63% (32/51 Res.) answered economic reasons why they established their companies(Tax incentive,opportunity for local market).
- 27%(14/51 Res.) answered profit and contribution for local environment.

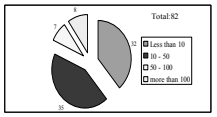
6

1.2 Results of the Survey
General Information(2)

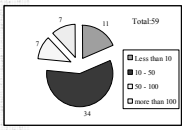
Location



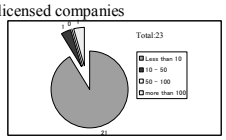
Number of employee for all companies



Number of employee for licensed companies



Number of employee for non-licensed companies



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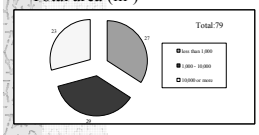
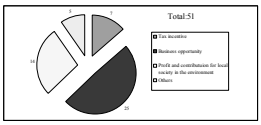
1.2 Results of the Survey
General Information (3)

Total area (m^2)



Reasons



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1.2 Results of the Survey
Common Question(1)

- 63% (54/84 Res.) have expansion plan of their plant and 27%(23/84 Res.) have plan of launching new waste management business.
- 19% (16/84 Res.) have wastewater treatment plants(WWTP). 96% of unlicensed WMCs (22/23) don't have WWTP.
- 19% (3/16 Res.) have industrial WWTP and 25% (4/16 Res.) have both domestic and industrial WWTP.
- 56% (9/16 Res.) discharge their effluent to Amazon river, igarape and ditch.
- Only 13% (2/16 Res.) are conducting continuous monitoring of effluent.

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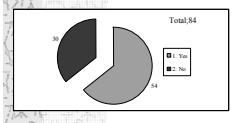
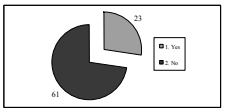
1.2 Results of the Survey
Common Question(2)

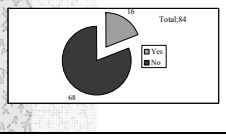
Expansion Plan



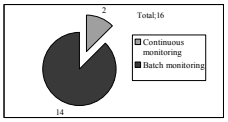
Commencement of new WM business



Wastewater treatment plant



Monitoring of effluent



1.2 Results of the Survey
Common Question(3)

- 19% (16/84 Res.) have air emission control equipments.
- However only 53% (8/15 Res.) conduct monitoring of the exhaust gas from of air emission control equipments.
- Only 3%(2/80 Res.) install odor control devices.
- 30% (25/80 Res.) have spill prevention control measures.
- 18% (15/85 Res.) answered that they already have ISO 9000 series certificates.
- 12% (10/85 Res.) answered that they already have ISO 14000 series certificates.

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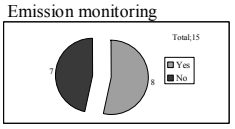
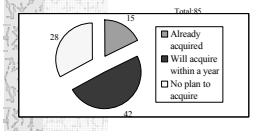
1.2 Results of the Survey
Common Question(4)

Air emission control equipment

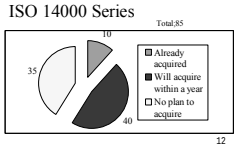
Emission monitoring



ISO 9000 Series



ISO 14000 Series



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1.2 Results of the Survey
Common Question(5)

- 89% (72/85 Res.) have employee training in terms of waste management.(safety management, handling of wastes etc)
- 44% (36/82 Res.) always analyze characteristics of in-coming wastes.
- 19% (8/43 Res.) have laboratory in the company.

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1.3 Type of WM Business and amount of wastes(1)

WMS classification informed by 85 WMCs in the survey

	Collection & Transportation	Treatment	Final Disposal	Reuse/Recycle /Recover	Total
Company with some kind of license	38	8	9	38	93
Company without license	7	0	0	18	25
Total	45	8	9	56	118

Amount of wastes dealt with WMCs according to classification informed by 85 WMCs in the survey

ton/day

		With some kind of license	Without licence	Total
Collection & Tranportation	HW	96	0	96
	NH	3,230	6	3,236
	Total	3,326	6	3,332
Treatment	HW	42	0	42
	NH	266	0	266
	Total	308	0	308
Final Disposal	HW	8	0	8
	NH	2,250	0	2,250
	Total	2,258	0	2,258
Reuse/Recycle /Recover	HW	11	0	11
	NH	138	1	14 139
	Total	149	2	151

1.3 Type of WM Business and amount of wastes(2)

WM business classification checked by environmental license *1

	Collection & Transportation	Treatment	Final Disposal	Reuse/Recycle /Recover	Unclear *2	Total
WM Classification ckecked by EL	23	7	0	28	10	68

Amount of wastes above classification

ton/day

		With envoronmental licnese	Without environmental license + unclear *3	Total
Collection & Tranportation	HW	51	45	96
	NH	2,886	350	3,236
	Total	2,937	395	3,332
Treatment	HW	42	0	42
	NH	265	1	266
	Total	307	1	308
Final Disposal	HW	0	8	8
	NH	0	2,250	2,250
	Total	0	2,258	2,258
Reuse/Recycle/ Recover	HW	11	0	11
	NH	136	3	139
	Total	148	3	151

*1:Environmental licenses from original IPAAM list(35) & new WMCs(27) were checked by the study team

*2:Unclear means that they are not able to classify to the four categories by their environmental licenses(EL).

*3:This classification means following companies.

•WMCs without EL and unclear

•WMCs report that they have some kind of ELs, however they actually don't have correct ELs in accordance with their reported WM business

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1.3 Type of WM Business and amount of wastes(3)

- WMC database should be based on WM business classification checked by environmental license.
- Following analysis is also based on the waste flow of WM business classification checked by environmental license.
- WMCs include two large collection & transportation companies of municipal wastes, therefore amount wastes in the table contain municipal wastes.
- Total collected waste is 3,332 ton/day. However 395(12%) ton/day is collected by WMCs without EL and unclear.
- Especially 45 ton/day of hazardous waste which is 47% of total hazardous wastes is collected by WMCs without EL and unclear.
- Finally all wastes, which is 2,258 ton/day, is disposed by WMCs without EL and unclear.

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1.3 Type of WM Business and amount of wastes(4)

- There is no final disposal landfill of industrial wastes and municipal wastes that has environmental license.
- A large part of collected hazardous wastes is unaccounted for.
- Regarding recyclable wastes like paper, plastics and metals, large three collection & transportation companies collect large part of the wastes
- Type of wastes recycled in the surveyed area is limited.

e.g. foundry sand, aluminum casting wastes, waste lubricant oil, waste paint sludge, waste paper, ink cartridge, wooden pallet, waste plastics etc

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2. Issues of off-site industrial waste management

18

2.1 Summary of issues (1)

1) From the WMCs Survey

a. Current environmental license registration(ELR)

- It is difficult to identify all licensed WMCs from the ELR system.
- Classification of waste management activities in the license is dispersed in several codes.(See next slide)
- There are some WMCs which report that they have ELs, but actually they don't have correct ELs in accordance with their reported WM business.
- Current environmental license registration system needs several matters to be improved.

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2.1 Summary of issues (2)

Code		Activity	Code		Activity
22**	2217	Incineration	26**	2601	Road transportation of hazardous cargo
	2218	Co-processing of wastes		2615	Transportation of solid IW
	2214	Package manufacturing	30**	3001	Treatment of solid IW without chemicals
24**	2407	Collection & treatment of IW		3002	Treatment of liquid IW
	2410	Collection & transportation of inert SW		3003	Treatment solid IW using chemicals
	2411	Collection & commercialization of SW		3004	Treatment of pallet
	2413	Distribution & supply of water		3005	Recycle of waste paper & cardboard

SW:Solid waste, IW;Industrial waste, HIW; Hazardous industrial waste

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2.1 Summary of issues (3)

b. Type of WM Business and amount of wastes

- Approximately 12% of non-hazardous wastes and 47 % of hazardous wastes is collected by WMCs without EL and unclear.
- Finally all wastes is disposed by WMCs without EL and unclear.
- There is no final disposal landfill of industrial wastes and municipal wastes that has environmental license.
- Type of wastes recycled in the surveyed area is limited.

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2.1 Summary of issues (4)

c. Legal enforcement and other environmental matters

- 64% (51/80 Res.) answered that inspection and monitoring system of industrial waste is insufficient
- All WMCs do not have manifest for tracking of wastes.
  35% (29/84 Res.) introduced the manifest system.
- 87% (72/83 Res.) answered that dumping of wastes without license is a big problem.
- 89% (74/83 Res.) answered that environmental consciousness of waste management in the society is low.

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2.1 Summary of issues (5)

d. Business environment

- 91% (67/74 Res.) answered that information system of of wastes of generators is necessary.
- 92% (68/74 Res.) answered that education and guidance of waste management is necessary.
- 80% (59/74 Res.) answered that electricity price is high. It is a reason of high operation cost.

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2.1 Resumo das questões (6)

2) From discussion with related organization, visits of WMCs and other reports

a. Legal enforcement and environmental matters

- Manifest is not obligation prescribed law and regulation
- Number of staff or engineer that have enough knowledge and experience of waste management is limited.

24

2.1 Summary of issues (7)

b. Equipment and technology

- Companies with appropriate equipment and technology is limited

e.g. There is no final disposal site of industrial wastes and municipal wastes that have environmental license.
There is almost no final recycling companies of ferrous and non-ferrous metals except aluminum wastes.

c. Flow of wastes

- Flow of hazardous wastes regarding treatment and final disposal is not clear.

In case, segregation between non-hazardous wastes and hazardous waste is sufficient, a part of hazardous wastes is disposed in the municipal waste disposal landfill.

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Thank you very much for your attention!

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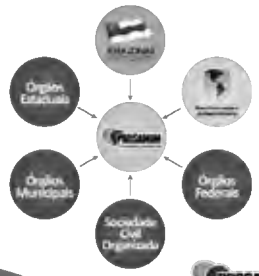
Presentation 3 for 1st Workshop (11 Sept., 2009): PROSAMIM Study Report

STUDIES FOR THE ELABORATION OF MANAUS SOLID WASTES MANAGEMENT MASTER PLAN

PROSAMIM was conceived by means of a wide institutional articulation.



2

OBJECTIVE

Contribute to the solution of the **ENVIRONMENTAL, SOCIAL and URBAN** problems which affect the population of Manaus.

3

1st stage **DIAGNOSIS**

- Characterization of the municipality
- Characterization of the wastes
- Characterization of the services

FUTURE SCENERY PROGNOSTIC

Proposals for PDRS-Manaus

4

2nd stage **PROPOSALS**

- Administrative structure
- Financial structure
- Legal and surveillance instruments
- Operational structure
- Educational program
- Social plan

3rd stage **MANAUS SOLID WASTES MANAGEMENT MASTER PLAN**

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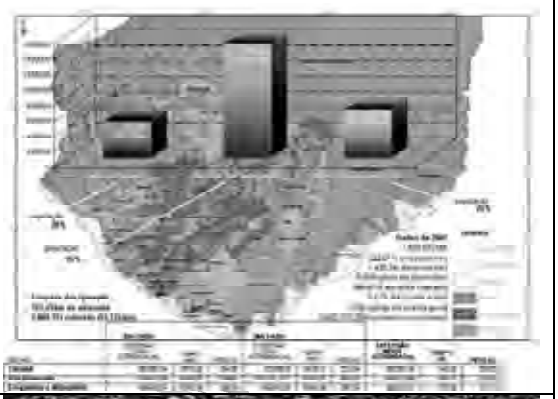

REGULATORY MILESTONE

- ✓ Federal
- ✓ State
- ✓ Municipal

7

SYNTHESIS OF THE MUNICIPAL DIAGNOSIS

✓ PLANNING
• ENFORCEMENT OF THE SOLID WASTES MANAGEMENT PLAN, TAKING INTO ACCOUNT THE GUIDELINES OF LOMM AND PDUMM;

✓ REGULATION
• LACK OF A REGULATING ENTITY;

✓ SURVEILLANCE
• CARRIED OUT BY SEMULSP IN THE TERMS OF MUNICIPAL LAW N. 1314/09 AND ITS MUNICIPAL REGULATING ORDINANCE N. 0146/09;

8

SYNTHESIS OF THE MUNICIPAL DIAGNOSIS

✓ SOCIAL CONTROL
• PUBLIC CONSULTATION ABOUT THE PLANNING IN THE TERMS OF THE LOMM;
• INDICATION OF PLANS PROPOSALS ACCORDING TO THE LOMM;
• OPERATION OF THE DEVELOPMENT AND ENVIRONMENT MUNICIPAL COUNCIL – COMDEMA, ACCORDIG TO THE CAMM.

✓ EXECUTION OF THE SERVICE
• SEMULSP, BUT CARRIED OUT BY OUTSOURCED PRIVATE COMPANIES.

✓ REMUNERATION
• PUBLIC PRICE DUE TO THE DIFFERENTIATED COLLECTION IN THE TERMS OF THE LOMM;
• PUBLIC SERVICES FEE DUE TO THE URBAN CLEANING & SOLID WASTES COLLECTION ACTIVITIES, IN THE TERMS OF THE CTMM;
• INCIDENT IN THE SOLID WASTES SERVICES IN THE TERMS OF MUNICIPAL LAW N. 714/03.

9

SOCIAL ASPECTS

Groups of waste pickers which participated in the research

GROUPS	Number of members
ARPA – Recycling and Environmental Preservation Association	22 waste pickers
ALIANÇA	15 waste pickers
Dorothy Stang Environmental Institute	70 waste pickers
ECORECICLA	150 waste pickers
NUCLEUS I	05 families
NUCLEUS II	04 families
NUCLEUS III	05 families
NUCLEUS IV	05 families
Self-employed	13 waste pickers

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SOCIAL ASPECTS

- ❑ **120 registered waste pickers, most of whom are women (57.27%),**
- ❑ **8% are illiterate and 51% finished primary school.**
- ❑ **66.36% started picking waste because could not find a job.**
- ❑ **86% work 5 to 7 days a week.**
- ❑ **74% work over 7 hours a day.**
- ❑ **Average individual income is R$ 181.00 and the family income is R$ 306.00.**
- ❑ **63.43% do not use any individual protection equipment.**

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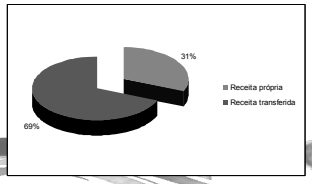
FINANCIAL STRUCTURE

FUNDS GENERATION CAPACITY

➢ORIGIN OF THE FUNDS:
• **Municipal Taxes & Inter-Governmental Transfers;**
• **Low own income generation capacity & dependence on inter-governmental transfers (2006/2008);**
- ❑**Own income generation (national average–1998/2007): 54.3%**
- ❑**Inter-governmental transfers (national average–1998/2007): 45.7%**



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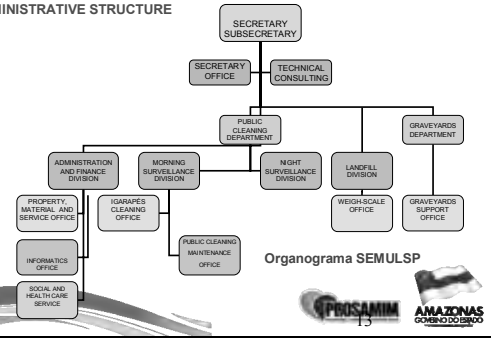
ADMINISTRATIVE STRUCTURE



Organograma SEMULSP

13

ENVIRONMENTAL EDUCATION PROGRAMS

- **Manaus City Hall Environmental Education Inter-Sectorial Commission**
- **Cleaning and Public Services Municipal Secretariat**
  - **Environmental education nucleus**
  - **Social inclusion nucleus**
  - **Recycling nucleus**
- **Environment and Sustainability Municipal Secretariat**
  - **UNIAMBIENTE**
  - **Itinerant Environment School**
  - **Manaus Collective Educator**
- **PROSAMIM**
  - **Social inclusion**
  - **Community participation**
  - **PEAS**

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Presentation 4 for 1st Workshop (11 Sept., 2009): Domestic and Health Waste Management

1º WORKSHOP
GESTÃO DE RESÍDUOS INDUSTRIAIS NO PIM

HEALTH AND DOMESTIC WASTES MANAGEMENT

JOÃO BOSCO LADISLAU DE ANDRADE

MANAUS
September 2009

1

1º WORKSHOP
GESTÃO DE RESÍDUOS INDUSTRIAIS NO PIM

AGENDA

- **REFERENCE ASPECTS OF THE DOMESTIC AND HEALTH WASTES**
- **MAIN RULES AND REGULATIONS ABOUT HEALTH WASTES**
- **MAIN SAFETY AND HEALTH RULES OF THE WORKER IN HEALTH WASTES HANDLING AND MANAGEMENT**
- **CURRENT MODEL OF THE HEALTH WASTES MANAGEMENT IN BRAZIL**
- **PROPOSAL FOR THE INTEGRATED MANAGEMENT OF HEALTH WASTES**
- **SOLID HEALTH WASTES MANAGEMENT**
- **FINAL REMARKS.**

2

1º *WORKSHOP*
GESTÃO DE RESÍDUOS INDUSTRIAIS NO PIM

REFERENCE ASPECTS OF THE DOMESTIC AND HEALTH WASTES

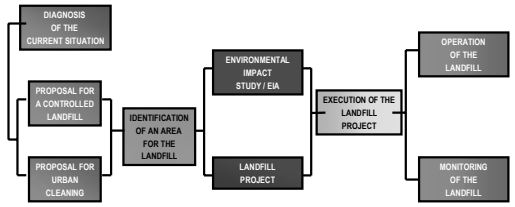
TARGET OF THE TEN-YEAR HEALTH CARE PLAN FOR THE AMERICAS, APPROVED IN THE III MEETING OF HEALTH MINISTERS OF THE AMERICAN COUNTRIES, IN SANTIAGO, CHILE, FROM 2 TO 9 OCTOBER 1972, HELD BY THE HEALTH CARE PAN-AMERICAN ORGANIZATION – WORLD HEALTH ORGANIZATION, AND TO BE ENFORCED FROM 1 JANUARY 1971 TO 1980:

"2.2. SOLID WASTES

*ESTABLISH ADEQUATE SYSTEMS FOR THE COLLECTION, TRANSPORTATION, TREATMENT AND FINAL DISPOSAL OF SOLID WASTES IN AT LEAST **70%** OF THE CITIES WITH OVER 20,000 INHABITANTS".*

1º *WORKSHOP*
GESTÃO DE RESÍDUOS INDUSTRIAIS NO PIM

REFERENCE ASPECTS OF THE DOMESTIC AND HEALTH WASTES



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1º *WORKSHOP*
GESTÃO DE RESÍDUOS INDUSTRIAIS NO PIM

MAIN RULES AND REGULATIONS ABOUT HEALTH WASTES

- **RESOLUTION OF THE JOINT ADMINISTRATION – RDC N. 306, FROM 12/7/2004 – SANITARY SURVEILLANCE NATIONAL AGENCY (ANVISA):** Sets the technical rules for the management of health wastes.

  Recommends the generators the elaboration of the **Health Wastes Management Plan – PGRSS.**
- **RESOLUTION N. 358, FROM 4/29/2005 – CONAMA:** Sets the **treatment and final disposal of the health wastes** and takes other measures.
- **ABNT (1987). NBR 10004. Solid wastes - Classification;**
- **ABNT (1993). NBR 12807. Health wastes - Terminology;**
- **ABNT (1993). NBR 12808. Health wastes - Classification;**
- **ABNT (1993). NBR 12809. Handling of health wastes - Procedures;**
- **ABNT (1993). NBR 12810. Collection of health wastes - Procedures.**

5

1º *WORKSHOP*
GESTÃO DE RESÍDUOS INDUSTRIAIS NO PIM

MAIN SAFETY AND HEALTH RULES OF THE WORKER IN HEALTH WASTES HANDLING AND MANAGEMENT

- **NR 4 – Special Safety Engineering and Labor Medicine Services.**
- **NR 5 – Accidents Prevention Internal Commission (CIPA).**
- **NR 6 – Individual Protection Equipment (EPI).**
- **NR 7 – Labor Health Care Medical Control Program (PCMSO).**
- **NR 8 – Facilities.**
- **NR 9 – Environmental Risks Prevention Program (PPRA).**

6

1º *WORKSHOP*
GESTÃO DE RESÍDUOS INDUSTRIAIS NO PIM

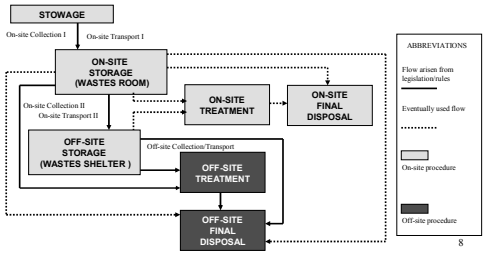
MAIN SAFETY AND HEALTH RULES OF THE WORKER IN HEALTH WASTES HANDLING AND MANAGEMENT

- **NR 15 – Unsound Activities and Operations.**
- **NR 17 – Ergonomic.**
- **NR 23 – Protection against Fire.**
- **NR 24 – Sanitary and Comfort conditions in the Work Stations.**
- **NR 26 – Safety Signaling.**

7

1º *WORKSHOP*
GESTÃO DE RESÍDUOS INDUSTRIAIS NO PIM

CURRENT MODEL OF THE HEALTH WASTES MANAGEMENT IN BRAZIL



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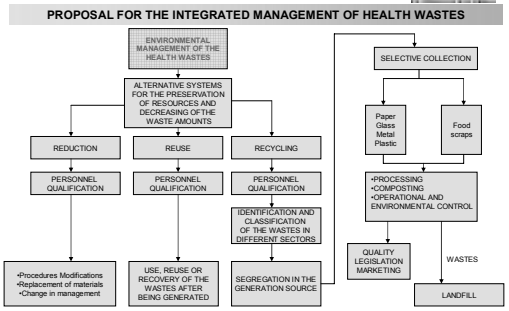
PROPOSAL FOR THE INTEGRATED MANAGEMENT OF HEALTH WASTES



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SOLID HEALTH WASTES MANAGEMENT

GENERATION

All those arisen from activities carried out in the services defined in article 1 which, due to their features, need different management procedures, demanding or not previous treatment before the final disposal.

(RESOLUTION N. 306/2004-ANVISA)

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SOLID HEALTH WASTES MANAGEMENT

SEGREGATION

CLASSIFICATION OF THE SOLID HEALTH WASTES ACCORDING TO RESOLUTION 306/2004-ANVISA

GROUP A – Wastes possibly containing biological agents which, due to their features, may present infection risks. (Five groups).

GROUP B – Wastes containing chemicals which may present risks to public health and the environment, depending on their inflammability, corrosiveness, reactivity and toxicity features. (Single group).

GROUP C – Any materials arisen from human activities which contain radionuclide in quantities superior to the exemption limits specified in CNEN rules and for which the reuse is ether inadequate or nor foreseen (Singe group).

GROUP D – Wastes which do not present biologic, chemical or radiologic risk to health and the environment, being compared to domestic wastes. (Single group).

GROUP E – Piercing and cutting materials and suchlike. (Single group).

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SOLID HEALTH WASTES MANAGEMENT

STOWAGE/IDENTIFICATION

http://www.fiscal.pr.gov.br/sitemodules/news/article.php?storyid=77 (Acesso: 31/7/2009)

ON-SITE TRANSPORT/TEMPORARY STORAGE

COLLECTION

http://www.piaui-a-online.com.br/construcao-e-saude/news/162374 (Acesso: 31/7/2009)

- NBR 9.190/2000 – ABNT (Plastic bags for the stowage of wastes).
- NBR 7.500/1987:2000 – ANBT (Risk and handling symbols for the transport and storage).
- Health Ministry Ordinance – MS n. 400/1977 (Rules and standards about health care constructions and facilities).

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SOLID HEALTH WASTES MANAGEMENT

OFF-SITE TREATMENT/STORAGE

http://www.cti.furg.br/~mat/acid3_br/mineracao.htm (Acesso: 31/7/2009)

OFF-SITE COLLECTION AND TRANSPORT

http://www.poliocoop.com.br/images/filosesd_02.jpg (Acesso:31/7/2009)

- RESOLUTION N. 237/1997 – CONAMA (Environmental licensing).
- RESOLUTION N. 316/2002 – CONAMA (Wastes thermal treatment).
- NBR 12.810/1993 – ABNT (Collection of SHW).
- NBR 14.652/2001 – ABNT (Collector – road transporter of SHW).

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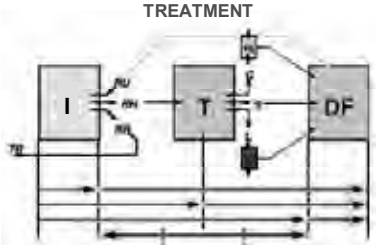
SOLID HEALTH WASTES MANAGEMENT

TREATMENT



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SOLID HEALTH WASTES MANAGEMENT

FINAL DISPOSAL
LANDFILL (ABNT, NBR 8419/84)

Area selection, including land planning and drilling.
Environmental licensing (if needed) – RESOLUTION N. 237/1997 - CONAMA.
Project execution (with the respective EIA/RIMA, if needed).
Area preparation and delimitation.
Construction method definition (trench, ramp or area).
Construction of roads and facilities.
Superficial drainage (for pluvial water).
Sub-superficial drainage (for the leachate).
Water-proofing.
Gases drainage (if needed).
Construction of a system for the treatment of leachate and percolate.
Formation of the cells (i.e., operation of the landfill).
Termination and monitoring of the landfill.

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FINAL REMARKS

- **For the management of the domestic and health wastes of Manaus Industrial Pole – PIM it is necessary all those involved with its issues acknowledge the necessity of a new management paradigm of the solid wastes. Which should also comprehend the Solid Health Wastes, but not as a useless thing. In that context, the reduction, reuse and recycling are imposed as rational alternatives for a management capable of contribute to our best life quality.**
- **It is necessary the industries of PIM are consolidated and acknowledged as a solid wastes management model in national level, based on transparent and environmentally balanced activities which may overcome the standards of the sector and may make part of the integral development, specially in the region.**
- **It is necessary the local state and municipal governments, SUFRAMA and the industries may guarantee, in the institutional and economic sectors, the planning, organization and the maximization of the results of the actions in the extent of the solid wastes in general and the health wastes specifically, aiming for the improvement of the quality and efficiency in providing the population with the services in general.**

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1º *WORKSHOP*
GESTÃO DE RESÍDUOS INDUSTRIAIS NO PIM

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2.1.3 Outcomes

Question and Answer Session for 1st Workshop: September 11, 2009

Questions:

1. Professor, presentation focused mainly on the health wastes, even showing very efficient ideas comparing to the second one. How do you think the treatment of industrial wastes will be in PIM, the State and the Municipality, once those wastes many times end up becoming domestic waste?

2. What should be done to solve the problem of lack of control and on-site destination?

3. What about the education and the accomplishment of the selective collection? How could the current situation be changed? Especially because it was clearly shown to be worse for the construction wastes?

4. Your presentation shows evidence of the lack of expert and reliable companies to carry out the treatment/recycling of wastes. So, how can that be solved? What is the forecast for that?

5. Which Non-HIW surveyed can be used by the cooperative enterprises (or others) for the production of new products?

6. **For Stroski (IPAAM).** Why is it so difficult to get the list of the approved companied in IPAAM?

7. **For Stroski (IPAAM).** How are the final destination companies monitored?

8. It has been noticed the population lacks further clarifications and availability of means so the collection of the domestic wastes may be correctly carried out and consequently educate them for a future selective collection, otherwise we will have to do just as we did with igarapé do 40 (quarenta), where the waterway is dumped with waste, so a governmental plan to educate, instruct or provide means so the population may initiate such activity, thus avoiding decreasing the possibility the calamities of the rain seasons, as well as generating income for the poorest families, besides reducing the expenses of the municipality on domestic waste collection. Are ther plans in that sense? If so, when would they be brought into practice?

9. As for the initiatives towards environmental education actions and programs, the Science and Technology Secretariat of the State of Amazonas and through the Amazonas State Federal University – UFAM and UEA are willing to contribute with partnerships which may provide the foundations for such programs?

10. The final off-site disposal of hazardous industrial wastes (landfill) is, according to an operation adjustment agreement between the City Hall and the Public Ministry, forbidden. So what is the legal framework like? Is the final disposal of such wastes correct or not?

11. As for the percentage of pollution control plants, characteristics of the 134 (a hundred thirty four) surveyed factories, is it highly important to have a chemist in the facilities as demanded by Law n. 2,800, from 06/18/1956, as the technician in charge of the area in the company?

12. In case I segregate wastes in my house, how will the collection be done by the municipality? Once today, a small part of the population does such segregation, but during the collection the wastes end up being mixed due to the lack of a more adequate structure to facilitate the segregation of the wastes in the landfill.

13. What were the criteria for the selection of the local consultants to survey the initial data of the study

14. It is known the health wastes should undergo a previous treatment before their final disposal in order to avoid they get in touch with vectors and possible human contact. In that sense, is the final disposal in a specific gutter in the landfill considered as legal?

15. Although your presentation aims for presenting information it also emphasizes the lack of a better monitoring of the wastes collection and destination companies by IPAAM, how could that be solved in short or medium-term?

16. What is wastes exchange?

17. Your presentation was based on statements, but without mentioning any actions, so it left doubts and/or lacked clarifications, which I mention below:

In the general extent there is a clear demonstration of the lack of habit for the destination/routine/transport, once the manifest is not mandatory, although it should be, so what to do? How to do it? And how long would the companies have to comply with it?

Suggestions:

- Treatment / final destination of hazardous wastes – Juvino S.R. Júnior
- Disposal / destination of hazardous wastes, such as glasses, glass and plastics in general – Juvino S.R. Júnior
- Transportation of hazardous wastes
- The participation of the Local Accounting Council would be really important to deal with the issues concerning the Environmental Accounting and the Social Balance.

Answers to the Questions for 1st Workshop: September 11, 2009

Gracilene Belota: Now let's go on to the last part with questions of the audience, and I would like the count on the comprehension of the audience because some questions do not have to do with the scope of the study. But not that their opinions are not interesting, so I would like those to be here for the afternoon session because we will need your opinion so we may accomplish all we have to. So I will start reading the questions and once more I pledge the afternoon groups to provide further clarifications about them. The first question is for SUFRAMA.

1st Question: What were the criteria for the selection of the local consultants to survey the initial data of the study?

Gracilene Belota: The criteria was aleatory, we picked the companies with projects approved by SUFRAMA by sector, which is the objective of the study. I would like to make it very clear we have the involvement of all stakeholders in the environmental aspects, but the Study

aims for Manaus Industrial Pole. As the Study foreseen the categories of wastes to be studied, we provided the consultants with the list of the companies comprehended by the Study so they selected the ones they believed to be important, taking into account the size, the number of employees, and a series of other criteria adopted by them, such as the productive process, so they focused on their own methodology, SUFRAMA, IPAAM and the other organization which are assisting the consultants were not involved in that process. After selecting the companies they wrote the questionnaires, which were then delivered to the local consultants Who carried out the survey. So it is very important people join the group discussions in the afternoon so the incomplete data may be completed, because maybe the questionnaire was to blame for the us not to get all the information we expected.

2nd Question: Although your presentation aims for presenting information it also emphasizes the lack of a better monitoring of the wastes collection and destination companies by IPAAM, how could that be solved in short or medium-term?

Stroski: the monitoring system of IPAAM is not efficient and that is a fact, what we have done internally in IPAAM, which is a concern of the current administration, is that in that sense we have even ran into covenants and partnerships with Prosamim in order to be prepared to better carry out those monitoring activities, and all we long for is to stimulate the environmental legality of all companies so they may become more competitive, and for that we are already developing our computer system so we may do the annual wastes inventory, and we are also defining the wastes manifest tracking procedure as part of the licensing procedures management of the industries set in Manaus Industrial Pole. We also have the monitoring procedure which takes place every time a license is renewed, so the problems do exist but we have been trying to correct them.

3rd Question: What is wastes exchange?

Kadota: The concept brought by JICA to Manaus is you would access a website in which you would inform you have a certain amount of a certain material you want to negotiate. So anyone interested in that material would have direct and clear information about business opportunities in buying and selling wastes, and anyone interested in your waste would get in touch with you and make an offer. On the other hand, the companies which treat wastes would be there making their services available for PIM: what type of services they have and the advantages of hiring them. The companies interested in environmental services would use the website to check and get those data, what would facilitate the proposals for tenders so they could solve their waste issues and improve their management, so it would in fact work a wastes Exchange because you would be there in a single site where both supply and demand would be informed.

4th Question: It is known the health wastes should undergo a previous treatment before their final disposal in order to avoid they get in touch with vectors and possible human contact. In that sense, is the final disposal in a specific gutter in the landfill considered as legal?

Professor Ladislau: In the current scenery, the way the health wastes have been managed and taking into account the type of final disposal we still have, i.e., the municipal landfill. So the way the health waste generation sources operate and send their wastes to the final destination area requires a fast solution because there may be problems, but if we consider the scenery of the generator accepting what the legislation states, once in their health wastes management plan they already know which wastes they will generate and what they will do

to them, we would have nothing to worry about if next those wastes are sent to a landfill in fact, what the city actually has never had.

5th Question: In case I segregate wastes at home house, how will the collection be done in Manaus? And today, few people make that separation, but when the wastes are collected they ended up being mixed due to the lack of a more appropriate structure, facilitating the separation of the wastes in the landfills.

Answer by Jane Crespo: the separation should be done in the whole master plan, because in the end, one of its proposals is the selective collection, how it can be done and structured, what is necessary for that to happen indeed, however, taking advantage of our brilliant secretary being here, I thing he can provide us with further information on that.

Secretary Paulo César Cavaletti: Good morning, I am the Secretary of SEMULSP, my name is Cavalleti, the intention of the study is to provide us with information about the wastes management either than pointing out who is right or wrong, after all, there is no way we can separate domestic wastes from industrial wastes in Manaus. We have the Industrial District with a geographic area and we have Manaus Industrial Pole with industries scattered all over, and the industries we have here are clean ones, we have no chimneys, and I think we pay a very high price for the industrial wastes: people say we will have kids who will be born with no heads, no brains and many other stuff, and we have to abandon the idea that we do not have a landfill, and I would like to disagree about Professor Ladislau, although I have been your student, but I emphasize that we do have a landfill, we have been working for over four years on that, we sealed the old landfill and now the disposal is done on an area covered with sheets of PAD, with lagoons, we have a complete monitoring work of the superficial and underground waters, and Manaus has today a rare and efficient final disposal process in the landfill, after all a landfill is nothing but a legal dump site, if legalization is an issue of course. And we will hold a meeting at the Environment Jurisdiction to define the actions to be taken in Manaus and the State of Amazonas by IBAMA, IPAAM and SEMMA about the extremely competent monitoring of the Public Ministry. On that note I dare to say Manaus has one of the five best wastes treatment of the largest cities of Brazil, and that is a fact about the issue of the collection and separation, the City Hall is not supposed to do that, the population should worry about that, make the generator conscious about that, no matter if its is an industry or a citizen in his house, we all generate wastes. What the municipal government is doing is making collection points available, and we started by the people living in PROSAMIM target area: all the wastes removed are sent to an association of waste pickers who used to work in the landfill. Unfortunately, as Manaus is far from the great consuming centers and the local industries have limitations to receive or use such material due to the economic conditions, the price paid for such material is always dropping, so not many people are picking wastes as their main income activity. Take the cardboard and the aluminum as examples: we have all the production chain in the State of Amazonas, we have two voluntary deliver points called PEVES, which were implemented by the Public Ministry and the Environment Jurisdiction: one of them is in the suburb of Dom Pedro and the other one in São Francisco, behind SEFAZ. So getting involved in recycling activities we should first learn how to reduce the quantity of wastes we generate by reusing them for example. And if you need any further clarifications we have a phone number for the population in SEMULSP, the number is 3214-8115. We have selective collection incentive programs, if you live in a vertical or horizontal condominium, get in touch with us and we will help you

implement those actions, we need the help of the population because the government cannot do anything alone, so we will have a better and more beautiful city.

Professor Ladislau: Mr. Secretary I do remember you from the environmental engineering course, but about the issue of the controlled landfill, I would like to say once for all that I do not agree about what you said but I respect your right to say whatever you want and I am at your entire disposal as a citizen, technician and public worker to help clarify why our landfill is or is not a landfill indeed, this is the contribution the city needs in a very respectful way, I am at your entire disposal to tell you the reasons why we do not have a landfill

6th Question: As for the percentage of pollution control plants, characteristics of the 134 surveyed factories, it is fundamentally important to hire a chemist as demanded by Law n. 2.800, from 18/06/1956, to be the technician in charge of the companies?

Answer Kadota: I agree, but the objective of the survey did not focus on the issue of the professionals, if they are duly registered in the associations or not. All the survey did was verify what kind and quantity of equipment there were, so I agree with you that the same way there must be a chemist in charge, there must also be someone in charge of the safety, an engineer, etc. All companies know their obligations and we are not questioning the companies about that, the intention of the survey was to check the environmental controls, if they had the equipment they claimed to have.

Gracilene: As a representative of Suframa I would like to make an observation: the target of the study is Manaus Industrial Pole as one of the goals the Public Ministry set for Suframa, although it is not being done for that alone.

7th Question: The off-site final disposal of hazardous industrial wastes (landfill) is, according to a behavior adjustment agreement signed between the Municipality and the Public Ministry, forbidden. So, how is the legality of this process? Is the final disposal of such wastes correct or not?

Answer Stroski: The Public Ministry is right, by the way, both IPAAM and the Public Ministry have established very useful procedures in the industrial sector and in the inland municipalities: the industrial landfill for Class 1 wastes and a constructive model of the Brazilian rules which are more restrictive for its construction, operation and monitoring. So the destination of hazardous wastes towards the municipal landfill is in full agreement with the intervention or prohibition of the Public. There is also an initiative of the municipality trying to restrict much more, so it is difficult to monitor the Class 1 wastes and keep the its complete control when entering the landfill. So the Public Ministry is right in not allowing the disposal if there is not a properly built landfill, as well as licensed by IPAAM.

8th Question: As for the initiatives of environmental education actions and programs, the Amazonas State Science and Technology Secretariat through the Amazonas State University, are willing to contribute to the partnerships intended for those programs.

Answer Jane Crespo: Such contribution is really welcome. Prosamim is a program formed by partners, so the more partners we have the best. And we also work with some people from

several sorts of know-how and the higher their knowledge the best for the program to be better consolidated. UEA is one of our partners, there are many master and doctor degree students writing their essays with us and we provide them with all information needed, so we are at the entire disposal of the whole academia, not only UEA, we also have UFAM, INPA and private universities. Prosamim is promoting Water Contamination Control Plan for igarapé do 40, which is today the drainage system of several companies from the Industrial District. The company which won the tender is starting to develop the diagnosis work. Igarapé do 40 is our main intervention axle, so this Water Contamination Control Plan for igarapé do 40 immediately involves the major objective. The peculiarity is he industrial contamination, so this one of the responsibilities and the major interface of Prosamim towards JICA's study.

Dr Ronaldo. We have been involved in those discussions from the very beginning within our entities, in CIEAM and the Chamber for over ten years discussing exactly a solution for Manaus Industrial Pole, and once none of our chairmen are here I would like to emphasize that is not because they do not care: Mr. Antonio Silva is abroad, Mr. Maurício is injured and the people from the chamber are travelling, but we are here, Mr. Kadota is the representative all those entities. I would like to comment on the issue raised by Mr. Stroski that we as class entities and many of the companies in the audience are our members, we have been from the very beginning been looking forward to a solution for the problem, which is a problem of the city, the Industrial District and a problem which we as citizens long for solving. So it is important the companies may answer in a very clear way, otherwise the solutions will not be satisfactory either, that must be stated in a very transparent way and we assure we only got into such issue because we know that will be dealt institutionally.

Gracilene: Ronaldo, you do not have to worry about that because we know how important the entities are, the Industrial Pole has a huge environmental responsibility, because of the technological issue we have to be ahead of the future, so we must optimize these issues. When that demand came from the industries to Suframa, we embraced it immediately, although monitoring may not be our main activity we have the obligation to care for this pole even in order to preserve and have some coherence with our speech that the state of Amazonas is 92% preserved, in that sense this study will be one more tool without any contestation for the preservation of the State of Amazonas due to the establishment of Manaus Industrial Pole and its industries, which although being clean, need to know about the technologies, train, give a proper destination to their industrial wastes. So I can assure you by the end of this study that will be made available to all organizations working in the study and which hold the competence to be carrying out activities in such sector.

Group 1, On-Site Management, Discussion Summary for 1st Workshop: 11 Sept., 2009

GROUP 1 – ON-SITE MANAGEMENT: CURRENT CONDITIONS AND ISSUES

- Classification of health wastes: the used legislation is not up-to-date;
- ABNT 12.808 was enforced only for 03 months (it does not fulfill the national legislation), the study team followed a regulation which was not up-to-date;

- Currently the resolution N. 358/2005 of CONAMA, and Resolution 306/2004 of ANVISA, which deal with OFF-SITE and ON-SITE health wastes, respectively (available in the respective websites);

- Clarifications about the concept of wastes exchange in the focus to be developed for the study;

- Information on the difficulties related to the destination of cardboard scraps due to the respective excess for the local market;

- Request of information about the use of cardboard scraps in brick factories ovens;

- The brick factories have an adequate infrastructure to burn cardboard, as for the ash and the smoke, it is still being studied;

- Clarification about the obligation to fulfill the issues contained in the forms sent to the companies;

- There is no legal obligation, nevertheless, it was highlighted the social obligation as for the fulfillment of the issues;

- Some inputs are not recyclable, such as waxed paper, reason why they go to the municipal landfill;

- Statement of the representative of the Environment Ministry about the need, after the final remarks of the study, of pointing out the several extents of the government for the necessity to incentive/subsidize projects which aim for investments in recycling companies, taking into account the high cost of such activity;

- It was also added the economic unfeasibility in the recycling of glass, unless it is subsidized;

- So the study may translate the actual scenery, it is necessary the surveyed companies may make the requested information available;

- Such observation was raised due to the difficulties in obtaining data about the quantity of wastes generated by;

- Foundry companies recycle the waste of the burned sand and reuse in the process;

- The segregation of the oil and the soot after the process with the reuse of the oil;

- Suggestion for the generation company to reuse the wastes, just like the foundry company;

- The use of oil-water separator decreases the emission of wastes, once the oil is reused;

- Energetic reuse by means of burning wastes, according to prior studies, is not environmentally feasible, as informed by the representative of the Environment Ministry;

- Hazardous wastes – besides the small surveyed amount, it will also be taken into account for the study of JICA;

- The Environment Ministry developed hazardous wastes studies for 03 States based on the State inventory of industrial wastes;

- Questions if there are consulting companies in Manaus to provide guidelines on wastes treatment;

- The companies should use their own personnel to look for improvements in their environmental performance. They should think not only of the efficiency increase of the production processes, but also of the environmental quality improvement;

- The companies may check with the class entities (FIEAM, CIEAM, CCINB) in their environment coordination to exchange information and benchmarking.

Group 2, Off-site Management, Discussion Summary for 1st Workshop, Sept. 11, 2009

Group 2 - Off-site Management: Current Conditions and Issues
General Topics:

- Incineration should be the last stage of the wastes.
- The State Treasury Department should attend to these discussions.
- Almost 50% of the recycling cost is due to the expenses on electricity, which is why many companies have illegal electrical wiring.
- It is very hard to implement a multinational company. Rechargeable batteries are still a huge problem and we should create rules and conditions so their recycling could be feasible.
- There is not much about wastes treatment; the whole cycle has to be developed. The example of Italy was mentioned, where the generator is responsible for the wastes and the companies get together by means of consortiums to recycle the wastes.
- There is much information available in the internet about loans and investments for small businessmen. The strengthening of conglomerates can be seen in the website of APEX, such as the case of the Brazilian Association of Incentives.

Local Market:

- Drop in cardboard price, about R$ 30 per ton;
- Banks, governments and industries should be responsible for the recycling cost, which cannot be avoided to happen. In Manaus we can see that willingness, IBAM should not only help the city hall, but also the companies and gather the responsible parties with feasible proposals and suggestions.
- In Manaus we have experienced the bankruptcy and joint-venture of waste management companies, thus causing insecurity in the generators which seek for reliable companies. The suggestion is IPAAM should gather management companies, environmental organizations and people in general to form partnerships, exchange information, ideas and suggestions.
- IPAAM should be a better representative of the State of Amazonas in the issues of the Brazilian Foundry Committee. That is a chance the state has to show what it has been doing, once the MFZ model and IPAAM are very well in terms of legislation, and that should be stated in national extent.
- Just like there are departments in SUFRAMA for the incentives, there should be incentives for management companies, because the bureaucracy ends up disheartening the opening of new companies.
- It is necessary to seek for new companies which may treat the wastes generated in PIM.
- The PIM does not have a large generation of wastes comparing to other Industrial Poles.
- Today, five IPAAM licenses are needed so a company may operate. It should be only one.
- Lack of professionals and companies with the necessary skills to carry out the correct destination of the wastes.

- Companies of PIM have generated wastes which are not being treated and are disposed in the municipal landfill. It is necessary to dispose the wastes in a correct way and have a stricter monitoring of IPAAM.
- The system used today does not fulfill the needs and IPAAM was questioned on IPAAM if as an institute it could solve such issue. New companies have been opened and it is essential they should be licensed and monitored by IPAAM, because that would have the reliability of an environmental organization. The prices charged by the waste management companies are high so an adequate final destination may be accomplished.
- The companies have no one to complain about their problems and needs related to the environment.
- IPAAM started demanding a manifest from the companies informing the destination of their wastes, but there is no defined model, Resolution 313 of CONAMA should be followed. There is a lack of follow up by IPAAM from the generation to the treatment of the wastes. There are companies which have the license of IPAAM but have no conditions to be in operation.
- There is no traceable manifest.
- It is important to create a wastes exchange.
- The regulation, infrastructure, incentives and the transport should be improved.

Final destination /incineration:

- The costs are very high, sometimes even impossible. People want to make a profit out of the wastes, but they hold no technical nor environmental knowledge. Either well-structured reliable companies are hired (high costs) or governmental support is needed (Public-Private Partnership), where reliable companies would keep the operations running. The public service still has too many bad habits, we should seek for something more efficient in order to fulfill our needs.

Construction wastes:

- There was a huge growth of the construction companies and few wastes are being recycled.
- It is necessary to restart working the awareness of the people and companies which receive and recycle those wastes to put them back to the market, once they are a great business opportunity for management companies;
- It is necessary a further professional qualification, there are way too many amateurs in that area, we must bring highly expert companies.
- If the study shows there is a higher demand for the construction waste management companies, the companies will demand new investments.
- Recycling Center:
- Objective: Market monitoring by means of notices informing on legislations and updating, working as a class entity. It should provide constant support and have a website as a means of communication among the management companies. The objective of the center would be to protect the recyclers, it would be an independent organization, and FIESP, which defends the interest of the industries in the State of São Paulo was mentioned as an example.
- Creation of a group with the recycling companies;
- Define how a service provider could join that group and how it will be managed.
- Verify what the governmental participation will be, mainly as for the taxes and energy costs.
- Count on the support of IBAM, CONAMA, SUFRAMA, IPAAM and experts.
- Monitoring and database:
- The monitoring should still be improved, aiming for stimulating the licensing of the companies.
- The data base to be shared between JICA and SUFRAMA will help with the surveillance and monitoring.
- The stability of the market happens through information; it is a very dynamic market.

- We should construct a data base in which information may be constantly input.
- PROSAMIM and IPAAM joint-venture:
- Research vehicle.
- Environmental Education:
- Every productive activity generates wastes, for that we need to develop an environmental education, such as campaigns.
- The environmental actions should start at home, such as the awareness and the segregation of the domestic waste, education. The domestic recyclables may be mixed with the industrial ones, for the recycling companies do not accept materials in small quantities.
- The waste picker may change his paradigm and become an environmental agent, provided he undergoes some training and education for such.

Group 3, IWM Improvement Policies, Discussion Summary for 1st Workshop, Sept. 11, 2009

Group 3: Industrial Wastes Management Improvement Policies

Debate topics suggestions:
- Creation of the Wastes Inventory Data Base by Suframa
- Joint-work with IPAAM
- Resources necessary for the implementation of the Data Base
- Need of improvement in the operation licenses issuance system for the waste management companies
- Advantages of the Data Base for the factories of PIM
- Economic support for the waste management companies
- Partnerships with other environmental entities
- Suggestions for the Data Base

Advantages of the Data Base:

- Demand for information concerning the waste management requested by the Federal Government to the Municipal Government (SEMSA) – health waste, water and soil quality (WATS) – due to the computerization (own data base).

- The solid wastes Data Base will be under the responsibility of SUFRAMA, IPAAM and FIEAM/CIEAM/CCNB, and will focus in the industries of PIM, whose Access may be extended to several areas in the municipal, state and federal extents.

- The Data Base may be constructed by SUFRAMA, due to its better infrastructure.

- Wastes disposal from the accounting viewpoint: mensuration of the social balance (in relation to donations and/or undoing) and development of the environmental accounting (indexes: gases emission control, wastewater quality monitoring).

- Optimization of the business resources by means of reduction, reuse and recycling; decreasing of expenses on soil and water decontamination; information speed: capability of agglutinating more people towards an environmental awareness.

- Selection of the waste management companies: the Data Base should contain information to enable the service providers in the market.
- State Law n. 2826/2003 (modified by Law 3426/2009): modification of criteria for the concession of fiscal incentives related to optimization efforts of the solid wastes

management by the industries which hold ISO 9000 and 14000 Certifications (the ICMS charged by the State).

- Those incentives are exclusive for the industries which have an economic project presented to SEPLAN, and its consequent implementation.

- Suggestion of a tender for the exploration of industrial wastes management (in the sense of leveling such service provision, which holds public interest – registration updating).

- About the validity of an imposing instrument for the supply of periodically updated information, concerning the generation and management of wastes, to be input in the Data Base: possibly, the regular input of information will be demanded from the factories, for the means of maintenance of the Registration in SUFRAMA and the enjoyment of the tax incentives (to be defined); or a covenant will be signed between SUFRAMA and IPAAM in the sense of granting SUFRAMA with the monitoring power.

- There should also be some reinforcement for requesting the registration updating.

- The factories may be granted with a deadline to fulfill such demand from the implementation of the Master Plan on, in 2011.

- At first the inputs in the Data Base will depend on the information provided by monitoring organizations. Afterwards, they should come straight from the companies.

- Need to create a financial mechanism (percentage meant for R&D, for example) in order to afford for the wastes management improvements existing in PIM today.

- So, many suggestions depend on political good-will and even on modifications of the pertinent legislation.

2.2 Second Workshop

2.2.1 Program

Program for 2nd Workshop: November 27, 2009

Workshop of the Study by JICA and SUFRAMA

2nd Workshop: Framework of IWM Master Plan

The second workshop invites the study steering committee and technical support committee members to meet with other government institutions, waste dischargers, waste management companies, environmental NGOs, local consultants and others to discuss and gather opinions on the framework for the Master Plan based on results from the first stage of the project, discussion between the JICA Study Team and Brazilian counterparts, as well as feedback from participants in the first workshop.

Venue			Date	Time
Comfort Hotel Convention Rooms			27 November (2009)	2pm to 6:30pm
Session	**Time***	**Title**	**Presenter**	
1	2:00-2:15	Opening Address	Mrs. Flávia Grosso - Superintendant of SUFRAMA Mr. Katsuhiko Haga - Chief Representative of JICA Brazil Office	
2	2:15-2:30	Workshop Objectives and Overview	Mrs. Maria Graciene Belota - SUFRAMA	
3	2:30-3:15	Industrial Waste Management in Japan: Eco-town concept, Zero emission, etc.	Mr. Susumu Shimura - JICA Study Team	
4	3:15-3:45	Concept of Industrial Waste Management Master Plan	Mr. Alexandre Kadota - FIEAM/CIEAM/CCINB	
5	3:45-4:15	Administration of Industrial Waste by INEA/RJ	Mrs. Erika Cantanhede Wuillaume - State Institute of Environment / for Rio de Janeiro (INEA/RJ)	
6	4:15-4:45	Questions and Answers	Participants and Speakers	
7	4:45-5:00	*Coffee break*	All Participants	
8	5:00-5:45	Concept of Industrial Waste Management Master Plan (Workshop)	All Participants (divided into three or four groups, each with its own leader)	
9	5:45-6:15	Group Summaries	Leaders of the groups	
10	6:15-6:30	Closing Remarks	Mrs. Marie Graciene Belota - SUFRAMA Mr. Jiro Shibasaki - Consul General of the Consulate-General of Japan in Manaus Mr. Susumu Shimura - JICA Study Team	

- During sessions 3, 4 and 5, participants are asked to prepare any questions or suggestions which will be addressed during a question and answer session, or during discussions in three or four groups. Please deposit questions in a collection box, which will be made available.
- The summary (session 9) at the end of the day will be prepared based on the group presentations in the afternoon.