

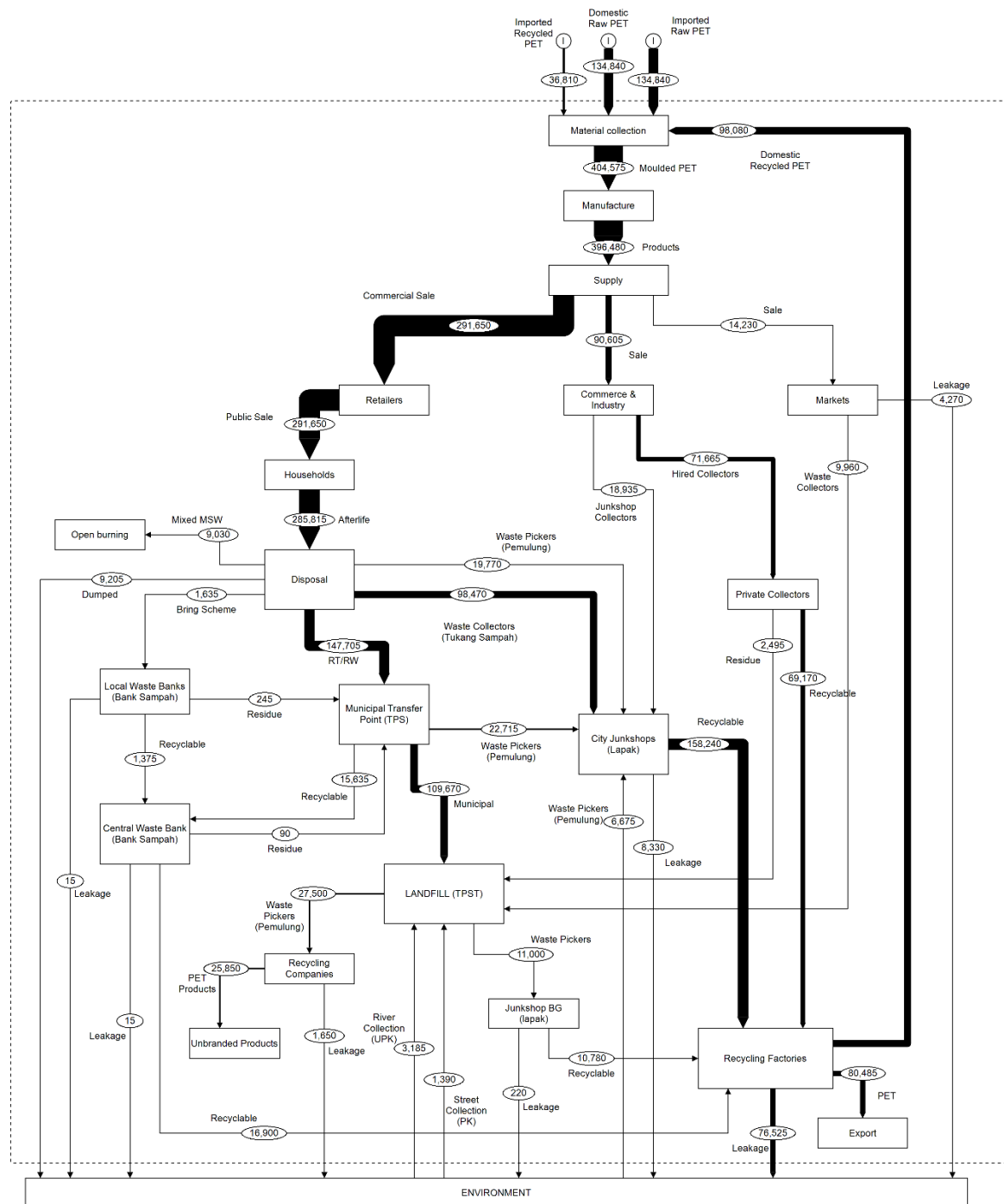
Data underlying the research: A multi-method approach to circular strategy design: Assessing extended producer responsibility scenarios through material flow analysis of PET plastic in Jakarta, Indonesia

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## 2. Material Flow Analysis PET Packaging in Jakarta, Indonesia



MFA V3, 2019

### 3. Data Substantiation for MFA PET Packaging in Jakarta

#### Flow 1 & Flow 3

**Flow 1:** Raw PET supplied to system from domestic sources

**Flow 2:** Raw PET supplied to system from import

Raw PET is supplied in equal amounts to the system from the raw and imported (from assumptions). So, flow 1 and flow 3 are the same. Both can be calculated from system need and import/domestic supply of recycled PET.

$$\text{flow 1} = \text{flow 3} = \left( \frac{\text{flow 4} - \text{flow 2} - \text{flow 45}}{2} \right) = 134840 \text{ t/a}$$

External Data	Source
Imported and domestic raw PET is split 50:50.	(Global Business Guide Indonesia, 2016)

#### Flow 2

**Flow 2:** Recycled PET imported into system

Estimation for recycled plastic imported into Jakarta multiplied by average percentage of PET in recycled plastic bales.

$$\text{flow 2} = A * \frac{B}{100} = 36810 \text{ t/a}$$

External Data	Source
A 283152 tons recycled plastic imported to Jakarta.	(Zero Waste Indonesia Alliance, 2020)
B 13% PET in average hard plastic bales.	(Moore Recycling Associates Inc., 2017)

#### Flow 4

**Flow 4:** Total PET collected

Total PET supplied to system from following flow multiplied by 1.02 since 2% of PET is lost in manufacture (from assumption).

$$\text{flow 4} = \text{flow 5} * 1.02 = 404575 \text{ t/a}$$

External Data	Source
C Average losses in manufacture processes of plastic products are 2%.	(Mold Manufacturer China, 2021)

## Flow 5

**Flow 5:** Total PET entering market in PET products

PET supplied to retailers, PET supplied to commerce & industry and PET supplied to open markets summed

$$\text{flow 5} = \text{flow 6} + \text{flow 7} + \text{flow 8} = 396480 \text{ t/a}$$

NO EXTERNAL DATA USED

## Flow 6

**Flow 6:** Supply of PET to retailers

Assumed to be the same as the amount of PET sold to household consumers from retailers (flow 9)

$$\text{flow 6} = \text{flow 9} = 291650 \text{ t/a}$$

Data	Backing
100% of PET supplied to retailers is sold on to household consumers.	PET is used as food packaging but not wrapping for packaging. Only residue from retailers is the wrapping of bottles/crates/etc. so no PET is diverted.

## Flow 7

**Flow 7:** Supply of PET to commerce & industry from producers

Generated waste from commerce & industry is amount 32% of household waste generation (from source below). Assumed that this percentage is the same for PET

$$\text{flow 7} = \text{flow 14} * 0.317 = 90605 \text{ t/a}$$

External Data		Source
D	Office and industry waste generation is of the amount 31.7% of household waste generation	(Ministry of Environment, Republic of Indonesia, 2012)
Assumed that the ratio of household to privately generated PET is the same as for total waste		

## Flow 8

**Flow 8:** Supply of PET to open markets from producers

Waste is collected from markets by private collectors only. Lots of material is lost to environment. Sum of collection and leakage gives supply

$$\text{flow 8} = \text{flow 12} + \text{flow 13} = 14230 \text{ t/a}$$

NO EXTERNAL DATA USED

## Flow 9

**Flow 9:** Sale of PET to households from retailers

Assuming that 98% of PET supplied to households is disposed of, household supply is 102% of household waste generation.

$$\text{flow 9} = 1.02 * \text{flow 14} = 291650 \text{ t/a}$$

Data	Backing
Household generated PET waste is 98% of supply of PET to households from retailers	2% of PET supplied to households is retained for household purposes. The remaining 98% is disposed of.

#### Flow 10

**Flow 10:** Collection of PET from commerce & industry by junkshop collectors

Based on assumption below, share of collected PET by junkshop collectors is calculated, compared to the collection from semi-formal waste collectors (tukang sampah).

$$\text{flow 10} = \frac{\text{flow 19}}{26} * 5 = 18935 \text{ t/a}$$

External Data		Source
E	26% of inflow to junkshops is from waste collectors that transport to municipal also. 5% of inflow to junkshops is from junkshop collectors from private generators	(Coca Cola, 2018)

#### Flow 11

**Flow 11:** Collection of PET from commerce & industry by hired collectors (private)

Since no PET is lost from commerce & industry to the environment (from assumption below), hired collectors get all remaining PET. Junkshop collection is subtracted from generated PET by commerce & industry.

$$\text{flow 11} = \text{flow 7} - \text{flow 10} = 71665 \text{ t/a}$$

External Data	Backing
100% of PET generated by commerce and industry is collected since no leakage to the environment exists	(Interview: SystemIQ, 2019) Offices and industrial parks have proper waste management systems and rarely expose waste to the environment.

#### Flow 12

**Flow 12:** Collection of PET from open markets by waste collectors (private)

Assuming hired collectors from markets do not conduct recycling, collection amount is found from PET entering landfill per year from markets.

$$\text{flow 12} = F * \frac{G}{100} = 9960 \text{ t/a}$$

External Data	Source
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F	208400 tons waste enter landfill site per year from open markets	(Dinas Lingkungan Hidup, 2018a)
G	PET in average waste of trucks entering landfill is 4.78%.	(Dinas Lingkungan Hidup, 2017)
Assumed that PET composition is the same for market waste as average, since percentage is averaged over all trucks that enter landfill site		

### Flow 13

**Flow 13:** Leakage of PET from open markets to the environment

Leakage of 30% assumed for open markets, calculated from collected PET from markets.

$$flow\ 13 = \frac{flow\ 12}{70} * 30 = 4270\ t/a$$

External Data	Source
Assumed that leakage from open markets is highest observed. Putri papers highlights 30% leakage from recyclers. Assumed the same	(Putri et al., 2018)

### Flow 14

**Flow 14:** Total PET disposed of from household consumers

Waste collector collection is monitored by government as total collection, with a rate of 92%. The remaining 8% likely does not consider the portion that is burned/dumped (6.38%) so total generation is 107% of 108% of the total waste collection (flow 18 + flow 19).

$$flow\ 14 = \frac{\frac{flow\ 18 + flow\ 19}{H} \cdot \frac{100}{100 - I - J}}{\frac{100}{100}} = 285815\ t/a$$

External Data	Source
H 92% of municipal solid waste is collected by official waste collection (tukang sampah)	(Dinas Lingkungan Hidup, 2017)
Assumed that the 92% of collection assumes remaining 8% is collected by informal or handled by households. Does not account for amount burned or dumped from household waste	

I	3.16% of total generated household waste is open burned	(Indonesian Central Statistics Bureau, 2014)
J	3.22% of total generated household waste is dumped/buried	(Indonesian Central Statistics Bureau, 2014)

#### Flow 15

**Flow 15:** PET burned from that disposed by household consumers

Percentage from Indonesian statistics bureau multiplied by total generation of household PET waste.

$$\text{flow 15} = I * \text{flow 14} = 9030 \text{ t/a}$$

External Data		Source
I	3.16% of total generated household waste is open burned	(Indonesian Central Statistics Bureau, 2014)

#### Flow 16

**Flow 16:** PET dumped from that disposed by household consumers

Percentage from Indonesian statistics bureau multiplied by total generation of household PET waste.

$$\text{flow 16} = J * \text{flow 14} = 9205 \text{ t/a}$$

External Data		Source
J	3.22% of total generated household waste is dumped/buried	(Indonesian Central Statistics Bureau, 2014)

#### Flow 17

**Flow 17:** PET brought to local waste banks by households

Total local waste bank inflow extrapolated for 2019, converted to tons per year. Multiplied by average percentage of PET in waste bank inflow from interviews.

$$\text{flow 17} = K * \frac{L}{100} = 1635 \text{ t/a}$$

External Data		Source
K	6347 tons of waste will enter the local waste banks in the whole of 2019 (extrapolated)	(Dinas Lingkungan Hidup, 2018d)
L	26% of waste inflow to waste banks is PET	(Survey: Local waste banks, 2019) Calculated from total inflow and outflow of PET to central waste banks.



## Flow 18

**Flow 18:** PET collected from household disposal by waste collectors (tukang sampah) to TPS facilities  
Total collection of waste to TPS facility extrapolated for 2019 and multiplied by percentage of PET in TPS waste.

$$flow\ 18 = M * \frac{N}{100} = 147705\ t/a$$

External Data		Source
M	2524800 tons of waste will enter aggregated TPS facilities in 2019 (extrapolated)	(Dinas Lingkungan Hidup, 2018c)
N	5.85% of TPS waste that enters the landfill site is PET	(Dinas Lingkungan Hidup, 2017)
Assumed that composition of trucks leaving TPS facility is the same as the inflow since most facilities don't perform separation and sampling to calculate percentage is unlikely to select a truck where sorting has been performed (or impact negligible)		

## Flow 19

**Flow 19:** PET collected from household disposal by waste collectors (tukang sampah) to junkshops  
24600 waste collectors take collected recyclables to junkshops before residue to TPS (40% of all collectors). One collector gathers 4 tons PET per annum (calculated from PET to TPS and number of collectors). Multiply number of collectors that sort by average collection of PET.

$$flow\ 19 = flow\frac{18}{O} * P = 98470\ t/a$$

External Data		Source
O	36899 waste collectors do not separate and sell PET to junkshops (60%)	(Interview: Waste4Change, 2019). Based on assumption that 2 waste collectors exist per RT/RW (block), there are 30749 RT/RWs and 40% of the collectors sell recyclables to junkshops.
P	24599 waste collectors separate and sell PET to junkshops (40%)	
Assuming that 100% of the collected PET is given to junkshops by waste collectors who perform this separation		

## Flow 20

**Flow 20:** PET collected from household disposal by (informal) waste pickers  
Calculated by subtraction of all other flows from household generation

$$\text{flow 20} = \text{flow 14} - \text{flow 15} - \text{flow 16} - \text{flow 17} - \text{flow 18} - \text{flow 19} = 19770 \text{ t/a}$$

NO EXTERNAL DATA / ASSUMPTIONS USED

#### Flow 21

**Flow 21:** PET sent to landfill from private collectors from commerce & industry

Calculated based on amount of PET entering landfill per year

$$\text{flow 21} = Q * \frac{R}{100} = 2495 \text{ t/a}$$

External Data		Source
Q	83250 tons waste enter landfill site per year from commerce & industry	(Dinas Lingkungan Hidup, 2018a)
R	PET in waste of trucks entering landfill from C/I is 3%.	(Interview: Waste4Change, 2019). Estimations regarding amounts of PET handled by private collectors/ sent to landfill, 2019

#### Flow 22

**Flow 22:** PET sent to recyclers from private collectors from commerce & industry

Calculated by flow of PET to landfill from private collection subtracted from total collection by hired collector from commerce & industry

$$\text{flow 22} = \text{flow 11} - \text{flow 21} = 69170 \text{ t/a}$$

Data	Backing
Assuming that no (negligible) PET is lost by hired waste collectors	Collectors gather from one point only and transport to one location or a sorting station. Simplicity of process means little to no material should be lost.

#### Flow 23

**Flow 23:** Leakage of PET to the environment by local waste banks

1% leakage generated from surveying, multiplied by inflow of PET to local waste banks

$$\text{flow 23} = \text{flow 17} * \frac{S}{100} = 15 \text{ t/a}$$

External Data		Source
S	1% of leakage of PET observed at local waste banks.	(Survey: Waste banks, 2019). Operators claimed no leakage. Small amount of leakage observed around facility and surroundings – estimated as 1%

#### Flow 24

**Flow 24:** PET sent to central waste banks from local waste banks

Calculated by subtraction of local waste bank leakage and residue from total inflow of PET to local waste banks

$$\text{flow 24} = \text{flow 17} - \text{flow 23} - \text{flow 25} = 1375 \text{ t/a}$$

NO EXTERNAL DATA / ASSUMPTIONS USED

#### Flow 25

**Flow 25:** PET sent to TPS facility from local waste banks

15% residue estimated from surveys, multiplied by inflow of PET to local waste banks

$$\text{flow 24} = \text{flow 17} * \frac{T}{100} = 245 \text{ t/a}$$

External Data		Source
T	15% of PET residue is sent to TPS from local waste banks.	(Survey: Waste banks, 2019). Operators estimated residue percentage based on number of bags sent to TPS per month and outflow bags

#### Flow 26

**Flow 26:** PET sorted from household waste in TPS facilities and sent to central waste banks

Number of TPS facilities performing sorting of recyclables calculated as a percentage, multiplied by the inflow of

PET to all TPS facilities and an assumed collection rate of facilities with separation

$$\text{flow 26} = \text{flow 18} * \frac{U}{100} * \frac{V}{100} = 15635 \text{ t/a}$$

External Data		Source
U	11% of TPS facilities in Jakarta perform separation of recyclables	(Dinas Lingkungan Hidup, 2018b)
Assumed that all dipo and TPS 3R facilities performed sorting (120). Divided by total number of TPS facilities (1115).		
V	98% of PET material is collected by sorting at TPS sites	(Survey: TPS, 2019). 2% of material is missed during manual sorting and goes through to landfill

#### Flow 27

**Flow 27:** PET sent to TPS from central waste banks

Residue to TPS estimated at 0.5% of inflow, multiplied by total inflow

$$\text{flow 27} = \text{flow 24} * \frac{W}{100} = 90 \text{ t/a}$$

External Data		Source
W	0.52% of Pet that enters the central waste banks is sent to TPS as residue	(Survey: Waste Banks, 2019) Calculated from data: residue: 0.013 t/d, inflow: 2.5 t/d

#### Flow 28

**Flow 28:** PET sent to landfill from TPS facilities

Amount of waste entering landfill per year multiplied by percentage of PET in TPS -> TPST waste

$$flow\ 28 = X * \frac{G}{100} = 109670\ t/a$$

External Data		Source
X	2294000 tons waste enter landfill site per year from TPS	(Dinas Lingkungan Hidup, 2018a)
G	PET in average waste of trucks entering landfill is 4.78%.	(Dinas Lingkungan Hidup, 2017)
Assumed that PET composition is the same for market waste as average, since percentage is averaged over all trucks that enter landfill site		

#### Flow 29

**Flow 29:** PET separated from TPS by (informal) waste pickers and sent to junkshops

Calculated by subtraction of all other flows in and out of TPS process

$$flow\ 29 = flow\ 18 + flow\ 25 + flow\ 27 - flow\ 26 - flow\ 28 = 22715\ t/a$$

NO EXTERNAL DATA / ASSUMPTIONS USED

#### Flow 30

**Flow 30:** PET collected from environment by (informal) waste pickers and sent to junkshops

Inflow to junkshops from waste collectors (tukang sampah) known to be double that of waste pickers. Total collection of waste pickers to junkshops known. Collection of waste pickers from disposal and TPS subtracted from this

$$flow\ 30 = flow\ 19 * \frac{Y}{100} - flow\ 20 - flow\ 29 = 6675\ t/a$$

External Data		Source
Y	Waste pickers (total of all sources) collect 50% of PET inflow to junkshops from waste collectors	(Survey: Junkshops, 2019). Inflow of PET to junkshops from waste pickers and collectors is split 33% and 66% respectively.

### Flow 31

**Flow 31:** Leakage of PET to the environment from junkshops

Leakage for junkshops estimated at 5% of inflow, from surveys

$$flow\ 31 = (flow\ 10 + flow\ 19 + flow\ 20 + flow\ 29 + flow\ 30) * \frac{Z}{100} = 8330\ t/a$$

External Data		Source
Z	Leakage from junkshops is 5% of inflow	(Survey: Junkshops, 2019). Junkshop Susilo estimated 5% leakage for 'hard plastic'. Others estimated higher for all plastic types. Since PET is harder to 'lose', assumed lower leakage (5%)

### Flow 32

**Flow 32:** PET sent to recyclers from junkshops

Calculated by subtracting leakage from total inflow

$$flow\ 32 = flow\ 10 + flow\ 19 + flow\ 20 + flow\ 29 + flow\ 30 - flow\ 31 = 158240\ t/a$$

NO EXTERNAL DATA / ASSUMPTIONS USED

### Flow 33

**Flow 33:** Leakage of PET to the environment from central waste banks

Leakage of PET to the environment estimated at 0.1% of inflow, multiplied by total inflow

$$flow\ 27 = flow\ 24 * \frac{A'}{100} = 15\ t/a$$

External Data		Source
A'	0.1% of Pet that enters the central waste banks is lost to the environment	(Survey: Waste banks, 2019). Operator estimated 0.1% leakage to the environment. Little to no PET seen around facility

### Flow 34

**Flow 34:** PET sent to recyclers from central waste banks

Calculated by inflow from local waste banks and inflow from TPS minus outflow of PET in environmental leakage and residue to TPS

$$flow\ 34 = flow\ 24 + flow\ 26 - flow\ 27 - flow\ 33 = 16900\ t/a$$

NO EXTERNAL DATA / ASSUMPTIONS USED

### Flow 35

**Flow 35:** PET collected from landfill and sent to landfill recycling companies by waste pickers

Number of junkshops around landfill multiplied by amount of PET sold by an averaged sized junkshop per year

$$flow\ 35 = B' * C' = 27500\ t/a$$

External Data	Source
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	The average waste picker will collect 9.2 tons of PET per year B	(Survey: Landfill junkshops, 2019). 546kg of PET is collected every 2 days by 12 waste pickers
Assumed that collection into the landfill junkshop surveyed is average for all waste pickers on the landfill and that collection rate of waste pickers for the 'companies' and junkshops is the same		
C'	3000 waste pickers are employed by the companies on the landfill	(Interview: BGBJ, 2019). Approximately 30 companies in Bantargebang that employ 100 waste pickers each

### Flow 36

**Flow 36:** PET collected from rivers by UPK and sent to landfill

Waste from rivers to landfill collected by UPK per year is known, multiplied by PET percentage in waste

$$flow\ 36 = E' * \frac{F'}{100} = 3185\ t/a$$

External Data		Source
E'	92290 tons waste enter landfill site per year from rivers (UPK)	(Dinas Lingkungan Hidup, 2018a)
F'	PET in average waste recovered from Indonesian rivers.	(Shuker & Cadman, 2018)

### Flow 37

**Flow 37:** PET collected from streets by PK and sent to landfill

Waste from streets to landfill collected by PK per year is known, multiplied by PET percentage in waste

$$flow\ 36 = G' * \frac{G}{100} = 1390\ t/a$$

External Data		Source
G'	29060 tons waste enter landfill site per year from streets (PK)	(Dinas Lingkungan Hidup, 2018a)
G	PET in average waste of trucks entering landfill is 4.78%.	(Dinas Lingkungan Hidup, 2017)

Assumed that PET composition is the same for market waste as average, since percentage is averaged over all trucks that enter landfill site

#### Flow 38

**Flow 38:** PET collected from landfill and sent to landfill junkshops by waste pickers

Number of junkshops around landfill multiplied by amount of PET sold by an averaged sized junkshop per year

$$flow\ 35 = H' * I' = 11000\ t/a$$

External Data		Source
H'	100 junkshops exist around Bantargebang landfill	(Interview: Bantargebang Landfill, 2019). 100-200 junkshops were highlighted and 100 of these were said to be recycling 'companies', thus 100 were estimated to be normal junkshops
I'	An average sized junkshop sells 110 tons PET per annum to recyclers	(Survey: Landfill junkshops, 2019). Averaged size junkshop recorded 546kg PET to be sold every 2 days
Assuming that all PET processed by the junkshop is recorded and leakage only occurs after the counting of PET, during transport to recycler		

#### Flow 39

**Flow 39:** PET processed into new unbranded products and sold on informal market

Based on surveying, losses of material are assumed at 6% of inflow for the landfill companies. 94% of the inflow is then processed into products and sold

$$flow\ 39 = flow\ 35 * \frac{100 - J'}{100} = 25850\ t/a$$

External Data		Source
J'	6% of PET in the inflow to landfill recycling companies is lost in residue to the environment	(Survey: Landfill junkshops, 2019). 2% of PET inflow is lost to the environment under one process. Companies perform 3 processes and so junkshop leakage is tripled.

#### Flow 40

**Flow 40:** Leakage of PET to the environment from landfill recycling companies

Based on surveying, losses of material are assumed at 6% of inflow for the landfill companies.

$$flow\ 40 = flow\ 35 * \frac{J'}{100} = 1650\ t/a$$

External Data	Source
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J'	6% of PET in the inflow to landfill recycling companies is lost in residue to the environment	(Survey: Landfill junkshops, 2019). 2% of PET inflow is lost to the environment under one process. Companies perform 3 processes and so junkshop leakage is tripled.
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#### Flow 41

**Flow 41:** Leakage of PET to the environment from landfill junkshops

Based on surveying, losses of PET to the environment known as 2% of inflow to landfill junkshops.

$$\text{flow 41} = \text{flow 38} * K' = 220 \text{ t/a}$$

External Data		Source
K'	2% of PET in the inflow to landfill junkshops is lost in residue to the environment	(Survey: Landfill junkshops, 2019). 2% of PET inflow is lost to the environment under one process.

#### Flow 42

**Flow 42:** PET sent to recyclers from landfill junkshops

PET inflow to landfill junkshops known. Residue calculated is subtracted from inflow

$$\text{flow 42} = \text{flow 38} - \text{flow 41} = 10780 \text{ t/a}$$

NO EXTERNAL DATA / ASSUMPTIONS USED

#### Flow 43

**Flow 43:** Leakage of PET to the environment from recyclers

Leakage from paper: Putri taken (30%) and multiplied by total inflow to recyclers

$$\text{flow 43} = (\text{flow 22} + \text{flow 32} + \text{flow 34} + \text{flow 42}) * \frac{L'}{100} = 76525 \text{ t/a}$$

External Data		Source
L'	30% of PET inflow to recyclers is lost to the environment	(Putri et al., 2018)

#### Flow 44

**Flow 44:** Recycled PET exported from recyclers

Acc. To Putri, 80484 tons of PET are exported from Jakarta every year. Taken as estimation of PET export

$$\text{flow 44} = M' * 12 = 80485 \text{ t/a}$$

External Data		Source
M'	6707 tons of PET are exported from Jakarta every month	(Putri et al., 2018)



## Flow 45

*Flow 45: Recycled PET supplied domestically from recyclers*

*Calculated by subtracting masses of PET exported and in leakage of recyclers from total inflow to recyclers*

$$flow\ 45 = flow\ 22 + flow\ 32 + flow\ 34 + flow\ 42 - flow\ 43 - flow\ 44 = 98080\ t/a$$

*NO EXTERNAL DATA / ASSUMPTIONS USED*

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## 5. Fieldwork Interview Question Lists – Junkshops, Waste banks, Recyclers

### Junkshop interview question list

The following questions refer to the inputs, outputs and processes of Jakarta's junkshops.

#### ***Junkshop Info***

1. How long have you been active?
2. Who funded the set-up of your junkshop?
3. Is your collection and processing controlled by any external actors?
4. Do you see an increasing amount of plastic entering the junkshop?
5. How close are you to full capacity?

#### ***Plastic Inflow***

6. From what sources do you collect plastic waste?
7. How much total plastic waste enters the junkshop per day/month/year?
8. What percentage of this waste is PET plastic? (Estimation)
9. How much plastic comes in from each of the sources mentioned? (Percentages)

#### ***Processing***

10. What do you do to the plastic when it comes into the junkshop?
11. Do you separate the PET from the other materials?
12. How much PET material is lost in this process per day/month/year, if any?
13. Does all of the residue get collected? Do you lose some to the environment?

#### ***Plastic Outflow***

14. Where do you send the plastic once you have collected/processed it?
15. Where do you send the residue from the processes, if anywhere?
16. How much PET plastic do you sell on to recyclers per day/month/year?
17. To which recyclers do you send your waste? (Names)

### Waste bank interview question list

The following questions refer to the inputs, outputs and sorting processes of Jakarta's waste banks.

#### ***Waste bank Info***

1. How long have you been active?
2. Who funded the set-up of your waste bank?
3. Is your collection and processing controlled by any external actors?
4. Do you see an increasing amount of plastic entering the waste bank?
5. How close are you to full capacity?

#### ***Plastic Inflow***

6. From what sources do you collect plastic waste?
7. How much plastic waste enters the waste bank per day/month/year?
8. What percentage of this waste is PET plastic? (Estimation)

#### ***Processing***

9. What do you do to the plastic when it comes into the waste bank?

10. Do you separate the PET from the other materials? And where does the residue go?
11. How much PET material is lost in this process per day/month/year, if any?
12. Does all of the residue get collected? Do you lose some to the environment?

**Plastic Outflow**

13. Where do you send the plastic once you have collected/processed it?
14. Where do you send the residue from the processes, if anywhere?
15. How much PET plastic do you sell on to the junkshops per day/month/year?
16. To which junkshops do you send your waste? (Names)

**Recycler interview question list**

The following questions refer to the inputs, outputs and processes of Jakarta's recyclers.

**Recycler Info**

1. How long have you been active?
2. Which area of Jakarta do you service?
3. Who funded the set-up of your recycling facility?
4. Is your collection and processing controlled by any external actors?
5. Do you see an increasing amount of plastic entering the facility?
6. How close are you to full capacity?

**Plastic Inflow**

7. What is the composition of waste that enters the recycling facility?
8. From what sources do you collect plastic waste?
9. How much total plastic waste enters the facility per day/month/year?
10. What percentage of this waste is PET plastic? (Estimation)
11. How much plastic comes in from each of the sources mentioned? (Percentages)

**Processing**

12. What do you do to the plastic when it comes into the facility?
13. Do you separate the PET from the other materials?
14. How much PET material is lost in this process per day/month/year, if any?
15. Does all of the residue get collected? Do you lose some to the environment?

**Plastic Outflow**

16. Where do you send the plastic once you have collected/processed it?
17. Where do you send the residue from the processes, if anywhere?
18. How much PET plastic do you sell on to manufacturers per day/month/year?
19. To which manufacturers do you send your waste? (Names)