UNCTAD GCI Training

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Environmental Indicators

Core SDG Indicators for Entity Reporting

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Learning Objectives

Environmental indicators – what will we cover

a) Core indicators in the environmental area:

- ✓ Water recycling and reuse;
- ✓ Water use efficiency;
- ✓ Water stress;
- ✓ Reduction of waste generation;
- ✓ Waste reused, re-manufactured and recycled;
- ✓ Hazardous waste;
- ✓ Greenhouse gas emissions (scope 1);
- ✓ Greenhouse gas emissions (scope 2);
- ✓ Ozone-depleting substances and chemicals;
- ✓ Renewable energy;
- ✓ Energy efficiency.

b) Potential sources of information to calculate environmental indicators in your company

c) Examples of companies already using and disclosing some of these environmental indicators

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B.1 Sustainable use of water

1. Water recycling and reuse – SDG 6.3.1
2. Water use efficiency – SDG 6.4.1
3. Water stress – SDG 6.4.2

B.1 Sustainable use of water

1. Water recycling and reuse
2. Water use efficiency
3. Water stress

B.1.1 Water recycling and reuse: Definition

Water recycling and reuse is **the total volume of water that a reporting entity recycles and/or reuses during the reporting period**. This includes:

- Water that is **directly reused** for different purposes, for example:
  - ✓ Irrigation (in agriculture)
  - ✓ Heating and cooling
  - ✓ Washing
  - ✓ Cleaning
  - ✓ pH adjustment
  - ✓ Fire protection
  - ✓ Production line needs

- Water that is **treated and reused (recycled)**, i.e., water that needs to be treated to reduce the level of contaminants and impurities before being reused

B.1.1 Water recycling and reuse: Measurement methodology

Two indicators can be calculated:

1) **Total volume of water recycled and reused;**
2) **Total volume of water recycled and reused as a percentage of the total water withdrawal and total water received from a third party.**

B.1.1 Water recycling and reuse: Measurement methodology

Two indicators can be calculated:

1) **Total volume of water recycled and reused;**
2) **Total volume of water recycled and reused as a percentage of the total water withdrawal and total water received from a third party.**

This indicator should be expressed in total cubic meters (m3).

If there is a need to convert liters (l, ℓ or L) into cubic meters, it is important to know that:

- 1,000 l = 1 m3
- 1 megaliter = 1,000 m3

To calculate this indicator, the procedure should be distinguished based on the following question:

Do your facilities have water or flow meters?

B.1.1 Water recycling and reuse: Measurement methodology

Two indicators can be calculated:

1) Total volume of water recycled and reused;
2) **Total volume of water recycled and reused as a percentage of the total water withdrawal and total water received from a third party.**

This indicator is expressed in percentage terms (%) and is defined in the following way:

Total volume of water recycled and reused DIVIDED BY Total water withdrawal and total water received from third party

B.1.1 Water recycling and reuse: Measurement methodology

The **numerator (Total volume of water recycled and reused)** is calculated as explained above at point 1).

The **denominator (Total water withdrawal and total water received from third party)** takes into account water withdrawn either directly by the organization or through intermediaries, such as water utilities.

It is calculated as the **sum of all water drawn into the boundaries of the entity for any use over the course of the reporting period from different sources**, as exemplified in the below table:

		January 2018	February 2018	March 2018	…
Water withdrawn and received by source	Surface water (m3)	1000			
	Groundwater (m3)	0			
	Seawater (m3)	2300			
	Produced water (m3)	0			
	Third-party water (m3)	5000			
	Total	8300			

B.1.1 Water recycling and reuse: Measurement methodology

As entities should be **striving to improve the amount of water recycling and reuse**, it is suggested to calculate a third indicator that should be expressed in terms of change with reference to the previous reporting period.

So the indicator should be calculated as:

Total volume of water recycled and reused at time t MINUS Total volume of water recycled and reused at time t-1

CALCULATION EXAMPLE

If the volume of water recycled and reused in year 2018 is equal to 100,800 m3 and the volume of water recycled and reused in year 2017 is equal to 98,300 m3 the change of water recycled and reused is equal to +2,500 m3. This signals an improvement as the amount of water recycled and reused has increased.

B.1.1 Water recycling and reuse: Potential sources of information

- The calculation of the indicators involves **water data collected at each facility/site through direct measurement (through water meters)**. Water should be metered and measured cubic meters (or in liters). If such information is collected, it can be found in **internal reporting system (operational information system tracking physical units and recording water flows) and/or environmental accounting systems/environmental management systems** especially for what concerns the resource recycling quantities and costs. If these instruments are not used at their facilities and thus estimation is required, reporting entities would need to disclose the fact that they are using estimates.
- Also, information collected in **accounts payable based on water suppliers' invoices** can be used to calculate this indicator. It is also possible to find information to calculate this indicator in accounts receivable when reused water is considered a product and when payment is made by the receiving unit.
- It is also possible to implement **a water audit** for specific facilities or office buildings for identifying where and how water is used.

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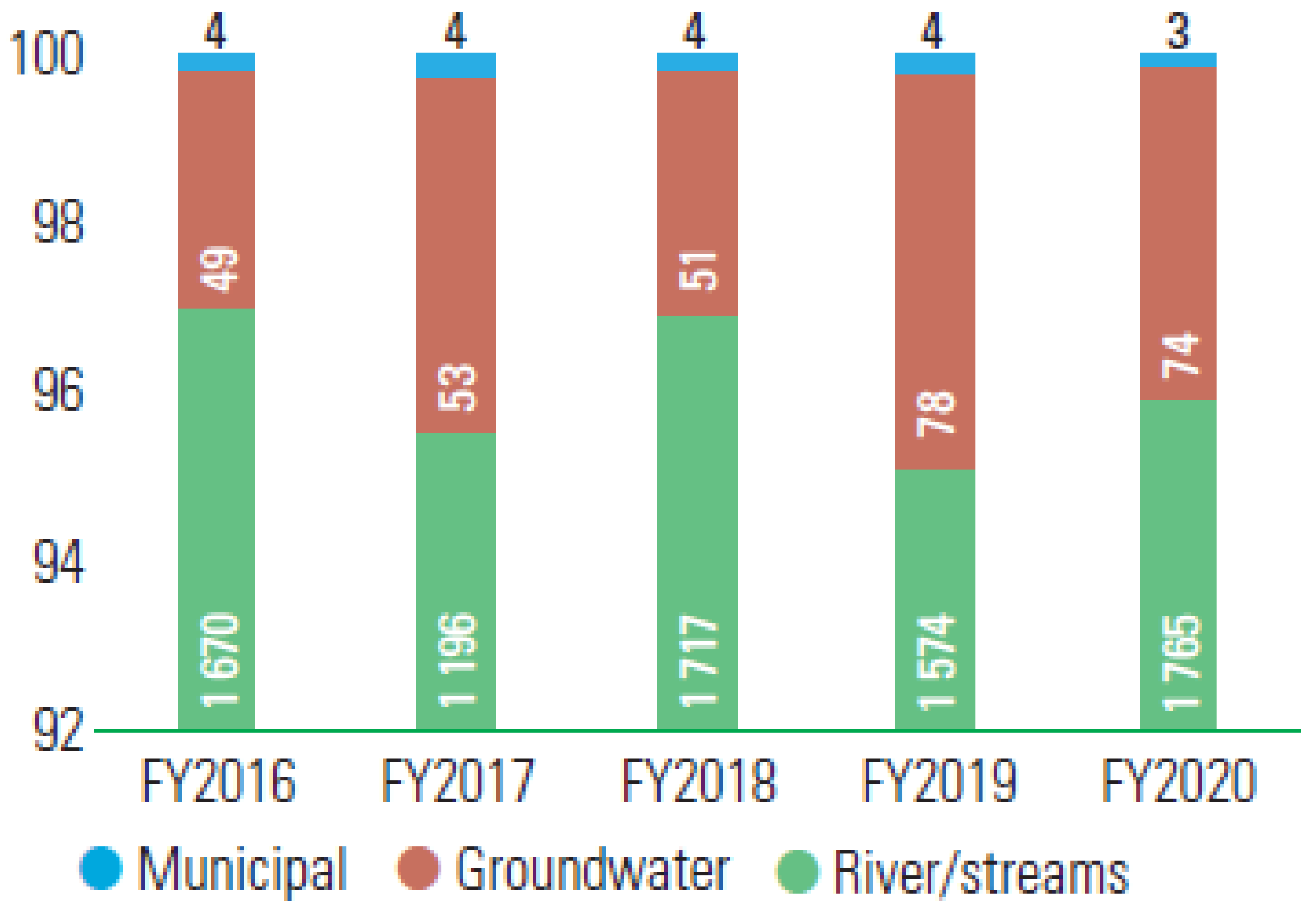
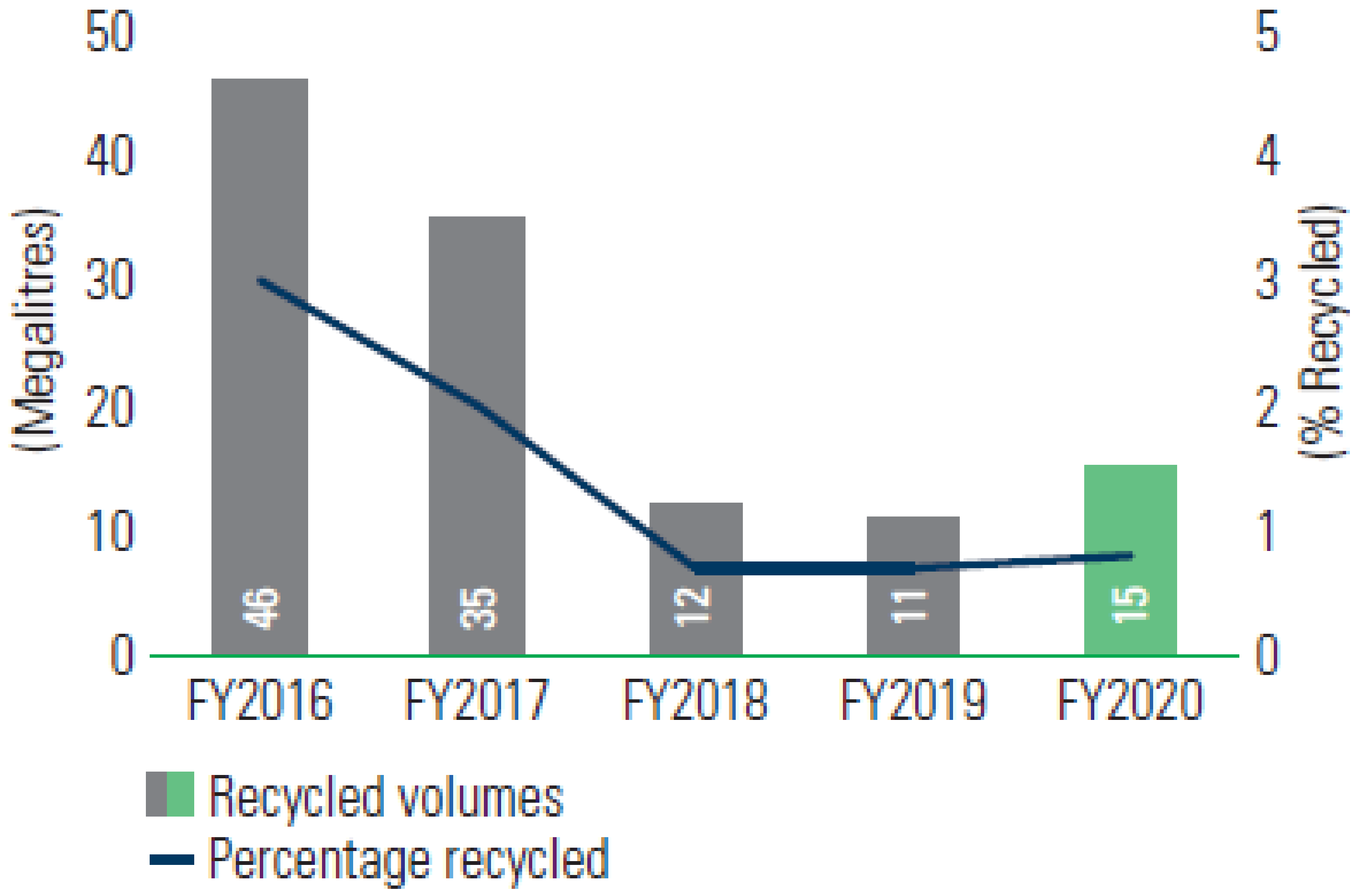
Water abstraction per source
(Megalitres) (%)



Water recycled or reused



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B.1 Sustainable use of water

1. Water recycling and reuse
2. Water use efficiency
3. Water stress

B.1.2 Water use efficiency

Definition

Water use efficiency is **the water use per net value added in the reporting period**.

Specifically:

- **water use is defined as water withdrawal plus total water received from a third party** (i.e., water withdrawn either directly by the organization or through intermediaries, such as water utilities).

Measurement methodology

Two indicators can be calculated:

1) **The ratio between water use in a reporting period and the net value added for the same reporting period;**
2) **The change of water use per net value added between two reporting.**

B.1.2 Water use efficiency: Measurement methodology

Two indicators can be calculated:

1) **The ratio between water use in a reporting period and the net value added for the same reporting period;**
2) **The change of water use per net value added between two reporting.**

This indicator is defined as: **Total volume of water used DIVIDED BY Net value added**

The numerator of this indicator should be expressed in total cubic meters (m3). If there is a need to convert liters (l, ℓ or L) into cubic meters, it is important to know that:

- 1,000 l = 1 m3
- 1 megaliter = 1,000 m3

The denominator of this indicator is expressed in monetary terms (R).

Therefore, the indicator is expressed in terms of m3 per R.

B.1.2 Water use efficiency: Measurement methodology

Two indicators can be calculated:

1) The ratio between water use in a reporting period and the net value added for the same reporting period;
2) **The change of water use per net value added between two reporting.**

This indicator is calculated as:

$$\frac{\text{Total volume of water used at time t}}{\text{Net value added at time t}} \quad \text{MINUS} \quad \frac{\text{Total volume of water used at time t-1}}{\text{Net value added at time t-1}}$$

CALCULATION EXAMPLE

For example:
If the **volume of water used in year t per net value added (i.e., the water use efficiency) is equal to 23,000 m3 per R** and the **volume of water used in year t-1 per net value added is equal to 25,000 m3 per R the change of water use per net value added is equal to -2,000 m3 per R**. This signals an improvement in the water use efficiency (as the water used per R of net value added is lower)

B.1.2 Water use efficiency: Potential sources of information

- The calculation of the indicators involves **water data collected at each facility/site through direct measurement (through water meters)**. Water should be metered and measured cubic meters (or in liters). If such information is collected, it can be found in **internal reporting system (operational information system tracking physical units and recording water flows) and/or environmental accounting systems/environmental management systems** especially for what concerns the water quantities and costs. If these instruments are not used at their facilities and thus estimation is required, reporting entities would need to disclose the fact that they are using estimates.
- Also, information collected in **accounts payable based on water suppliers' invoices** can be used to calculate this indicator.
- It is also possible to implement a **water audit** for specific facilities or office buildings for identifying where and how water is used (see what suggested for indicator B.1.1 on this point).

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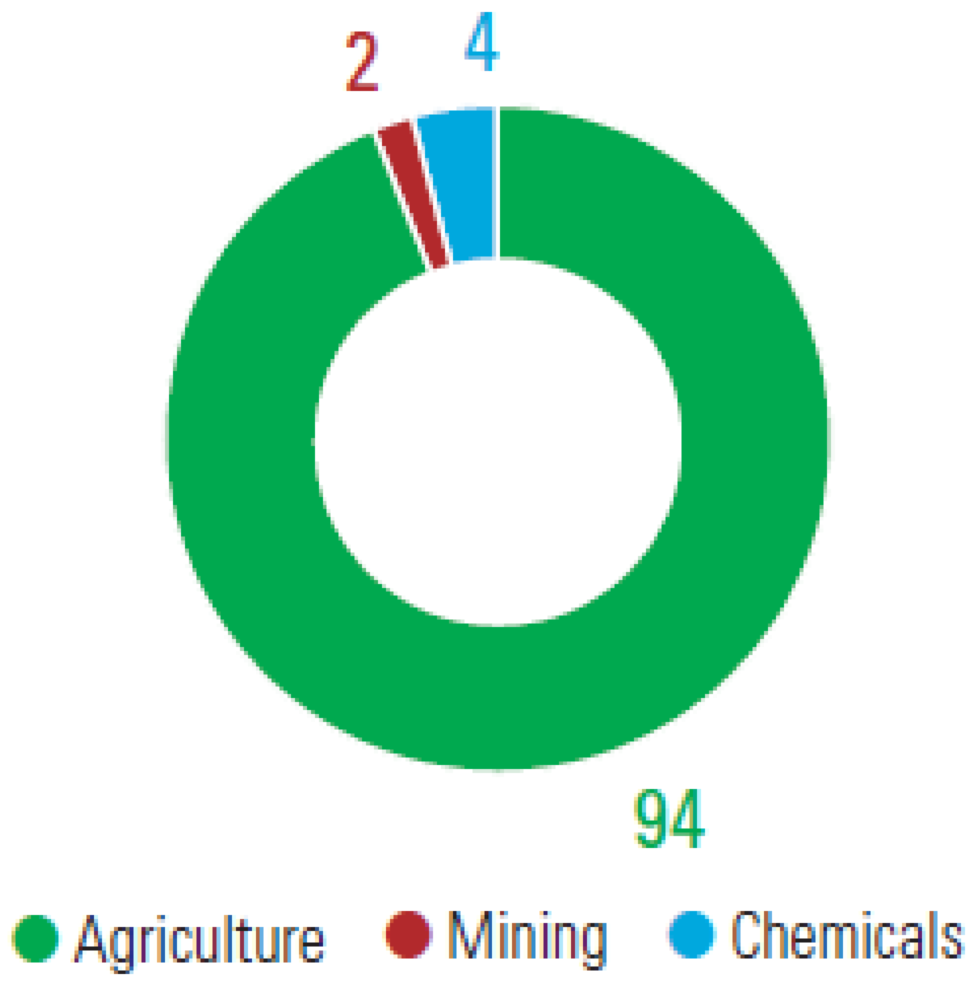
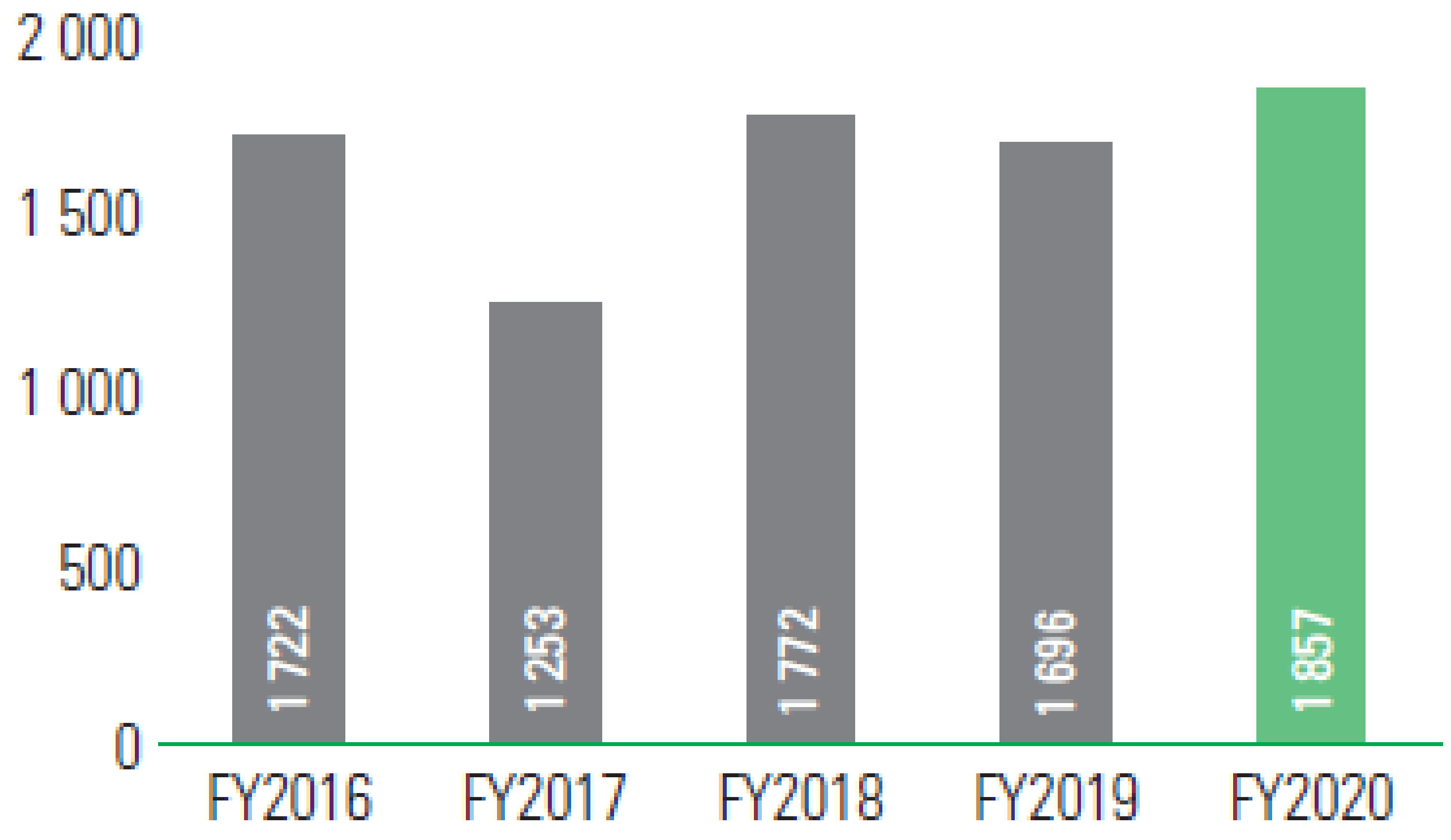
Water usage by division

(%)



Water usage

(Megalitres)



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B.1 Sustainable use of water

1. Water recycling and reuse
2. Water use efficiency
3. Water stress

B.1.3 Water stress: Definition

Water stress is defined as **total water withdrawn with a breakdown by sources** (e.g., surface, ground, sea) **and with reference to water- stressed or water-scarce** areas (expressed as a percentage of total withdrawals).

Water stress can refer to the **availability, quality, or accessibility of water.**

Since an organization can affect the availability of water for others, it is important to disclose the entity's water withdrawal from all areas with water stress (if applicable) with a breakdown of this total by the above mentioned withdrawal source categories. **The amount of water withdrawal from areas with water stress specifies an entity's impacts in sensitive locations and is useful to understand where improvement actions are most needed.**

B.1.3 Water stress: Measurement methodology

To calculate this indicator, an entity can follow three steps:

STEP 1: report a breakdown of the total water withdrawal by surface water, groundwater, seawater, produced water, and third-party water.

Step 1

		All areas 2018	Areas with water stress 2018	Water stress 2018
Water withdrawn and received by source	Surface water (m3)	1000		
	Groundwater (m3)	0		
	Seawater (m3)	2300		
	Produced water (m3)	0		
	Third-party water (m3)	5000		
	Total	8300		

B.1.3 Water stress: Measurement methodology

STEP 2: determine which withdrawals (at specific facilities or sites) are located in areas with water stress

There are **publicly available tools** for assessing areas with water stress such as:

- the World Resources Institute 'Aqueduct Water Risk Atlas' (www.wri.org/our-work/project/aqueduct/)
- the WWF 'Water Risk Filter' (www.waterriskfilter.panda.org)

Based on these tools, water stress in an area may be assessed using either of the following indicators and their thresholds :

- The ratio of total annual water withdrawal to total available annual renewable water supply (i.e., baseline water stress) is high (40-80%) or extremely high (>80%);
- The ratio of water consumption-to-availability (i.e., water depletion) is moderate (dry-year depletion, where for at least 10% of the time, the monthly depletion ratio is >75%), high (seasonal depletion, where for one month of the year on average, the depletion ratio is >75%), or very high (ongoing depletion, where the depletion ratio on average is >75%).

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B.1.3 Water stress: Measurement methodology

STEP 2: determine which withdrawals (at specific facilities or sites) are located in areas with water stress

Step 2

		All areas 2018	Areas with water stress 2018	Water stress 2018
Water withdrawn and received by source	Surface water (m3)	1000	300	
	Groundwater (m3)	0		
	Seawater (m3)	2300		
	Produced water (m3)	0		
	Third-party water (m3)	5000		
	Total	8300	300	

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B.1.3 Water stress: Measurement methodology

STEP 3: express the total water withdrawn with a breakdown by sources (e.g., surface, ground, sea) and with reference to water- stressed or water-scarce areas as a percentage of total withdrawals

The table below summarizes the result of the three steps:

Step 3

		All areas 2018	Areas with water stress 2018	Water stress 2018
Water withdrawn and received by source	Surface water (m3)	1000	300	30%
	Groundwater (m3)	0		0%
	Seawater (m3)	2300		0%
	Produced water (m3)	0		0%
	Third-party water (m3)	5000		0%
	Total	8300	300	3.6%

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B.1.3 Water stress: Potential sources of information

- Regarding the assessment of basins where water challenges are pronounced, many entities use their own **internal knowledge** of the basins where they operate.
- There are also a **number of external datasets** that can assist entities in this process and there are also free web-based tools (with online instructions) that use these datasets to conduct calculations, such as:
  - ✓ WBCSD Global Water Tool
  - ✓ WRI Aqueduct Water Risk Atlas
  - ✓ WWF-DEG Water Risk Filter (Quick View)
  - ✓ WFN Water Footprint Assessment Tool
- Additional sources of information to gather data for the calculation of this indicator are the **invoices of water suppliers (for water received from third parties) as well as the information that can be derived from water withdrawal licenses and permits that are required by entities if they want to use ground or surface water**.

B.2 Waste Management

1. Reduction of waste generation – SDG 12.5
2. Waste reused, re-manufactured and recycled – SDG 12.5.1
3. Hazardous waste – SDG 12.4.2

B.2 Waste Management

1. Reduction of waste generation
2. Waste reused, re-manufactured and recycled
3. Hazardous waste

B.2.1 Reduction of waste generation: Definition

Reduction of waste generation measures the **change in the entity's waste generation per net value added**.

Specifically:

- Waste is intended as a non-product output with a negative or zero market value
- Water and air-polluting emissions – although they are non-product output – are not regarded as waste

B.2.1 Reduction of waste generation: <u>Definition</u>

The waste generated during a reporting period can be mainly **classified in two different ways**:

1) according to its **quality**:

- ✓ mineral waste (that is safe by nature and can be discharged without requiring special landfill technology and/or long-term landfill management) such as rock, brick and glass,
- ✓ non-mineral waste (that requires special landfill technology and/or long-term landfill management. Non-mineral waste can be mineralized through waste treatment technology) including agricultural and industrial waste.

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- ✓ non-mineral waste (that requires special landfill technology and/or long-term landfill management. Non-mineral waste can be mineralized through waste treatment technology) including agricultural and industrial waste.

2) according to the different **treatment technologies** applied to waste itself:

- ✓ Reusing, re-manufacturing, and recycling
- ✓ Waste incineration
- ✓ Landfills

B.2.1 Reduction of waste generation: Measurement methodology

This indicator should be calculated in the following way:

$$\frac{\text{Total waste generated at time } t}{\text{Net value added at time } t} \quad \text{MINUS} \quad \frac{\text{Total waste generated at time } t-1}{\text{Net value added at time } t-1}$$

Waste should be weighted or metered.

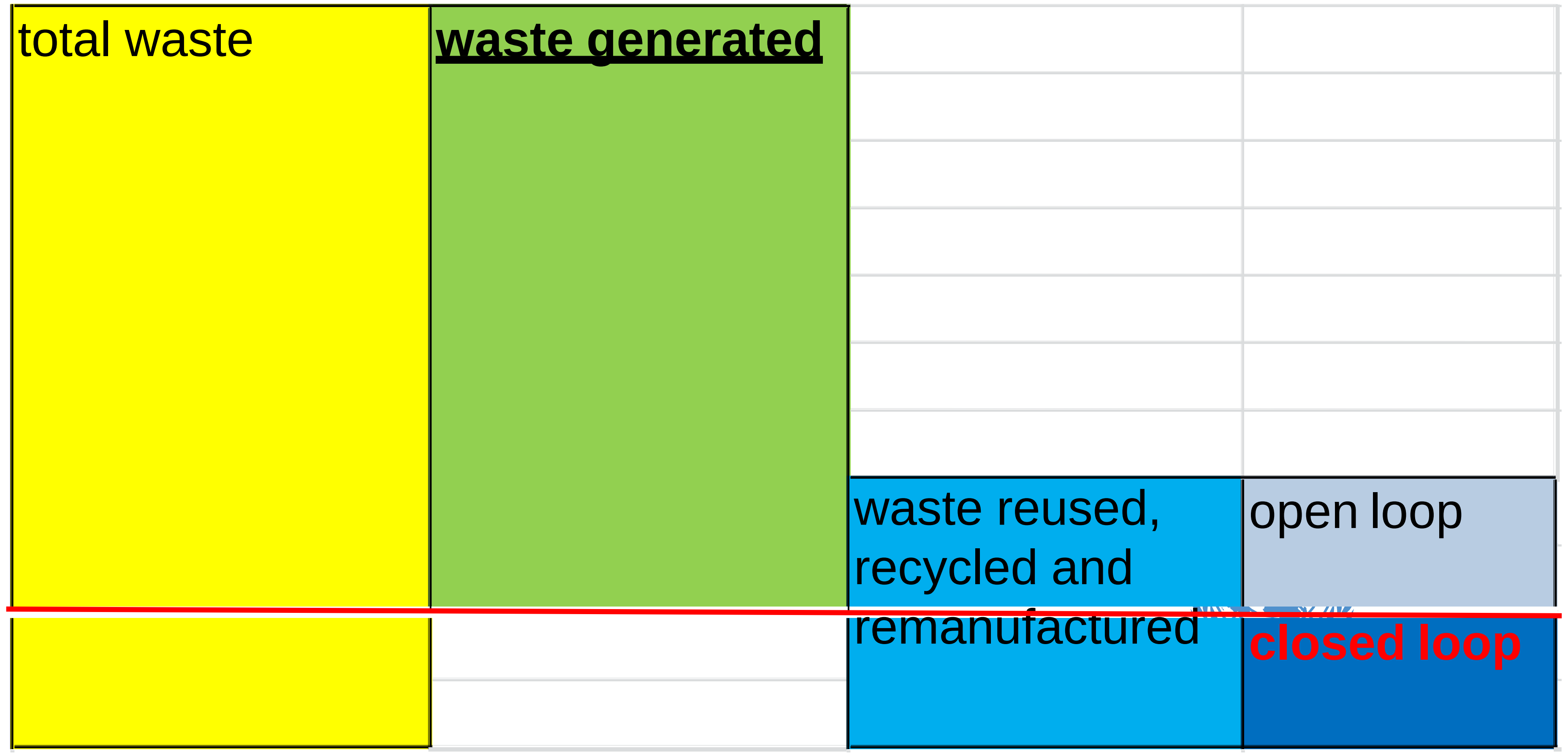
As waste can be solid, liquid or have a paste-like consistency, it can be measured in kilograms and tons, liters or cubic meters. However, for the purpose of this indicator, **waste should be reported according to weight (kg, t)** and not volume (liters, m3).

B.2.1 Reduction of waste generation: <u>Measurement methodology</u>

To calculate the “**total waste generated**” entities shall distinguish between:

- **Open-loop** reusing, re-manufacturing, and recycling, where waste is not returned to the processes of the reporting entity (but it is rather returned to the market),
- **Closed-loop** reusing, re-manufacturing, and recycling, where waste is returned to the processes of the reporting entity.

The **amount of <u>waste generated</u>** over a certain reporting period is **calculated excluding the amount that is treated either on-site or off-site through closed-loop recycling**, **reuse or remanufacturing processes**



B.2.1 Reduction of waste generation: Potential sources of information

- Waste should be weighed or metered at each specific business site.
- If entities might find it difficult to meter the quantity of waste produced, it is possible to calculate the amount of waste generated in a reporting period via bills from the waste management company (information provided by the waste disposal contractor usually includes, along with the type of waste, also the amount of waste managed (in kilos or tons)).
- The data required for the calculation of these indicators and the related information flows are normally managed by a Facility manager or a General services administrator. When such positions are not present in an entity, the related information is to be found in the accounts payable as part of the waste management costs calculation of the reporting period.

B.2 Waste Management

1. Reduction of waste generation
2. Waste reused, re-manufactured and recycled
3. Hazardous waste

B.2.2 Waste reused, re-manufactured and recycled: Definition

This indicator refers to **the amount of waste reused, re-manufactured, and recycled**. As explained also for the indicator B.2.1:

- **Reuse consists in the further use of a component, part or product after it has been removed from a clearly defined service cycle**. Reuse **does not involve a manufacturing process**; however, cleaning, repair or refurbishing may be performed between uses.
- **Re-manufacturing is the further use of a component, part or product after it has been removed from a clearly defined service cycle in a new manufacturing process** that goes beyond cleaning, repair or refurbishing.
- **Recycling is recovery and reuse of materials from scrap or other waste materials for the production of new goods**. Pre-treatment processes that condition the waste for recycling are regarded as part of the recycling path.

It is possible to further distinguish between open- and closed-loop reuse, re-manufacturing and recycling (see indicator B.2.1)

B.2.2 Waste reused, re-manufactured and recycled: Measurement methodology

Two indicators can be calculated:

1) **Total amount of reused, remanufactured and recycled waste;**
2) **Total amount of waste reused, remanufactured and recycled normalized by the net value added.**

B.2.2 Waste reused, re-manufactured and recycled: Measurement methodology

Two indicators can be calculated:

1) **Total amount of reused, remanufactured and recycled waste;**
2) **Total amount of waste reused, remanufactured and recycled normalized by the net value added.**

The amount of reused, re-manufactured, and recycled waste should be recognized in the period in which it is treated and should be **measured in kilos and tons** (see on this point indicator B.2.1. Reduction of waste generation).

When possible, it would be preferably to distinguish among the three options, and specifically, between reuse and recycling versus remanufacturing, so that it is possible to calculate the following two indicators:

- **Total reused and recycled waste generated at time t**
- **Total remanufactured waste generated at time t**

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B.2.2 Waste reused, re-manufactured and recycled: Measurement methodology

Two indicators can be calculated:

1) Total amount of reused, remanufactured and recycled waste;
2) **Total amount of waste reused, remanufactured and recycled normalized by the net value added.**

This indicator should be calculated in the following way:

$$\frac{\text{Total amount of waste reused, remanufactured and recycled generated at time t}}{\text{Net value added at time t}}$$

- In order to normalize data on waste generation figures and to be consistent with the way in which indicator “B.2.1. Reduction of waste generation” is calculated, reused, re-manufactured and recycled waste should be divided by the amount of net value added (expressed in R) generated in the same reporting period (see indicator A.1.3. Net Value added).
- The unit of measure of this indicator is kilos or tons of waste per R.

B.2.2 Waste reused, re-manufactured and recycled: Measurement methodology

Waste Generated	Quality and classification				TOTAL	
Treatment Technology	Mineral		Non-mineral			
	2018	2017	2018	2017	2018	2017
Open-loop reuse, remanufacturing, recycling	83.7	23.7	105.8	74	189.5	97.7
Reuse	58.6	10.8	15.2	21.5	73.8	32.3
Remanufacturing	8.3	5.4	8.4	8.1	16.7	13.5
Recycling	16.8	7.5	82.2	44.4	99	51.9
Incineration	87.5	52.4	45.4	74.5	132.9	126.9
Low-temperature	9.2	12.2	7.3	14.3	16.5	26.5
High-temperature	75.3	9.9	19	18.6	94.3	28.5
Cement kilns	3	30.3	19.1	41.6	22.1	71.9
Sanitary landfills	78.2	104.5	130.5	21.3	208.7	125.8
Landfills for bioactive materials	35.8	10.3	22.5	10.4	58.3	20.7
Landfills for stablized materials	39.3	21.9	51.1	3	90.4	24.9
Landfills for inert materials	3.1	72.3	56.9	7.9	60	80.2
Open dumpsite	67	0.2	12.3	5.4	79.3	5.6
Temporary stored on-site	14.6	42	46.8	55.2	61.4	97.2
TOTAL	331	222.8	340.8	230.4	671.8	453.2
Closed-loop reuse, remanufacturing, recycling	-10	-12	-5.2	-3	-15.2	-15
Reuse	-10	-12	-2.1	-2	-12.1	-14
Remanufacturing	0	0	-1.5	-1	-1.5	-1
Recycling	0	0	-1.6	0	-1.6	0
TOTAL WASTE GENERATED						

CALCULATION EXAMPLE

Calculate:

1. Total waste generated for 2017
2. Total reused, remanufactured and recycled waste generated in 2017
3. Assuming Net Value Added (NVA) in 2017 was R1,100 calculate Waste reused, re-manufactured & recycled per NVA

B.2.2 Waste reused, re-manufactured and recycled: Measurement methodology

Waste Generated	Quality and classification				TOTAL	
Treatment Technology	Mineral		Non-mineral			
	2018	2017	2018	2017	2018	2017
Open-loop reuse, remanufacturing, recycling	83.7	23.7	105.8	74	189.5	97.7
Reuse	58.6	10.8	15.2	21.5	73.8	32.3
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Reuse	-10	-12	-2.1	-2	-12.1	-14
Remanufacturing	0	0	-1.5	-1	-1.5	-1
Recycling	0	0	-1.6	0	-1.6	0
TOTAL WASTE GENERATED	321	210.8	335.6	227.4	656.6	438.2

CALCULATION EXAMPLE

If we refer to the Table and we want to calculate this indicator for year 2017 (assuming we are including both open-loop and closed-loop reused, remanufactured and recycled waste):

Total waste generated in 2017:

= 453.2 - 15.0 = 438.2

Total waste reused, remanufactured and recycled

= 97.7 + 15.0 = 112.7

Let us assume that the net value added in 2017 was equal to R1,100

So that this indicator is equal to

112.7/1,100 = 0.102 tons per R

B.2.2 Waste reused, re-manufactured and recycled: <u>Measurement methodology</u>

Two indicators can be calculated:

1) **Total amount of reused, remanufactured and recycled waste;**
2) **Total amount of waste reused, remanufactured and recycled normalized by the net value added.**

To be consistent with the previous indicator, the **difference between year t and year t-1** should be also computed for these indicators so that it is possible to monitor the level of progress the organization has made toward waste reuse, re-manufacture, and recycle efforts.

B.2.2 Waste reused, re-manufactured and recycled: Potential sources of information

- In many countries, various forms of waste treatment are required by law, and, normally, a waste disposal contractor is involved in open-loop recycling. Therefore, relevant information for a specific reporting period can be found on the **invoices from the waste management company (information provided by the waste disposal contractor usually includes, along with the type of waste, also the amount of waste managed (in kilos or tons)).**
- When the waste generated by a company can be **sold** (e.g., because it represents a suitable raw material for another manufacturing company), relevant information can be found on the invoice issued by the company selling waste materials (accounts receivable).
- When the recycled, reused or remanufactured material is **returned to the processes of the reporting entity (closed-loop)**, the related figures should be collected at each business site and reported through operational reporting.
- The data required for the calculation of these indicators and the related information flows are normally managed by a Facility manager or a General services administrator or by a plant manager. The related information can also be found in the accounts receivable, when waste materials is sold to other companies, or in the invoices of materials if waste is reused in the reporting entity processes.

The Rose Foundation Case Study

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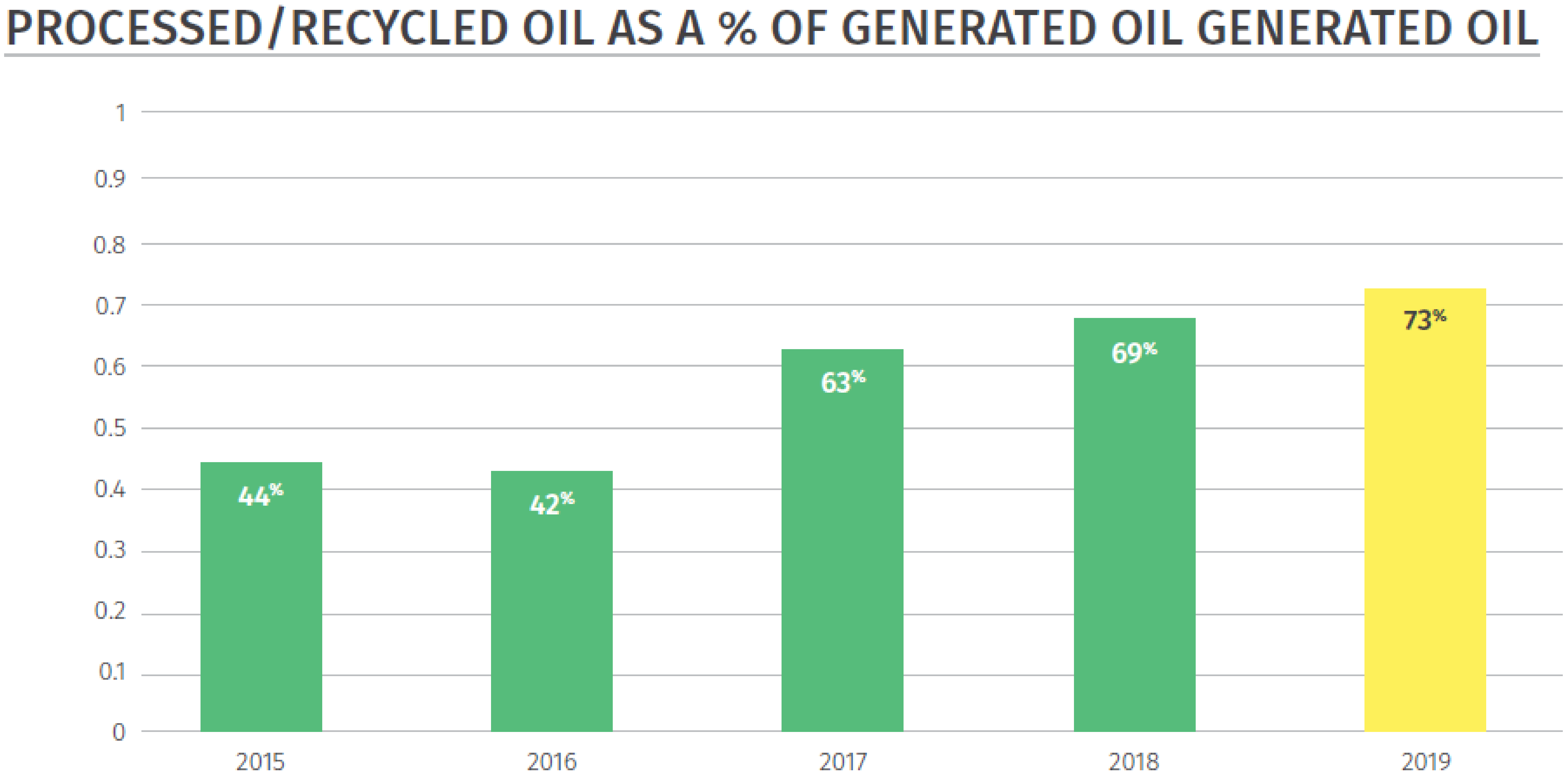

Source: The ROSE Foundation 2019 Sustainability Report (SME SDG Case Study)

B.2 Waste Management

1. Reduction of waste generation
2. Waste reused, re-manufactured and recycled
3. Hazardous waste

B.2.3 Hazardous waste: Definition

This indicator refers to the **amount of waste with hazardous characteristics.** Waste can be classified according to The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, defined in terms of hazardous characteristics.

Waste is classified as hazardous also when, as a result of being radioactive, is subject to other national or international control systems

Waste in South Africa is currently governed by means of a number of pieces of legislations including:

- Hazardous Substances Act (Act 5 of 1973
- Health Act (Act 63 of 1977)
- Environment Conservation Act (Act 73 of 1989)
- Occupational Health and Safety Act (Act 85 of 1993)
- National Water Act (Act 36 of 1998)
- National Environmental Management: Waste Amendment Act, 2014 (Act 26 of 2014)

Source: http://sawic.environment.gov.za
Copies of the above legislation can be sourced from http://www.polity.org.za/pol/acts/

B.2.3 Hazardous waste: Measurement methodology

Two indicators can be calculated:

1) **Total amount of hazardous waste;**
2) **Total amount of hazardous waste normalized by the net value added.**

B.2.3 Hazardous waste: Measurement methodology

Two indicators can be calculated:

1) **Total amount of hazardous waste;**
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B.2.3 Hazardous waste: Measurement methodology

Two indicators can be calculated:

1) **Total amount of hazardous waste;**
2) **Total amount of hazardous waste normalized by the net value added.**

The total amount of hazardous waste generated during a reporting period is defined as the sum of the amounts of all types of hazardous waste (see Definition).

It should be measured in kilos and tons.

B.2.3 Hazardous waste: Measurement methodology

Treatment Technology	Hazardous Waste	
	2018	2017
Open-loop reuse, remanufacturing, recycling	38	2.1
Reuse	1.1	0
Remanufacturing	0.6	1.1
Recycling	36.3	1
Incineration	12.2	26.8
Low-temperature	5.7	10.3
High-temperature	5.2	9.6
Cement kilns	1.3	6.9
Sanitary landfills	55.6	34.7
Landfills for bioactive materials	12.8	33.3
Landfills for stablized materials	3.8	0.9
Landfills for inert materials	39	0.5
Open dumpsite	0.4	5.2
Temporary stored on-site	1.4	0.3
TOTAL	107.6	69.1
Closed-loop reuse, remanufacturing, recycling	-0.1	-0.2
Reuse	-0.1	-0.2
Remanufacturing	0	0
Recycling	0	0
TOTAL WASTE GENERATED	107.5	68.9

CALCULATION EXAMPLE

If we refer to the Table when calculating the amount of hazardous waste generated over a certain reporting period, one should **exclude the amount that is treated either on-site or off-site through closed-loop recycling, reuse or remanufacturing processes, i.e., the recycled, reused or remanufactured waste materials returned to the processes of the reporting entity.**

The total amount of hazardous waste in year **2017** is then equal to:

69.1 MINUS 0.2 = 68.9 tons

The total amount of hazardous waste in year **2018** is equal to:

107.6 MINUS 0.1 = 107.5 tons

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B.2.3 Hazardous waste: Measurement methodology

Two indicators can be calculated:

1) Total amount of hazardous waste;
2) **Total amount of hazardous waste normalized by the net value added.**

This indicator should be calculated in the following way:

$$\frac{\text{Total amount of hazardous waste generated at time t}}{\text{Net value added at time t}}$$

In order to normalize data on hazardous waste, the amount of hazardous waste should be divided by the net value added (expressed in R) generated in the same reporting period (see indicator A.1.3. Net Value added). The unit of measure of this indicator is kilos or tons of waste per R.

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B.2.3 Hazardous waste: Measurement methodology

Similar to the other indicators on waste, also for hazardous waste, the difference between year t and year t-1 should be computed so that it is possible to monitor the level of progress the organization has made toward waste reuse, re-manufacture, and recycle efforts.

This indicator should be calculated in the following way:

$$\frac{\text{Total amount of hazardous waste generated at time t}}{\text{Net value added at time t}}$$

MINUS

$$\frac{\text{Total amount of hazardous waste generated at time t -1}}{\text{Net value added at time t-1}}$$

In addition, when possible, the total amount of hazardous waste should be broken down by disposal methods, e.g., reuse, recycling, composting, recovery, including energy recovery, incineration (mass burn), deep well injection, landfill, on-site storage, other (to be specified by the organization).

B.2.3 Hazardous waste: Potential sources of information

- Hazardous waste should be **weighed or metered** at each specific business site.
- When entities find it difficult to meter the quantity of hazardous waste produced, in line with what is advised for other indicators on waste management included in this guidance, it is suggested to use the **invoices from the waste management company** to reconstruct the relevant information required to calculate this indicator. Information provided by the waste disposal contractor usually includes, along with the type of waste, also the amount of waste managed (in kilos or tons) and the disposal method. Usually, consignment notes to move hazardous waste are required and businesses need to keep records (known as a 'register') for a specific number of years at the premises that produced or stored the waste.
- The related **information flows** are normally managed by a Facility manager or a General services administrator. When such positions are not present in an entity, such information is to be found in the accounts payable as part of the waste management costs calculation of the reporting period.

The ROSE Foundation Case Study

GCI (name)		GCI (value)	Reported	The level of disclosure	Comments about the level of disclosure	Status of information needed for	Activity to produce GCI
	B.2.2. Waste reused, re-manufactured and recycled	*Total amount of waste reused, re-manufactured and recycled in absolute amount, in % terms and in terms of change*	Y	Full	The Rose Foundation reports on the following: 1. Used oil generated (L) 2. Used oil collected as a % of used oil generated 3. Used oil generated vs used oil processed (L) 4. Used oil generated vs used oil collected (L) 5. Processed/recycled oil as a % of used oil generated		
	B.2.3. Hazardous waste	*Total amount of hazardous waste, in absolute terms, as well as proportion of hazardous waste treated, given total waste reported by the reporting entity (in absolute amount, in % terms and in terms of change)*	Y	Full	This information is reported as above for the used oil, which is considered hazardous		

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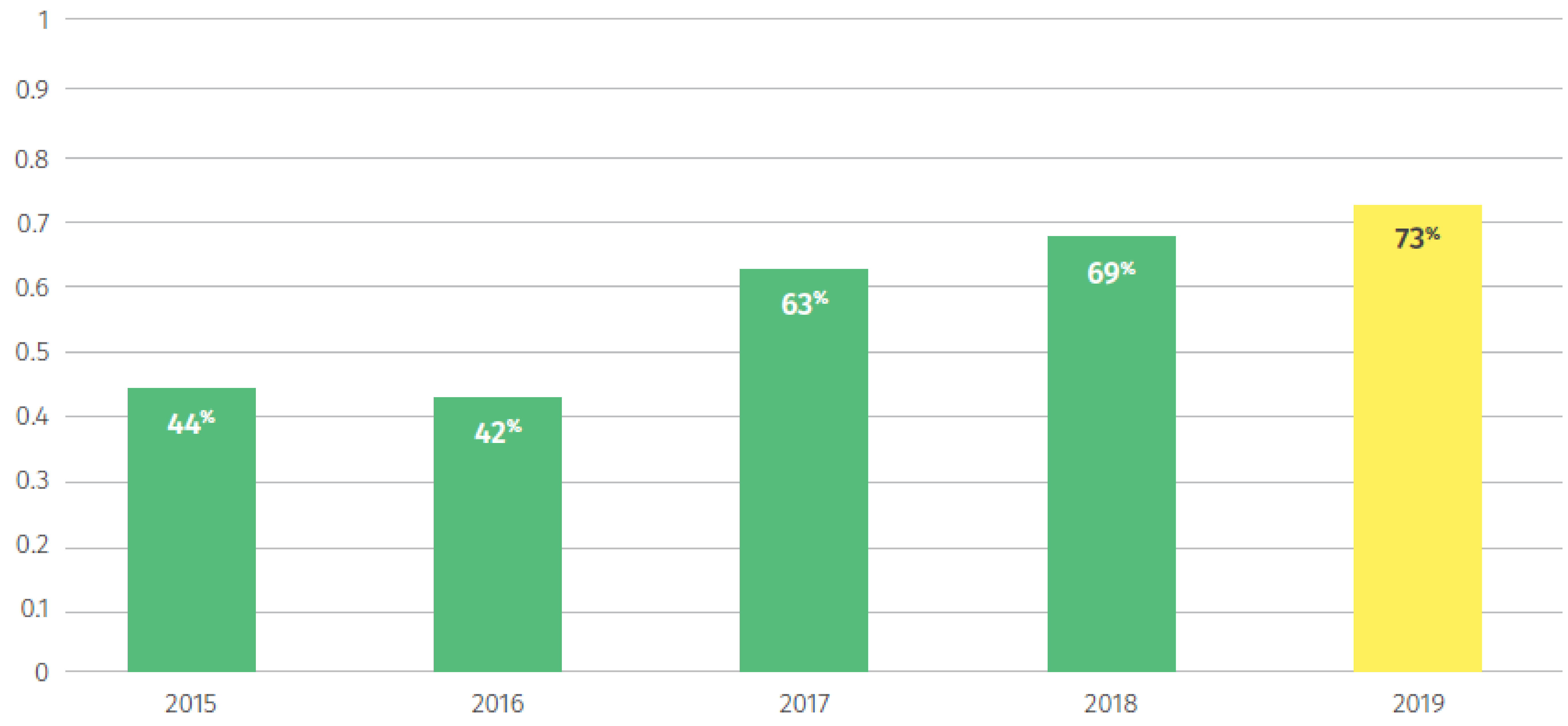
PROCESSED/RECYCLED OIL AS A % OF GENERATED OIL GENERATED OIL



Source: The ROSE Foundation 2019 Sustainability Report (SME SDG Case Study)

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B.3 Greenhouse gas emissions

1. Greenhouse gas emissions (scope 1) – SDG 9.4.1
2. Greenhouse gas emissions (scope 2) – SDG 9.4.1

B.3 Greenhouse gas emissions

1. Greenhouse gas emissions (scope 1)
2. Greenhouse gas emissions (scope 2)

B.3.1 Greenhouse gas emissions (scope 1): Definition

The indicator “Greenhouse gas emissions (scope 1)” is defined as **direct greenhouse gas (GHG) emissions** per unit of net value added.

Scope 1 covers emissions that occur inside an entity’s organizational boundary and are also referred to as Direct GHG. They are “emissions from sources that are owned or controlled by the organization” , such as:

- ✓ Stationary Combustion: from the combustion of fossil fuels (e.g. natural gas, fuel oil, propane, etc.) for comfort heating or other industrial applications
- ✓ Mobile Combustion: from the combustion of fossil fuels (e.g. gasoline, diesel) used in the operation of vehicles or other forms of mobile transportation
- ✓ Process Emissions: emissions released during the manufacturing process in specific industry sectors (e.g. cement, iron and steel, ammonia)
- ✓ Fugitive Emissions: unintentional release of GHG from sources including refrigerant systems and natural gas distribution

B.3.1 Greenhouse gas emissions (scope 1): Measurement methodology

This indicator is defined in the following way:

$$\frac{\text{Scope 1 GHG (tons of CO2)}}{\text{Net value added}}$$

The calculation of GHG (scope 1) is most commonly and easily done by means of **an excel file (a tool)** that can be downloaded from www.ghgprotocol.org

The calculation methodology is based on the use of some emissions factors that are specific for each fuel/material type. In fact, in the excel sheets, it is possible to find some conversion coefficients, i.e., the **Global Warming Potentials (GWPs)**, to translate different gases into emissions of carbon dioxide (CO2). **GWP values convert GHG emissions data for non-CO2 gases into units of CO2 equivalent.** Companies can choose which GWPs to use by selecting a specific IPCC (Intergovernmental Panel on Climate Change) protocol.

B.3.1 Greenhouse gas emissions (scope 1): Potential sources of information

- Data for the calculation of this indicator can be recovered from accounts payable, specifically from invoices of providers of fuels (where the unit of measure can be m3 or liters).
- The collection of these data needs to be done site by site, by a facility manager/general services administrator, by a quality manager or by an environmental/sustainability manager with the collaboration of the accounting department. Such data can then be cumulated both by legal entity and by country.

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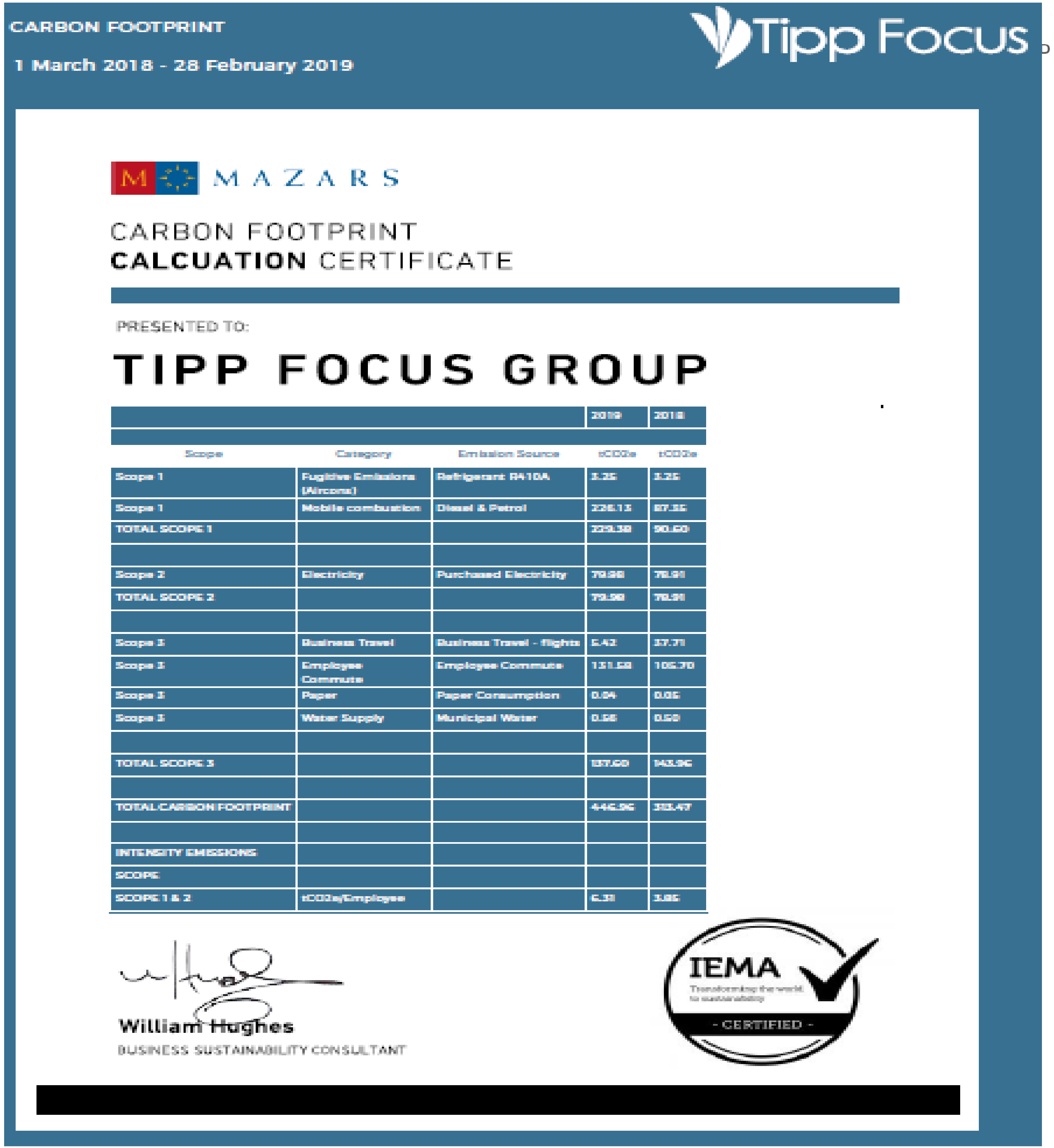

CARBON FOOTPRINT
1 March 2018 - 28 February 2019

Tipp Focus

MAZARS

CARBON FOOTPRINT
CALCUATION CERTIFICATE

PRESENTED TO:

TIPP FOCUS GROUP

			2019	2018
Scope	Category	Emission Source	tCO2e	tCO2e
Scope 1	Fugitive Emissions (Aircons)	Refrigerant R410A	3.25	3.25
Scope 1	Mobile combustion	Diesel & Petrol	226.13	87.35
TOTAL SCOPE 1			229.38	90.60
Scope 2	Electricity	Purchased Electricity	79.98	78.91
TOTAL SCOPE 2			79.98	78.91
Scope 3	Business Travel	Business Travel - flights	5.42	37.71
Scope 3	Employee Commute	Employee Commute	131.58	105.70
Scope 3	Paper	Paper Consumption	0.04	0.05
Scope 3	Water Supply	Municipal Water	0.56	0.50
TOTAL SCOPE 3			137.60	143.96
TOTAL CARBON FOOTPRINT			446.96	313.47
INTENSITY EMISSIONS				
SCOPE				
SCOPE 1 & 2	tCO2e/Employee		6.31	3.86

William Hughes
BUSINESS SUSTAINABILITY CONSULTANT

IEMA
- CERTIFIED -

Source: Tipp Focus 2019 Sustainability Report (SME SDG Case Study)

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GCI (name)		GCI (value)	Reported (Y/N)	The level of disclosure	Comments about the level of disclosure	Status of information needed for	Activity to produce GCI
B.3 Greenhouse gas emissions	B.3.1. Greenhouse gas emissions (scope 1)	*Scope 1 contribution in absolute amount, in % terms and in terms of change* 229.38 tons; 51%; 153% increase from prior year	Y P 65	Full	This indicator is currently not reported in % terms or in terms of change, however, the raw data is available and included in the Report to make this indicator fully reportable		
	B.3.2. Greenhouse gas emissions (scope 2)	*Scope 2 contribution in absolute amount, in % terms and in terms of change* 79.98 tons; 18%; 1.4% increase from prior year	Y P 65	Full	This indicator is currently not reported in % terms or in terms of change, however, the raw data is available and included in the Report to make this indicator fully reportable		

B.3 Greenhouse gas emissions

1. Greenhouse gas emissions (scope 1)
2. Greenhouse gas emissions (scope 2)

B.3.2 Greenhouse gas emissions (scope 2): <u>Definition</u>

This indicator is defined as **indirect GHG emissions** (from consumption of purchased electricity, heat or steam) per unit of net value added.

Specifically:

- ✓ Scope 2 covers emissions arising from the generation of secondary energy forms, e.g. electricity, that are purchased by the company for its own use. These emissions are considered 'indirect' because they are a consequence of activities of the reporting organization but actually occur at sources owned or controlled by another organization (i.e., owned or controlled by an electricity generator or utility)
- ✓ For many companies, the energy indirect (Scope 2) GHG emissions that result from the generation of purchased electricity can be much greater than their direct (Scope 1) GHG emissions.

B.3.2 Greenhouse gas emissions (scope 2): Measurement methodology

To calculate scope 2 emissions, the GHG Protocol Corporate Accounting and Reporting Standard (Corporate Standard) recommends multiplying activity data (MWhs of electricity consumption) by emission factors to arrive at the total GHG emissions impact of electricity use.

This approach uses the following calculation:

Emissions [tCO2] = Activity data [MWh] * Emission factor [tCO2/MWh]

Where:

- ✓ **Activity data** is the amount of electricity purchased and consumed in megawatt-hours (MWh). This value will generally be directly measured, specified in purchase contracts or estimated ;
- ✓ **Emission factor** represents an average value, for a given period of time, of emissions per MWh, for either a specific grid (location), supplier or energy generation source.
- ✓ In South Africa, the emissions factor can be obtained from the Eskom website or their Integrated Report

B.3.2 Greenhouse gas emissions (scope 2): Potential sources of information

- In order to obtain activity data (MWh), refer to electricity invoices.
- The collection of this data needs to be done site by site, by a facility manager/general services administrator, by a quality manager or by an environmental/sustainability manager with the collaboration of the accounting department.

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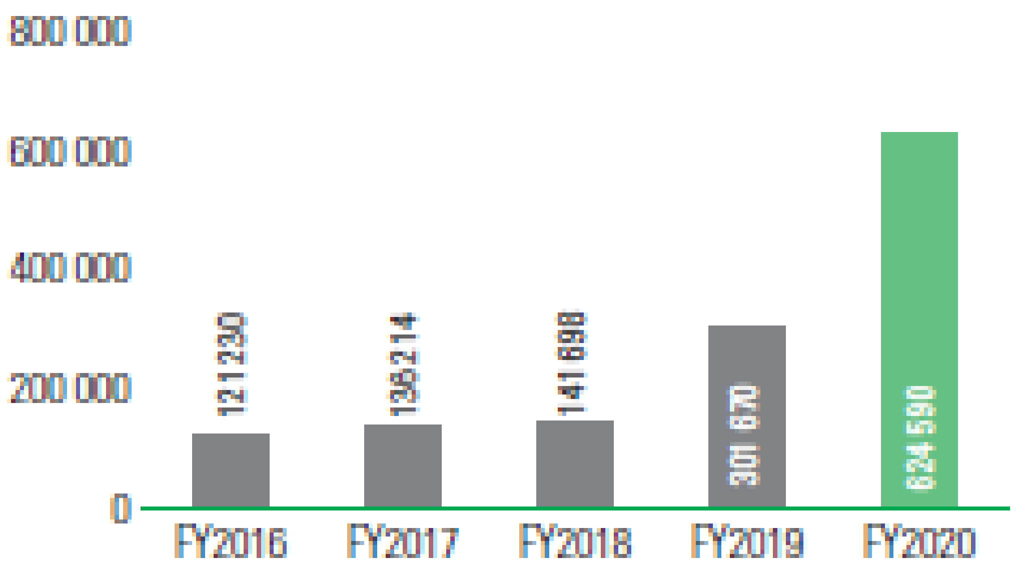
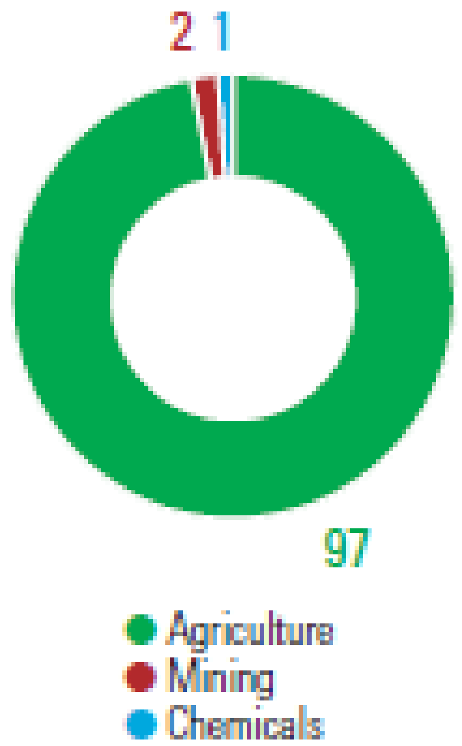
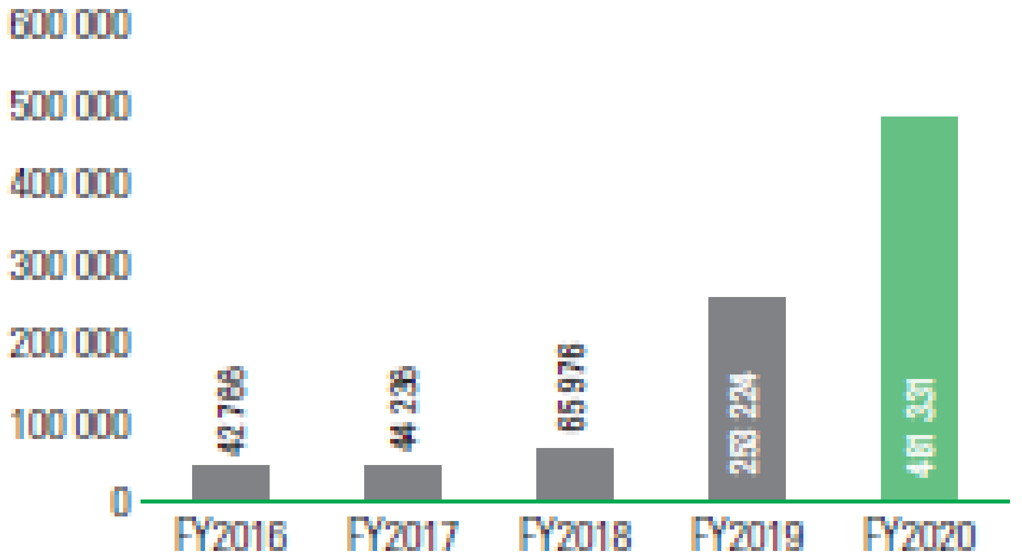
Total scope 1 and 2 GHG emissions
(Tonnes CO_2e)



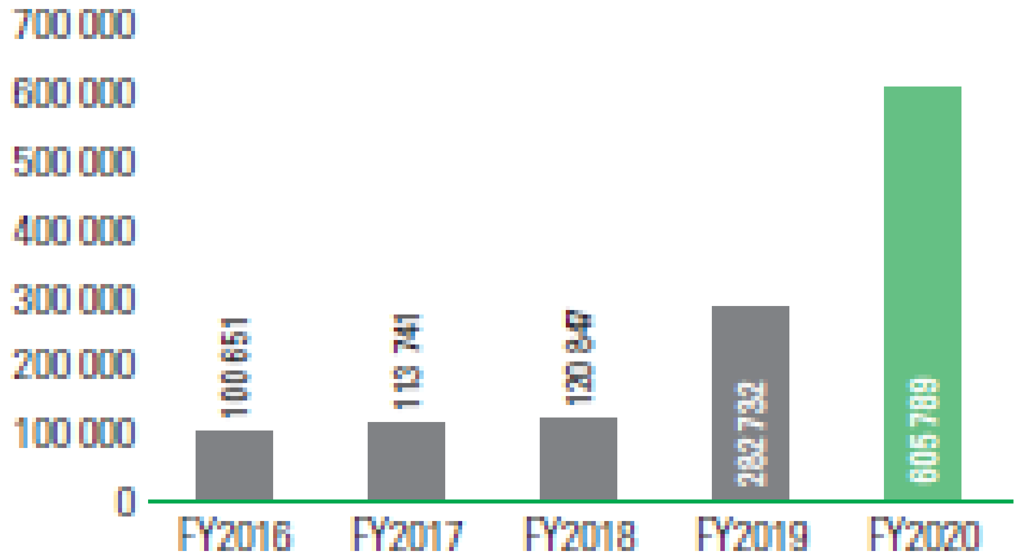
Total emissions by division
(%)



Scope 1: Direct emissions
(Tonnes CO_2e)



GHG emissions: Agriculture
(Tonnes CO_2e)



The calculation of Omnia's GHG inventory was based on the operational control approach, according to which Omnia records and accounts for emissions from facilities, sites and operations over which it has operational control, or the authority to introduce and implement its operating policies. All calculations were based on GHG activity data multiplied by an appropriate GHG emission factor. Apart from the Eskom grid emissions factor, most other emission factors were obtained from the International Panel on Climate Change (IPCC) as well as the Department for Environment, Food and Rural Affairs (DEFRA) GHG reporting: conversion factors 2019, unless other material or factors specific to the operation were available. Using standard IPCC emission factors makes for ease of comparison between the different divisions as well as with those of previous years.

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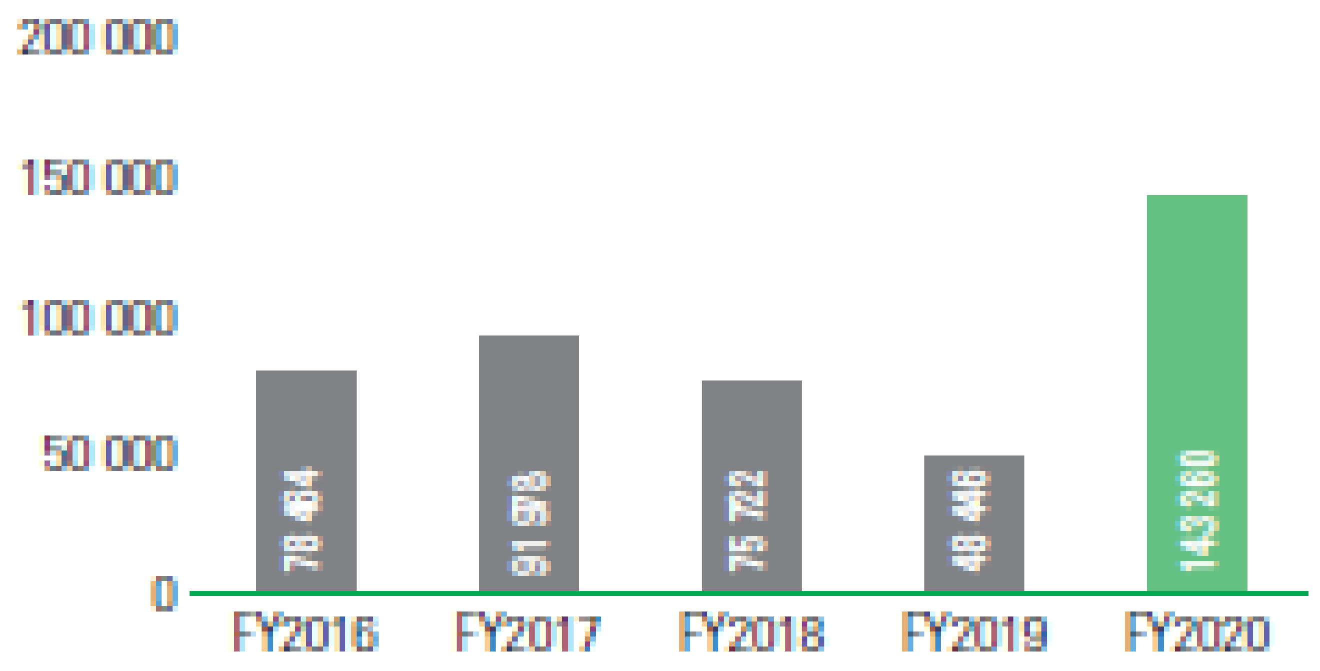
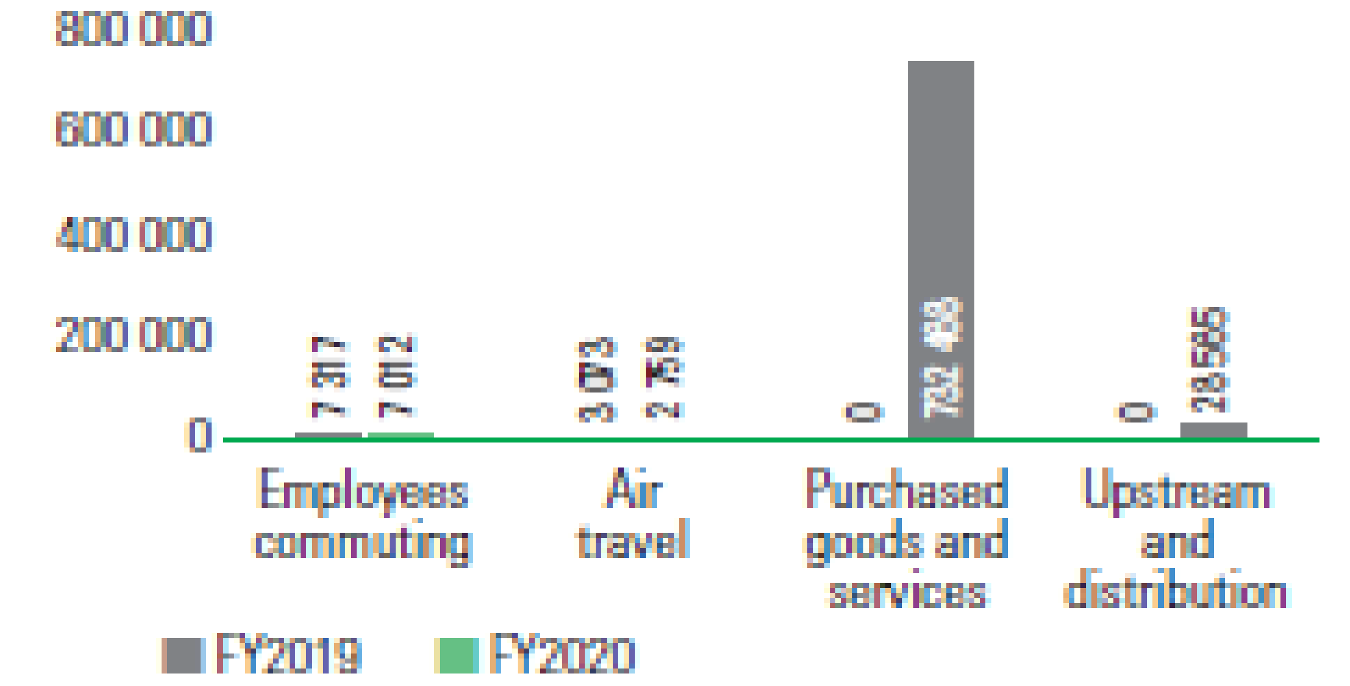
Scope 2: Indirect emissions
(Tonnes CO_2e)



Scope 3: Emissions
(Tonnes CO_2e)



Scope 1
- Emissions from the combustion of fuels, including diesel, light fuel oil, heavy fuel oil coal and natural gas
- Process emissions from nitric acid

Scope 2
- Utilisation of grid electricity (emissions associated with the production, transmission and distribution of electricity from the national grid)
- Utilisation of purchased steam

Scope 3 which falls outside the control of the organisation

Includes other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the company and outsourced activities. In FY2020, the Group made significant progress in quantifying sourcing and distribution-related scope 3 emissions for the first time.

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B.4 Ozone-depleting substances and chemicals

B.4.1 Ozone-depleting substances and chemicals – SDG 12.4.2

B.4.1 Ozone-depleting substances and chemicals

Definition

This indicator aims at **quantifying an entity's dependency on ozone- depleting substances (ODS) and chemicals** per net value added.

The most important ozone-depleting substances and chemicals are controlled under the Montreal Protocol and are listed in Annex A, B, C or E of the Protocol (For a complete list see: http://ozone.unep.org/en/handbook-montreal-protocol-substances-deplete-ozone-layer/5)

Measurement methodology

This indicator should be calculated in the following way:

$$\frac{\text{Total amount of ozone-depleting substances and chemicals at time t}}{\text{Net value added at time t}}$$

An **ozone depletion potential value** indicates how much impact a certain substance has on the depletion of the ozone layer relative to a reference substance.

B.4.1 Ozone-depleting substances and chemicals: <u>Measurement methodology</u>

The difference between year t and year t-1 should be also computed so that it is possible to monitor the level of progress the organization has made toward ozone-depleting substances and chemicals.

This indicator should be calculated in the following way:

$$\frac{\text{Total amount of ozone-depleting substances and chemicals at time t}}{\text{Net value added at time t}}$$

MINUS

$$\frac{\text{Total amount of ozone-depleting substances and chemicals at time t -1}}{\text{Net value added at time t-1}}$$

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B.4.1 Ozone-depleting substances and chemicals: Measurement methodology

Chemical Name	Lifetime, in years	ODP1 (Montreal Protocol)	ODP2 (WMO 2011)	GWP1 (AR4)	GWP2 (AR5)	CAS Number
Group I						
CFC-11 (CCl3F) Trichlorofluoromethane	45	1	1	4750	4660	75-69-4
CFC-12 (CCl2F2) Dichlorodifluoromethane	100	1	0.82	10900	10200	75-71-8
CFC-113 (C2F3Cl3) 1,1,2-Trichlorotrifluoroethane	85	0.8	0.85	6130	5820	76-13-1
CFC-114 (C2F4Cl2) Dichlorotetrafluoroethane	190	1	0.58	10000	8590	76-14-2
CFC-115 (C2F5Cl) Monochloropentafluoroethane	1020	0.6	0.5	7370	7670	76-15-3
Group II						
Halon 1211 (CF2ClBr) Bromochlorodifluoromethane	16	3	7.9	1890	1750	353-59-3
Halon 1301 (CF3Br) Bromotrifluoromethane	65	10	15.9	7140	6290	75-63-8
Halon 2402 (C2F4Br2) Dibromotetrafluoroethane	20	6	13.0	1640	1470	124-73-2

CALCULATION EXAMPLE

In order to understand the ozone-depleting contribution of Halon-1211, a reporting entity needs to multiply the amount of Halon-1211 (200 kg) by the ozone depletion potential value of 3 (kg CFC-11 equivalent/kg Halon-1211) to come to the ozone depletion contribution (ODC) as follows:

ODC = 200 kg X 3 = 600 kg CFC-11 equivalent

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B.4.1 Ozone-depleting substances and chemicals: <u>Measurement methodology</u>

Purpose and form	Substance	ODP	Total 2018	Total 2017
Production				
produced ODS	HCFC-21	0.04	1000	500
Production of ODS			1000	500
Purchase				
purchased ODS embodied in				
- supplied goods				
- supplied equipment	CFC-112	1	100	
- traded goods				
purchased ODS for				
- goods manufactured				
- own production processes				
- own equipment	Halon-1301	10	2	1
- for trade				
Purchase of ODS			102	1
Stocks				
ODS in goods				
ODS as substance in containers			1	1
ODS in equipment	Halon-1301		1200	1300
ODS in use as process agent	HCFC-124		10	20
Stocks of ODS			1211	1321

CALCULATION EXAMPLE

The dependency of an enterprise on ozone-depleting substances is defined as:

Production of ODS + purchases of ODS + stocks of ODS

Where:

- Production of ODS means the amount of virgin (i.e., not recovered, reclaimed or recycled) ozone-depleting substances added by the reporting entity .
- Purchases of ODS can assume different forms:
  - Ozone-depleting substances embodied in supplied goods
  - Ozone-depleting substances embodied in equipment for own use
  - Ozone-depleting substances embodied in traded goods
  - Ozone-depleting substances as substances for goods manufactured
  - Ozone-depleting substances as substances for own production process
  - Ozone-depleting substances as substances for own equipment
- Stocks of ODS are defined as any ozone-depleting substance stored or accumulated on the reporting entity's premises for use, reclaim, recovery, recycling or destruction in the future. They include ODS substances in containers, in goods, in own equipment and in use as process agents.

B.4.1 Ozone-depleting substances and chemicals: <u>Measurement methodology</u>

Purpose and form	Substance	ODP	Total	
			2018	2017
Production				
produced ODS	HCFC-21	0.04	1000	500
Production of ODS			1000	500
Purchase				
purchased ODS embodied in				
- supplied goods				
- supplied equipment	CFC-112	1	100	
- traded goods				
purchased ODS for				
- goods manufactured				
- own production processes				
- own equipment	Halon-1301	10	2	1
- for trade				
Purchase of ODS			102	1
Stocks				
ODS in goods				
ODS as substance in containers			1	1
ODS in equipment	Halon-1301		1200	1300
ODS in use as process agent	HCFC-124		10	20
Stocks of ODS			1211	1321

CALCULATION EXAMPLE

Looking at the Table, this indicator for year 2017 is calculated through the following steps:

a) Conversion of specific substances into CFC equivalent

HCFC-21 500 kg X 0.04 = 20 kg CFC-11 equivalent (production)

CFC-112 0 kg X 1 = 0 kg CFC-11 equivalent (purchase)

Halon-1301 1 kg X 10 = 10 kg CFC-11 equivalent (purchase)

Halon-1301 1,300 kg X 10 = 13,000 kg CFC-11 equivalent (stock)

HCFC-124 20 kg X 0.04 = 0.8 kg CFC-11 equivalent (stock)

b)Calculation of the dependency of an enterprise on ozone-depleting substances:

Production of ODS + purchases of ODS + stocks of ODS

20 + 0 + 10 + 13,000 + 0.8 = 13,030.8 kg CFC-11 equivalent

c) Assuming that the net value added in year 2017 is equal to R11,000, the indicator is then calculated in the following way:

Total amount of ozone-depleting substances and chemicals in 2017

Net value added in 2017

= 13,030.8/11,000 = 1.18 kg CFC-11 equivalent per R

B.5 Energy consumption

B.5.1 Renewable energy – SDG 7.2.1

B.5.2 Energy efficiency – SDG 7.3.1

B.5 Energy consumption

1. Renewable energy
2. Energy efficiency

B.5.1 Renewable energy

Definition

This indicator is defined as the **ratio of an entity's consumption of renewable energy to its total energy consumption** during the reporting period.

Types of renewable energy include, for example, solar energy, biomass, hydropower, geothermal energy, and ocean energy.

Measurement methodology

This indicator should be calculated in the following way:

$$\frac{\text{Total consumption of renewable energy at time t}}{\text{Total energy consumption at time t}}$$

B.5.1 Renewable energy: Measurement methodology

To calculate the **numerator**, the company should:

- ❑ consider only the amount of renewable energy consumed, comprising:
  - renewable fuel sources (such as biofuels),
  - solar energy,
  - biomass,
  - hydropower,
  - geothermal energy,
  - ocean energy
- ❑ include heat from renewable sources and electricity from renewable sources.
  - renewable sources of electricity are comprised of: hydro, wind, solar (photovoltaic and solar thermal), geothermal, wave, tide and other marine energy, as well as the combustion of biofuels.
  - renewable sources of heat are: solar thermal, geothermal and the combustion of biofuels.

  So the numerator is the sum of all the sources of renewable energy (among the ones mentioned above) consumed by the reporting entity.

When computing the numerator, it is suggested to distinguish between different types of renewable energy resources, as these range from "infinite" renewable sources, such as solar power, to cyclical renewable resources, such as biomass.

B.5.1 Renewable energy: Measurement methodology

The **denominator** of this indicator, i.e., total energy consumption within the reporting entity can be calculated as:

Non-renewable fuel consumed + Renewable fuel consumed + Electricity, heating, cooling, and steam purchased for consumption + Self-generated electricity, heating, cooling, and steam, which are not consumed - Electricity, heating, cooling, and steam sold

Fuel consumption is expressed in joules or multiples. Electricity, heating, cooling, and steam consumptions are expressed in joules, watt-hours or multiples. However, both the numerator and the denominator should be expressed in joules. Therefore, conversion factors are needed.

B.5.1 Renewable energy: Measurement methodology

CALCULATION EXAMPLE

Let us assume that an entity has consumed at time t, during a certain reporting period:

- biomass fuels, in particular:
  - 10,000 kg of coconut shells
  - 22,000 kg of wood charcoal
- 35,000 m3 of natural gas from Saudi Arabia
- 300 tons of hard coal from Albania

Assuming the following conversion factors :

- o 17.9 MJ/kg for coconut shells,
- o 29 MJ/kg for wood charcoal,
- o 34.20 MJ/m3 for the natural gas from Saudi Arabia
- o 27.21 GJ/t for the hard coal from Albania.

How would you calculate renewable energy as a proportion of total energy

B.5.1 Renewable energy: <u>Measurement methodology</u>

CALCULATION EXAMPLE

Knowing that: 1 Gigajoule = 1000 Megajoule

The total amount of energy consumed during a certain reporting period is calculated in the following way:

10,000 kg x 17.9 MJ/kg + **22,000kg x 29 MJ/kg** + 35,000 m3 x 34.20 MJ/m3 + 300 tons x 27.21 GJ/t

179,000 MJ + 638,000 MJ + 1,197,000 MJ + 8,163,000 MJ = **10,177,000 MJ or 10,177 GJ**

This is the denominator of the indicator, i.e., the total energy consumption at time t.

The numerator is only the sum of the biomass fuels (i.e., the renewable energy sources – **coconut shell & wood charcoal**), i.e., the **total consumption of renewable energy at time t is:**

179,000 MJ + 638,000 MJ = **817,000 MJ or 817 GJ**

The indicator is thus calculated in the following way:

<u>Total consumption of renewable energy at time t = 817 GJ</u>

Total energy consumption at time t =10,177 GJ

= 817/10,177 = 0.08

B.5.1 Renewable energy: <u>Measurement methodology</u>

In order to normalize data on renewable energy and to be consistent with the way the other environmental indicators are calculated, it is suggested to normalize the amount of joules of renewable energy by the amount of net value added (expressed in R) generated in the same reporting period (see indicator A.1.3. Net Value added). So, in the end, the unit of measure of this indicator is GJ or MJ per R.

$$\frac{\text{Total consumption of renewable energy at time t}}{\text{Net value added at time t}}$$

CALCULATION EXAMPLE

Referring to the example used above and assuming that, at time t, the net value added is equal to R1,000, this indicator is calculated in this way:

$$\frac{\text{Total consumption of renewable energy at time t} = 817\text{ GJ}}{\text{Net value added at time t} = \text{R}1{,}000}$$

= 817/1000 = 0.8

B.5.1 Renewable energy: Measurement methodology

The difference between year t and year t-1 should be also computed so that it is possible to monitor the level of progress the organization has made toward the use of renewable energy.

This indicator should be calculated in the following way:

$$\frac{\text{Total consumption of renewable energy at time t}}{\text{Net value added at time t}}$$

MINUS

$$\frac{\text{Total consumption of renewable energy at time t -1}}{\text{Net value added at time t-1}}$$

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B.5.1 Renewable energy: Potential sources of information

- As the majority of entities purchase energy, the amount of energy consumed for a reporting period, subdivided into the different types, can be found by looking at the **invoices of the energy suppliers and of fuel providers.**
- If the entity has an Energy manager, the collection of energy data is accomplished by this professional. Otherwise a facility manager/general services administrator can also be in charge of such information, with the collaboration of the accounting department (accounts payable for the energy invoices). Such data should be collected at the level of each business unit/facility so that it can then be cumulated both by legal entity and by country.

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B.5 Energy consumption

1. Renewable energy
2. Energy efficiency

B.5.2 Energy efficiency

Definition

This indicator is defined as an entity's **energy consumption divided by net value added**.

Measurement methodology

This indicator should be calculated in the following way:

$$\frac{\text{Total consumption of energy at time t}}{\text{Net value added at time t}}$$

B.5.2 Energy efficiency: Measurement methodology

Total consumption of energy within the reporting entity can be calculated as (see also indicator B.5.1):

Non-renewable fuel consumed + Renewable fuel consumed + Electricity, heating, cooling, and steam purchased for consumption + Self-generated electricity, heating, cooling, and steam, which are not consumed - Electricity, heating, cooling, and steam sold

Fuel consumption is expressed in joules or multiples. Electricity, heating, cooling, and steam consumptions are expressed in joules, watt-hours or multiples. However, both the numerator and the denominator should be expressed in joules. Therefore, conversion factors are needed.

B.5.2 Energy efficiency: Measurement methodology

CALCULATION EXAMPLE

For example:

Let’ assume that an entity has consumed at time t, during a certain reporting period:

- 150,000 m3 of natural gas from Saudi Arabia
- 900 tons of hard coal from Albania

Assuming the following conversion factors :

- 34.20 MJ/m3 for the natural gas from Saudi Arabia
- 27.21 GJ/t for the hard coal from Albania.

Knowing that:

1 Gigajoule = 1000 Megajoule

The total amount of energy consumed during a certain reporting period is calculated in the following way:

150,000 m3 x 34.20 MJ/m3 + 900 tons x 27.21 GJ/t

5,130,000 MJ + 24,489,000 MJ = 29,619,000 MJ or 29,619 GJ

This is the numerator of the indicator.

Assuming that the net value added is R10,000, the indicator is calculated in the following way:

29,619 / 10,000 = 2.96 GJ per R

B.5.2 Energy efficiency: Potential sources of information

- As the majority of entities purchase energy, the amount of energy consumed for a reporting period, subdivided into the different types, can be found by looking at the invoices of the energy suppliers.
- If the entity has an Energy manager, the collection of energy data is accomplished by this professional. Otherwise a facility manager/general services administrator can also be in charge of such information, with the collaboration of the accounting department (accounts payable for the energy invoices).
- Such data should be collected at the level of each business unit/facility so that it can then be cumulated both by legal entity and by country.

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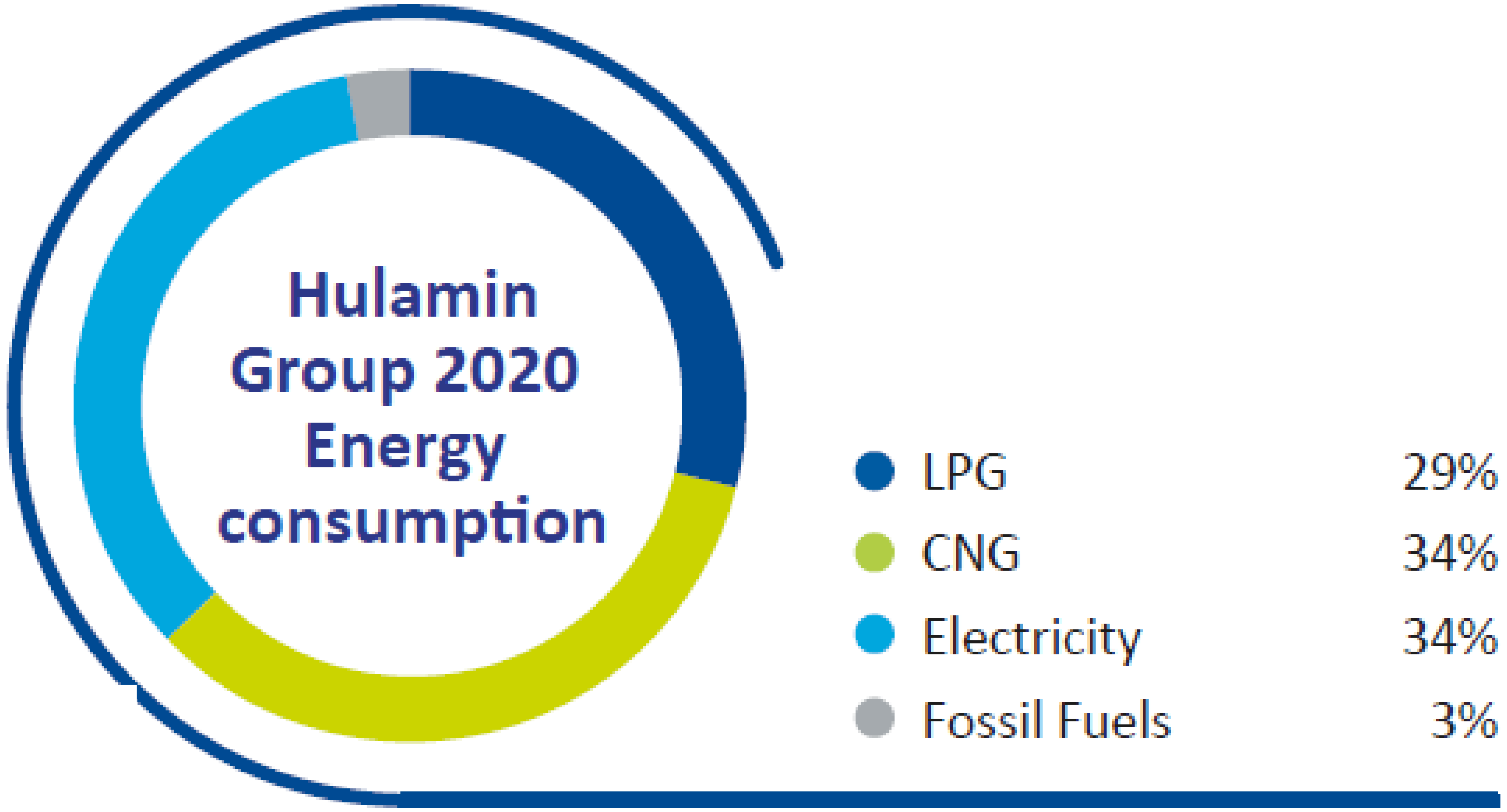
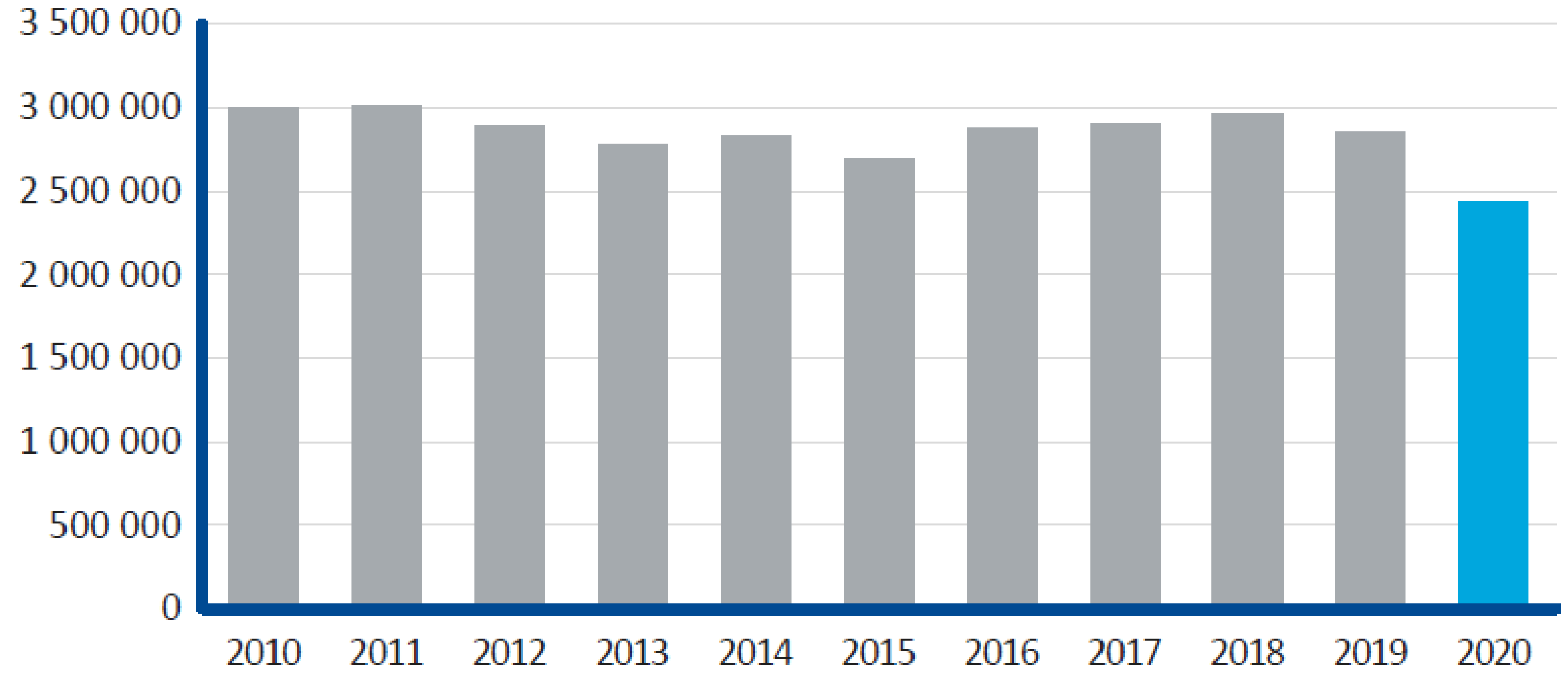


Hulamin Group Total Energy Consumption (GJ)



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Hulamin Group Total Energy Intensity
(GJ/ MT production)