

**DATA ENTRY MANUAL**

**EMPTYING: MACHINE POWERED**

System: Fecal Sludge Management

Element: Emptying

Component: Machine Powered

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# INTRODUCTION

This manual is designed to help you enter all the costs associated with operating a **machine powered** emptying component. This **machine powered** emptyingcomponent includes emptying of fecal sludge from containment using a vacuum truck or motorized pump. If fecal sludge is consistently discharged within 2 km of the containment location, then the component falls under the emptying element. If it is discharged to a treatment or or safe disposal point located on average more than 2 km away from the containment location, then the component is considered to be part of the emptying and transport element. (Stumped on what we mean by component? See **INSIGHT 0.1**).

Real-life examples of a **machine powered** emptying component include:

* Pit latrines are emptied using a vacuum truck. The vacuum truck discharges the waste at a disposal site very near the containment facilities (average of less than 2 km). The disposal site might be a safe disposal or treatment site, or it might be an unauthorized discharge site such as a nearby river. In either case, the costs of transportation to the site are minimal and significantly less than typical, so we consider it an emptying only component instead of an emptying and transport component.
* Pit latrines are emptied using a motorized pump. The fecal sludge is collected in barrels and transferred to another operator to be transported to disposal or treatment. The costs incurred by the second operator providing transport are not reported here.

***INSIGHT 0.1***

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| **Elements and components**  An *element* is a functional step of the sanitation value chain. Elements defined by CACTUS are: containment, emptying, transport, combined emptying and transport, and treatment.  A *component* is a cluster of technologies defined by CACTUS, which provide the functionality of a single *element*, have similar characteristics and are likely to have similar cost profiles.  This manual provides instructions for providing data for a **machine powered** *component,* which falls under the **emptying** *element.* |

First, download and open a clean workbook for a **machine powered** emptying component. Then follow the instructions below to fill in the required data on each of the five workbook tabs: context, direct CAPEX, indirect CAPEX, direct OPEX and indirect OPEX.

# TAB 1: CONTEXT

Definition

The context tab provides information that applies to all costs in the data point for which you are reporting. Enter the requested information in the light yellow boxes.

## GENERAL INFORMATION

Parameters

* **Name of organization / business / utility / operation:** If you are entering data for a formal organization or business, enter the name here.
* **Description of organization / business / utility / operation:** Provide a brief description of your organization or operation here. Possible examples include, 'Local business that empties pit latrines using machine powered equipment.’
* **Description of human powered (with specialized equipment) emptying component:** Provide a description of the specific component for which you are providing data. For example, 'Emptiers remove waste from pit latrines, using a vacuum truck’
  + If your operation provides only one type of service, the description of the organization above might be the same or similar as the description of the component.
  + If your operation covers multiple elements within the sanitation value chain or multiple types of emptying services, this box would be used to describe the specific **machine powered** component that you are reporting in this workbook. For example, if you are an operator that employees teams to vacuum empty some pit latrines while using Gulpers to empty others, the vacuum emptying operations should be described in this box and only those costs should be reported in this workbook, while the Gulper operations should be reported separately as a **human powered (with specialized equipment)** component.
* **Year:**Enter the year that corresponds to most of the costs that you are entering. For example, if the current year is 2020 and you are entering costs based on last year’s financial records, you should enter 2019.
* **Country:** Select the country where the operations take place from the dropdown box
* **City**: Enter the name of the city where your organization or business is located

## SERVICE INFORMATION

Definition

The service information helps us determine the number of people and households who depend on the emptying and transport services that are reported in this workbook, which is critical for calculating CACTUS’s key metrics: the total annual cost per capita (TACC) and total annual cost per household (TACH).

Data to provide

**Primary service parameters**

There are three service parameters to enter in this section: *number of people served*, *number of households served*, and *number of people per household*. The number of people and number of households served should indicate the number who depend on your service for their fecal sludge emptying needs for their primary toilet. If known, provide those parameters here. If you only know two of the three, the remaining parameter can be calculated from those. For each parameter, enter:

* **Value:** Enter the appropriate values for at least two of the three service parameters
* **How value was determined:** Include any information about how you came to this value. If you know the value within a given range, you can provide the range here and then use the average of the range in the value column.

**Additional information**

If you cannot provide the parameters above, these additional questions can help us estimate your service population. Even if you did provide the parameters above, please answer as many of these questions as possible to help us better understand the context of your service and possibly to help estimate service populations for other emptying services in the future.

* **What kind of containment technologies do you empty?** Describe the containment technologies that you typically empty, which might include pit latrines, septic tanks, UDDT vaults, and others. If you empty a mix of containment types, you can describe that mix here.
* **Describe the geographic area that you serve:** This might be the name of the district, neighborhood, ward, sub-area, etc. that you serve. If you serve multiple areas or portions or an area, describe that breakdown.
* **Approximately how large is the geographic area that you serve (in km2)?**
* **How far are the toilets you empty typically located from the disposal point where you discharge the waste (in km)?** Provide an average or approximate distance that you typically travel between a toilet and the point where you discharge the waste. If you do not transport the waste at all, enter 0.

The remaining questions are divided to ask separately about service data for private residential toilets (those that serve as the primary toilet for a discrete, specific group of households), community residential toilets (those that serve as the primary toilet for any nearby households, not confined to a discrete group, such as a community toilet block) and public, commercial, or institutional toilets (typically do not serve as a household’s primary toilet and located at bus stations, markets, schools, hospitals, etc.). If you do not service one of the toilet types, you may leave that section blank.

*Private residential toilets*

* **How many private residential toilets do you typically service in one year?** A private residential toilet is defined as any toilet that serves as the primary toilet for a discrete, specific group of households. It might be used by a single household or shared between multiple households.
* **How many households typically share one residential toilet?** If toilets are typically owned and used by a single family, enter 1. If toilets are typically shared by multiple families, enter an average to the best of your ability, even if the actual number is highly variable. You may provide any additional notes or context that would be helpful in framing your response.
* **What is the average household size that you serve?** For the private residential toilets that you service, what is the average number of people in each household?
* **What volume of waste do you typically empty from a private residential toilet?** The volume might be highly variable, but try to provide an approximate average.
  + Include the appropriate unit used to measure the amount of waste collected. This is typically liters (L) but may also be kilograms (kg).
  + The average volume of waste collected per toilet can be estimated based on the number of barrels, buckets, carts, etc required to contain all of the waste for a single toilet.
  + You may include any notes about how you estimated the volume in addition to the number.
* **What is the average size of containment for private residential toilets?** If known, provide the approximate volume of the average pit latrine, septic tank, or vault that you empty. Indicate the appropriate unit, which will usually be L.
* **What is the average emptying frequency for private residential toilets that you service?** Indicate how frequently private residential toilets that you service require emptying and include the appropriate unit (e.g., months or years).

*Community residential toilets*

* **How many community residential toilets do you typically service in one year?** A community residential toilet is defined as one that serves as a primary toilet for households but is available to any nearby household rather than privately owned or managed, such as a block of community toilets in a residential area.
* **How many households typically share each community residential toilet?** Enter an average to the best of your ability, even if the actual number is highly variable. You may provide any additional notes or context that would be helpful in framing your response.
* **What is the average household size that you serve?** For the community residential toilets that you service, what is the average number of people in each household? (If you also service private residential households, the average household size might be the same here)
* **What volume of waste do you typically empty from a community residential toilet?** The volume might be highly variable, but try to provide an approximate average.
  + Include the appropriate unit used to measure the amount of waste collected. This is typically liters (L) but may also be kilograms (kg).
  + The average volume of waste collected per toilet can be estimated based on the number of barrels, buckets, carts, etc required to contain all of the waste for a single toilet.
  + You may include any notes about how you estimated the volume in addition to the number.
* **What is the average size of containment for community residential toilets?** If known, provide the approximate volume of the average pit latrine, septic tank, or vault that you empty. Indicate the appropriate unit, which will usually be L.
* **What is the average emptying frequency for community residential toilets that you service?** Indicate how frequently community residential toilets that you service require emptying and include the appropriate unit (e.g., months or years).

*Public, commercial and institutional toilets*

* **How many public toilets, commercial buildings or institutions do you typically service in one year?** These are toilets that are typically not a person’s primary toilet. They include toilets as bus stations, markets, hospitals, and schools. They often require payment to use.
* **Describe the public toilets that you typically service.** Include the location or type of institution where they are located and the approximate number of people who use them.
* **What volume of waste do you typically empty from a public toilet?** See notes above for volume for waste from private residential toilets. This might be the same value as above.
* **What is the average size of containment for public toilets?** See notes above for containment size for private residential toilets. This might be the same value as above.
* **What is the average emptying frequency for public toilets that you service?** See notes above for emptying frequency for private residential toilets. This might be the same value as above.

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# TAB 2: DIRECT CAPEX

## OVERVIEW

Definition

**Direct CAPEX** includes capital investments (either purchases or long-term leases longer than one year) into physical assets that are beneficial beyond one year and that directly contribute to the emptying of waste. These investments are broken into three categories: (1) physical assets, (2) major and extraordinary repairs and (3) taxes and financing fees.

Common parameters

The following parameters to describe cost items are common throughout this tab. Any differences in these parameters seen in individual sections will be described separately in the corresponding section.

* **Cost:** Total cost for the described item
* **Currency:** Select the appropriate currency from the drop down box which should correspond to the currency specific to that particular cost. Different costs could have different currencies depending on how your organization reports these costs.
* **Confidence in cost estimate:** Indicate how confident you are in the reported cost. Answer choices include high confidence (approximately +/-5% from reported cost), fair confidence (approximately +/-15%), and low confidence (approximately +/-50% or more).
* **Indicate if cost is incurred but not reported:** Use an X from the drop-down menu to indicate if a cost that is incurred is not reported because it is not known or otherwise missing. If the cost is not reported because it is actually not incurred for your specific component, then you do not need to indicate that it is missing. This column helps us track missing costs for later data analysis.
* **Notes:** A more detailed description of what the cost item is or how the cost was determined. Any assumptions or calculations that were made to arrive at the cost estimate should be included here.

## SECTION 1: PHYSICAL ASSETS

Definition

This section includes the costs for purchasing physical assets required to empty fecal sludge.

Parameters

Additions and clarifications of the parameters specific to this section include:

* **Cost:** Provide the amount paid for the asset. You may enter the cost either inclusive or exclusive of taxes such as VAT. If the cost is inclusive of VAT or other taxes, indicate that in the notes column for each cost item. If the cost is exclusive of VAT or other taxes, provide the cost of those taxes separately in Section 3. Make sure to only include the taxes in one section to avoid double counting them.
* **Lifetime (years):** Indicate the estimated lifetime of the cost item in years. Estimates can be based on personal observations of asset lifetimes, estimates provided by vendors or values used for internal financial purposes. Default values are also provided in the description of each cost item below in case you are unable to determine an appropriate estimate, but a specific estimate for your component is preferred. The workbook only allows input of a single value in years. If you are working with a range, provide the average value as the lifetime, and indicate the expected range in the notes column. If possible, describe how the estimate was determined in the notes column, particularly if you use a default value.
* **Year purchased:** List the year that the item was purchased. Use an average if you are reporting on the costs of multiple items purchased over a span of multiple years.

Cost items

* **Vacuum trucks:** Includes the combined costs of all vacuum trucks used to empty pit latrines and septic tanks
  + *Default values* for the lifetime of a vacuum truck are 10-15 years
* **Motorized emptying pumps:** Includes the cost for all motorized pumps and associated hoses used to empty pit latrines or septic tanks
  + Most commonly these would be standalone pumps that discharge waste to a barrel or other waste storage container.
  + *Default values* for the lifetime of a motorized pump are 3-7 years.
* **Waste storage containers:** Includes the combined costs for all containers used to contain the waste for transport. In this context, waste storage containers would most commonly be filled by the emptiers (usually with a motorized emptying pump) as a container to hold waste while it is in transit to another location.
  + *Default values* for the lifetime of a waste storage container are 1-4 years.
* **Other transport vehicles:** Includes any motorized vehicle used to transport waste to the disposal or treatment site, if not already included as a vacuum truck
  + Examples of transport vehicles include pickup trucks, tuk tuks and motorized bicycles/tricycles
  + Average lifetime values vary significantly depending on the type of transport vehicles used.
* **Other or combined physical assets:** Provide the combined cost for any physical assets that are not explicitly described above, or you may use this row to report the combined cost for two or more of the items above if your financial records group those costs together. Be sure to include the details of the included items in the notes cell.
  + Use an average lifetime value if multiple items are combined, ideally weighted by the cost of each item.

Frequently asked questions

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| **1. We import motorized emptying tools and equipment. Where do I report the fees associated with importation?**  *Report any customs fees or import tariffs under Section 3 (taxes and financing costs). Report the cost of purchasing the equipment and any transport, freight or shipping fees in Section 1 (physical assets) on the row for motorized emptying pumps.*  **2. Why is a vacuum truck or transport vehicle included as a possible asset if this is a service that does not provide transportation?**  *A service falls under the emptying only element if the transportation from containment to disposal site is on average less than 2 km. This means that services providing no transportation of waste are included here as well as services that only provide transportation for a very short distance. In either case, the costs of transportation to the site are minimal and significantly less than typical, so we consider it an emptying only component instead of an emptying and transport component.*  **3. A majority of the costs or all of these costs are combined in our financial records. How should I enter these cost items?**  *Enter the combined cost of all of these items in the ‘other’ row. If you have an extra item whose costs are separate and doesn’t fall under any of the cost items highlighted in the other rows, you can also combine that cost with the other combined costs and report the total cost in the ‘other’ row. Be sure to describe all combined costs in the notes cell.* |

## SECTION 2: MAJOR AND EXTRAORDINARY REPAIRS

Definition

Major and extraordinary repairs include any extensive repairs made to an asset that prolong its useful life beyond one year and have a materially significant value. Please note that if your organization reports a repair as OPEX, then you can report it as maintenance on the Direct OPEX tab rather than in this section, even if it otherwise meets the definition of a major and extraordinary repair.

Parameters

The parameters in this section are the same as those in the physical assets section with one clarification:

* **Lifetime:** Here, lifetime indicates how frequently a repair is expected to be required in years. For example, if the transmission on a vacuum truck is replaced after 5 years, the lifetime would be 5.
* **Year cost was incurred:** Indicate the year when the reported cost was incurred

Cost items

Major and extraordinary repairs should be reported according to the physical asset which requires the repair. Possible examples for each are described below:

* **Vacuum trucks:** Replacement of brakes or transmission
* **Motorized emptying pumps:** Replacing major components
* **Other transport vehicles:** Replacement of brakes or transmission
* **Other or combined physical assets:** Provide the combined cost for any major and extraordinary repairs that are not explicitly listed above, or you may use this row to report the combined cost for two or more of the items above if your financial records group those costs together. Include the details of the combined items in the notes cell, and use a weighted average for the lifetime value.

Frequently asked questions

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| **1.****How do I determine whether a cost should be classified as a major and extraordinary repair on this tab or as maintenance on the direct OPEX tab?**  *In general, if the cost of the repair is significant in relation to the overall cost of the asset, the repair extends the useful life of the asset by more than one year, and the repair occurs at a frequency of less than once per year, then it would be considered CAPEX and reported in this section as a major and extraordinary repair. However, if your organization records the cost as OPEX, then you can report it as maintenance in the direct OPEX tab, regardless of whether it technically meets the definition for a major and extraordinary repair.*  **2. What if one of the physical assets requires two types of major and extraordinary repairs?**  *In this case, you can report one of the repairs in the appropriate row for the physical asset and the other in the row for 'other physical assets'. In the unlikely case that you have two types of major and extraordinary repairs for one asset AND a major and extraordinary repair for an 'other' asset, you can report the sum of the costs for the two repairs for the single asset in the appropriate row and use an average lifetime (ideally a weighted average based on the costs).* |

## SECTION 3: TAXES AND FINANCING FOR PHYSICAL ASSETS

Definition

Taxes and financing for physical assets include any interest paid on a loan, commissions or fees paid to a lender or bank for the financing and taxes, which might include sales tax, value added tax (VAT) and import tax.

Parameters

All parameters are described previously in the overview section.

Cost items

Where possible, taxes and financing costs should be reported for the individual physical asset for which they were incurred. However, if you only know combined financing costs and taxes for all physical assets, you may report those in the rows for 'other or combined physical assets'.

For each asset, **financing costs** and **taxes** should be reported in separate rows:

* **Financing costs:** Includes the total interest plus any commissions and fees paid to a lender or bank
* **Taxes:** Examples include sales, VAT or import taxes paid for a physical asset

Frequently asked questions

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| **1.****The physical asset cost that I reported in Section 1 is inclusive of VAT. Do I need to report that cost separately in this section as well?**  *No, if the cost reported for a physical asset in Section 1 already includes VAT, you should leave the corresponding row for taxes here blank.*  **2. I received a waiver for VAT for the purchase of my equipment. How should I indicate that in my reporting?**  *This is a great example for indicating that a cost (should be) incurred but is not reported. If you received a waiver for VAT but reasonably expect that similar operators in the future would have to pay taxes on the equipment, then you should mark the cell for ‘Indicate if cost is incurred but not reported’ with an X in the taxes row for the appropriate physical asset.* |

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# TAB 3: INDIRECT CAPEX

## OVERVIEW

Definition

**Indirect CAPEX** includes capital investments (either purchases or long-term leases longer than one year) into physical assets that are beneficial beyond one year and that **indirectly** contribute to the emptying of waste. (Stumped? See **INSIGHT 3.1**)

***INSIGHT 3.1***

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| **Guidance for determining whether a cost is direct or indirect**  Some cost descriptions are listed on both the direct and indirect cost tabs. To determine where a specific cost should be reported, consider the following questions:   * Is the item/service/staff member used only for this service? * Is it essential to deliver the service? If we eliminate it, would we be unable to operate the service?   If the answers to the questions above are yes, then it is likely a direct cost and should be reported on this tab.  Alternatively, consider:   * Does the item/service/staff member provide core business services that indirectly support the sanitation service? * Is the item/service/staff member shared across multiple services or different business activities?   If the answers to those questions are yes, then the cost is more likely an indirect cost. |

Common parameters

The following parameters to describe cost items are common throughout this tab. Any differences in these parameters seen in individual sections will be described separately in the corresponding section.

* **Cost:** Total cost for the described item that is incurred by the operation or business
* **Fraction applied to shared costs:** The fraction of the reported total cost that should be applied to this component, which should be generated using the methodology described in the Appendix. The fraction should be entered as a decimal equal to or between 0 and 1. (Stumped? See **INSIGHT 3.2**)
* **Currency:** Select the appropriate currency from the drop down box which should correspond to the currency specific to that particular cost. Different costs could have different currencies depending on how your organization reports these costs.
* **Confidence in cost estimate:** Indicate how confident you are in the reported cost. Answer choices include high confidence (approximately +/-5% from reported cost), fair confidence (approximately +/-15%), and low confidence (approximately +/-50% or more).
* **Indicate if cost is incurred but not reported:** Use an X from the drop-down menu to indicate if a cost that is incurred is not reported because it is not known or otherwise missing. If the cost is not reported because it is actually not incurred for your specific component, then you do not need to indicate that it is missing. This column helps us track missing costs for later data analysis.
* **Notes:** A more detailed description of what the cost item is or how the cost was determined. Any assumptions or calculations that were made to arrive at the cost estimate should be included here.

***INSIGHT 3.2***

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| **Cost allocation between shared costs**  Indirect costs are often shared between multiple products or services that are offered by a business. For example, if your organization performs emptying with both vacuum trucks and manually, then indirect costs such as your office rent and finance team salaries are likely shared between those two services. For each cost item provided in this tab, report the total cost that is incurred by your organization and then determine the fraction of the total cost that should be applied to this component using the methodology described in the Appendix. |

Frequently asked questions

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| **My organization only provides machine powered emptying as reported in this workbook. We do not provide any other products or services. What do I enter for ‘fraction applied to shared costs’?**  *If you do not need to divide your indirect costs between different operations, you can set the value as ‘1’ for all cost items.* |

## SECTION 1: PHYSICAL ASSETS

Definition

This section includes the purchase cost for physical assets that indirectly support the emptying service.

Parameters

Additions and clarifications of the parameters specific to this section include:

* **Cost:** Total cost for the described item. You may enter the cost either inclusive or exclusive of taxes such as VAT. If the cost is inclusive of VAT or other taxes, indicate that in the notes column for each cost item. If the cost is exclusive of VAT or other taxes, provide the cost of those taxes separately in Section 3. Make sure to only include the taxes in one section to avoid double counting them.
* **Lifetime (years):** Indicate the estimated lifetime of the physical asset in years. Estimates can be based on personal observations of asset lifetimes, estimates provided by vendors or values used for internal financial purposes. The workbook only allows input of a single value in years. If you are working with a range, provide the average value as the lifetime, and indicate the expected range in the notes column.
* **Year purchased:** List the year that the item was purchased. Use an average if you are reporting on the costs of multiple assets purchased over a span of multiple years, for example if you are reporting the cost for 5 vehicles that were purchased between 2018 and 2021.

Cost items

* **Land for office:** Includes the costs associated with purchasing or long-term leasing the land on which your office is built.
  + A long-term lease means that you pay for the lease at a frequency of less than once per year, for example if you pay upfront for a 25-year lease on the land.
  + If you are entering the cost of a long-term lease, report the frequency of payment as the lifetime. If you are reporting the cost for purchased land, use a default lifetime value of 100 years.
  + This cost typically only applies if you have built your own office. If you purchased or rent an office, it will be reported as 'purchase, construction or long-term lease of an office building' below (if a long-term lease with payment frequency less than once per year) or in the indirect OPEX tab.
* **Purchase, construction or long-term lease of an office building:** Includes all costs associated with purchasing, constructing or long-term leasing the office building.
  + For construction, the cost should include all labour and materials.
  + A long-term lease means that you pay for the lease at a frequency of less than once per year. If you rent your office and pay rent monthly or annually, the cost should be reported on the indirect OPEX tab.
  + If you are entering the cost of a long-term lease, report the frequency of payment as the lifetime. If you are reporting the cost for a purchased or constructed office building, use a default lifetime value of 40 years.
* **Office equipment:** Includes the costs associated with purchasing all equipment to be used in the office that are replaced at a frequency of less than once per year. This includes furniture, computers and all other electronic equipment used in the office.
  + The lifetime and year purchased should be averages of the multiple items included in this row. Ideally the average would be weighted based on the relative cost of each included item.
  + Use the notes column to describe specifically which items are included.
* **General use vehicles:** Includes the combined cost for purchase of any vehicles used for general, sales and administrative purposes.
  + Note that these do not include vehicles used for transportation of waste. If a vehicle is sometimes used for both, list it in the direct CAPEX tab.
* **Other or combined physical assets:** Provide the combined cost for any physical assets that are not explicitly listed above, or you may use this row to report the combined cost for two or more of the items above if your financial records group those costs together. Use the notes column to provide more details about the items accounted for in the cost. For the lifetime of combined costs, use the average lifetime of the items, weighted by the individual item costs.

## SECTION 2: MAJOR AND EXTRAORDINARY REPAIRS

Definition

Major and extraordinary repairs include any extensive repairs made to an asset that prolong its useful life beyond one year and have a materially significant value.

Parameters

The parameters in this section are the same as those in the physical assets section with one clarification:

* **Lifetime:** Here, lifetime indicates how frequently a repair is expected to be required in years. For example, if your vehicles require a significant repair such as replacing the brakes every three years, the lifetime would be 3.
* **Year cost was incurred:** Indicate the year when the reported cost was incurred

Cost items

Major and extraordinary repairs should be reported according to the physical asset which requires the repair.

* **Land for office:** Possible examples include excavation to improve stormwater drainage on the property or an overhaul of the property landscaping
* **Office building:** Possible examples include renovation of the office building or construction of a new staff kitchen
* **Office equipment:** A possible example is upgrading the CPUs of office computers
* **General use vehicles:** Possible examples include replacing the vehicle brakes, transmission, or engine
* **Other or combined physical assets:** Use this row for any major and extraordinary repairs required for any other physical assets that you reported in the previous section or to report the combined cost of major and extraordinary repairs for multiple assets. Use the notes column to provide more details about the repair that is accounted for in the cost. For the lifetime of combined items, use an average lifetime, ideally weighted by the cost of each item.

## SECTION 3: TAXES AND FINANCING FOR PHYSICAL ASSETS

Definition

Taxes and financing for physical assets include any interest paid on a loan, commissions or fees paid to a lender or bank for the financing and taxes, which might include sales tax, value added tax (VAT) and import tax. Only taxes that are incurred from the purchase or initial lease transaction should be reported here. Annual taxes such as property taxes should be reported on the indirect OPEX tab.

Parameters

All parameters are described previously in the overview section.

Cost items

Where possible, taxes and financing costs should be reported for the individual physical asset for which they were incurred. However, if you only know combined financing costs and taxes for all indirect physical assets, you may report those in the rows for 'other or combined physical assets'. You may also use the row for 'other or combined physical assets' if you reported the cost of a physical asset in the 'other' row in the previous sections of this tab.

For each asset, **financing costs** and **taxes** should be reported in separate rows:

* **Financing costs:** Includes the total interest plus any commissions and fees paid to a lender or bank
* **Taxes:** Examples include sales, VAT or import taxes paid for a physical asset

## SECTION 4: PROFESSIONAL DEVELOPMENT AND TRAINING

Definition

This section includes expenses incurred for one-time or infrequent staff trainings.

Parameters

* **Lifetime (years):** For a routinely held training (e.g., one that is held every two years), indicate the estimated frequency of the training in years. For a training that was held once when the company or service provider first began operations and is not expected to ever be repeated, you may enter a lifetime of 100 years.
* **Year cost was incurred:** Indicate the year when the reported cost was incurred.

Cost items

* **One-time of infrequent staff training expenses**: Examples include single trainings that are held when a company or service provider first begins operations but that are not expected to be repeated or large trainings that are held routinely at a frequency less than once per year.

## SECTION 5: OTHER INDIRECT CAPEX

Any other capital investment into physical assets that occurs at a frequency of less than once per year, is needed to provide the core business activities that support transport, and does not fit into any of the other sections on this tab can be reported here. If there are multiple items that meet this description, the costs should be combined to report as a single item, and a weighted average should be used for the lifetime and year the cost was incurred. Use the notes column to describe what the item(s) are.

# 

# TAB 4: DIRECT OPEX

## OVERVIEW

Definition

**Direct OPEX** includes all operational costs that **directly** contribute to provision of the fecal sludge emptying service that is being reported in this workbook. (Stumped on the difference between direct and indirect costs? See **INSIGHT 3.1** for the indirect CAPEX tab)

Common parameters

The following parameters to describe cost items are common throughout this tab:

* **Annual cost:** The cost incurred for each item over the course of a year
* **Currency:** Select the appropriate currency from the drop down box which should correspond to the currency specific to that particular cost. Different costs could have different currencies depending on how your organization reports these costs.
* **Confidence in cost estimate:** Indicate how confident you are in the reported cost. Answer choices include high confidence (approximately +/-5% from reported cost), fair confidence (approximately +/-15%), and low confidence (approximately +/-50% or more).
* **Indicate if cost is incurred but not reported:** Use an X from the drop-down menu to indicate if a cost that is incurred is not reported because it is not known or otherwise missing. If the cost is not reported because it is actually not incurred for your specific component, then you do not need to indicate that it is missing. This column helps us track missing costs for later data analysis.
* **Notes:** A more detailed description of what the cost item is or how the cost was determined. Any assumptions or calculations that were made to arrive at the cost estimate should be included here.

***INSIGHT 4.1***

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| **Revenue streams or fees paid between different sanitation actors**  In order to reduce variability caused by differences in organization and structure of different sanitation systems, the CACTUS method assumes that all elements of the sanitation value chain are operated by a single virtual operator. While this rarely occurs in real life, the important practical implication of this assumption is that any financial transactions between sanitation operators are not included in cost reporting. For example, if someone responsible for emptying pays a fee to the transportation operator, that transaction or cost will not be reported. This is because transportation costs will be reported as a part of a separate transport component. Similarly, transactions between households or toilet operators and those providing emptying services are also not reported. |

## SECTION 1: SALARIES

Definition

This section covers wage costs for all direct staff (i.e., staff directly involved in the waste emptying operation) who are employed on an annual or long-term contract and receive a fixed salary. Do not report wages for staff who are paid per job or per day on a variable basis or those who are self-employed or paid by commission, as these should be reported in Section 2.

Parameters

The parameters in this section are the same as those in the overview section.

Cost items

* **Drivers:** Includes salaried drivers of any vacuum trucks or other vehicles used for waste emptying.
* **Emptiers, operators and/or assistants**: Includes staff directly involved in the emptying of waste by operating the vacuum trucks or motorized emptying equipment. Examples are workers who help empty pits and septic tanks and load waste onto carts or vehicles.
  + If the same staff member serves as both an emptier and driver, report their cost in this row rather than the one above.
* **Other or combined staff directly responsible for emptying**: Use this row to provide the combined salary costs for any staff that do not match the description for one of the above types. Use the notes column to provide more details about the types and number of staff accounted for in the cost.

Frequently asked questions

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| **1. What is the difference between salaries in this section versus wages paid on a variable basis, and why are they reported separately?**  *Salaried staff include those who are employed on an annual or longer term contract and are paid a consistent wage regardless of how many toilet or containment facilities are serviced, so their costs are fixed for a given year. Wages paid on a variable or casual basis include those for workers who are hired and paid on a daily or weekly as-needed basis and those who are paid by commission. In both cases, the wages paid will vary depending on the number of containment facilities serviced. These variable costs should be reported in Section 2 instead of Section 1.*  **2. Why are drivers considered possible staff members if this component only represents emptying without transportation?**  *A service falls under the emptying only element if the transportation from containment to disposal site is on average less than 2 km. This means that services providing no transportation of waste are included here as well as services that only provide transportation for a very short distance. If your organization falls in the latter category, you might employ drivers but still be considered an emptying only element.* |

## SECTION 2: VARIABLE STAFF PAYMENTS

Definition

This section covers costs for workers who perform emptying services and are paid per job or per day/week/month on a variable basis, are self-employed, or are paid by commission.

Parameters

All parameters are described previously in the overview section.

Cost items

* **Wages or commissions paid to staff on a variable or casual basis:** Includes all wages paid over the course of the year for casual labor, workers paid by commissions, or workers who are self-employed (i.e., workers who receive payment directly from customers)
* **Other variable staff costs:** Includes any additional costs for staff that would vary depending on the number of containment facilities serviced in a given week or month. This might include short-term insurance for casual workers, phone credit, or meals purchased on a variable basis. Use the notes column to provide details about which costs are included.

Frequently asked questions

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| **How do I report labour costs for a service that is provided by a person who works for themselves, for example a vacuum truck operator who obtains customers independently and is paid directly by their customers rather than through wages from an employer?**  *The take-home pay or income earned by the emptier should be reported as the annual wage. This should be equal to the sum of all customer fees collected over a year minus costs incurred by the emptier. If the annual take-home pay earned by the emptier is known, that amount can be used directly. If it is not known, it can be approximated by multiplying the average fee charged to customers by the estimated number of customers served in a year (or average number of customers served in a month multiplied by 12 months per year) and then subtracting known costs incurred by the emptier, which would include any other costs reported in this tab plus any transport or tipping fees paid by the emptier to discharge waste. Note that this is the only situation in which revenue generated from customers or fees paid to another operator would be considered in the reported costs. (*Stumped? See **INSIGHT 4.1***)* |

## SECTION 3: FIXED NON-SALARY STAFF EXPENSES

Definition

This section includes the fixed annual expenses that are incurred on behalf of all staff and workers for items such as insurance costs and vaccinations that are not included in their salaries.

Parameters

All parameters are described previously in the overview section. The annual costs reported here should reflect the total annual cost incurred for all staff.

Cost items

* **Insurance:** Includes costs for all insurances and other similar items. Examples include health insurance, disability insurance, workers’ compensation and social security if those are not previously included in the reported salary.
* **Annual vaccinations**: Includes annual costs associated with vaccinations and other annual or routine health checks provided by the employer
* **Other or combined expenses**: Provide the combined cost for any expenses that are not explicitly listed above, or you may use this row to report the combined cost for insurance, vaccinations and any other staff expenses if your financial records group those costs together. Use the notes column to provide more details about the items accounted for in the cost.

Frequently asked questions

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| **What is the difference between “other costs” in Section 2 (Variable Staff Payments) versus Section 3 (Fixed Non-Salary Expenses)?**  *The primary difference is whether you would consider the cost as fixed or variable. If the cost is generally fixed for the year, then enter it in Section 3. If it is likely to change based on short-term (weekly or monthly) changes in the number of containment facilities that you service, then enter it in Section 2.* |

## SECTION 4: EQUIPMENT, LAND AND BUILDINGS

Definition

This section includes all direct annual costs incurred for equipment, land and buildings, which can include routine maintenance, rent, or replacement of items if done on a routine basis. Any costs already reported for equipment, land and buildings in the direct CAPEX tab should not be repeated here.

Parameters

All parameters are described previously in the overview section.

Cost items

* **Vacuum trucks**: Includes rent and routine maintenance for vacuum trucks
* **Motorized emptying pumps**: Includes rent and routine maintenance for motorized emptying pumps
* **Waste storage containers:** Includes rent, repair or regular replacement of waste storage containers such as barrels that are used to temporarily contain waste when emptying with a motorized pump and during transportation. Storage containers are often replaced more frequently than once per year and are therefore considered OPEX. However, if your organization considers them CAPEX, you may report them as a physical asset on the direct CAPEX tab instead.
* **Other transport vehicles**: Includes rent and routine maintenance for vehicles, such as pickup trucks or motorbikes, that are used to transport waste to a treatment facility
* **Parking or storage space for emptying or transport equipment or vehicles:** Includes rental or lease fees paid for garage or parking space for vehicles used for transporting waste and for storage space used for emptying equipment
* **Other or combined operational costs for equipment:** If you pay any operational expenses (rent, routine replacement or routine maintenance) for equipment that are not explicitly listed above, you may enter them here. You may also use this row to report the combined costs for any of the equipment listed above if you track the combined, rather than individual, cost. In the notes column, describe the cost types that are covered.
* **Other operational costs for land:** If you pay any operational expenses for land that is directly used for the emptying service and is not covered by one of the other items above, you may enter it here. Use the notes column to describe how the land is used and what the cost covers.
* **Other operational costs for buildings:** If you pay any operational expenses for buildings that are directly used for the emptying service and are not covered by one of the other items above, you may enter them here. Use the notes column to describe how the buildings are used and what the cost covers.

## SECTION 5: CONSUMABLES

Definition

This section includes annual costs paid for items that are regularly consumed and replaced and that directly contribute to the waste emptying service, such as fuel used for vacuum trucks.

Parameters

All parameters are described previously in the overview section.

Cost items

* **Fuel:** Includes fuel used for vacuum trucks, motorized emptying pumps or other transportation vehicles
* **Lubricant**: Includes motor oil, pipe grease and other similar products used for vacuum trucks, motorized emptying pumps or other transportation vehicles
* **Personal protective equipment (PPE)**: Includes boots, overalls, reflective vests, safety glasses, gloves and any other protective gear used by workers
* **Cleaning supplies**: Includes chemicals such as bleach and disinfectants and supplies such as mops and buckets that are used for cleaning emptying equipment and the containment area at the end of a job
* **Water:** Includes any water used for washing latrines after emptying, washing tools, or other activities related to emptying and transporting waste
* **Other or combined consumables**: Provide the combined cost for any consumables that are not explicitly listed above, or you may use this row to report the combined cost for two or more of the items above if your financial records group those costs together. Use the notes column to provide more details about the items accounted for in the cost.

## SECTION 6: SERVICES

Definition

This section includes annual costs paid for professional services that are essential to deliver the waste emptying service.

### 

Parameters

All parameters are described previously in the overview section.

Cost items

* **Transportation, disposal or incineration services for managing solid waste (i.e., trash):** If a third party is paid to manage trash that is collected with sanitation waste, include the cost here. This might include collection of trash, transportation to disposal and disposal or incineration fees.
* **Maintenance services:** Any maintenance services that are paid to a third party can be provided here if they were not already included in the equipment operating expenses above.
* **Insurance that qualifies as a direct expense:** This would primarily include insurance required for transportation vehicles that are essential to deliver the emptying and transport services. If your organization records all insurance costs together and some are considered indirect expenses, then you may leave this blank and report all insurance costs on the indirect OPEX tab.
* **Other or combined services**: If you pay for any services that are not explicitly included above, you may provide those costs here. You may also use this line if you prefer to report the cost of any or all services above as a single combined cost. In the notes, describe the costs that are covered.

## SECTION 7: ADMINISTRATIVE CHARGES AND PERMITS

Definition

This section includes annual costs paid for administrative charges and permits that are considered direct operating expenses. Examples include annual registration for transportation vehicles and annual permits required to manage waste. There is only one row in this section, which can be used to report the combined cost for all costs that match this description. Use the notes column to describe the costs that are covered.

# 

# TAB 5: INDIRECT OPEX

## OVERVIEW

Definition

**Indirect OPEX** consists of routine expense items or operational costs that **indirectly** support fecal sludge management services. These are most often costs that support core business activities. (Stumped on the difference between direct and indirect costs? See **INSIGHT 3.1** for the indirect CAPEX tab)

Common parameters

The following parameters to describe cost items are common throughout this tab. Any differences in these parameters seen in individual sections will be described separately in the corresponding section.

* **Annual cost:** The cost incurred for each item over the course of a year
* **Fraction applied to shared costs:** The fraction of the reported cost that should be applied to this component, which should be generated using the cost allocation methodology described in the Appendix. The fraction should be entered as a decimal equal to or between 0 and 1. (Stumped? See **INSIGHT 3.2** for the indirect CAPEX tab)
* **Currency:** Select the appropriate currency from the drop down box which should correspond to the currency specific to that particular cost. Different costs could have different currencies depending on how your organization reports these costs.
* **Confidence in cost estimate:** Indicate how confident you are in the reported cost. Answer choices include high confidence (approximately +/-5% from reported cost), fair confidence (approximately +/-15%), and low confidence (approximately +/-50% or more).
* **Indicate if cost is incurred but not reported:** Use an X from the drop-down menu to indicate if a cost that is incurred is not reported because it is not known or otherwise missing. If the cost is not reported because it is actually not incurred for your specific component, then you do not need to indicate that it is missing. This column helps us track missing costs for later data analysis.
* **Notes:** A more detailed description of what the cost item is or how the cost was determined. Any assumptions or calculations that were made to arrive at the cost estimate should be included here.

## SECTION 1: SALARIES

Definition

This section includes the salaries or wages paid to staff who indirectly support fecal sludge management services through core business activities.

Parameters

The parameters in this section are the same as those in the overview section.

Cost items

* **Sales and marketing staff:** Includes salaries paid for the sales and marketing team
* **Customer support and call centre staff:** Includes salaries paid for staff who provide customer support or staff a call centre to field requests from customers and schedule services
* **All other or combined indirect staff:** Includes combined salaries for any other office personnel (e.g., human resources, IT, accounting, finance, government relations and others), executives or other staff (e.g., government relations, research and development, external relations) who indirectly support the activities reported in this workbook. If it is simpler to combine sales, marketing, customer support and call centre staff here with the others, you may do so. Use the notes column to provide details about the type and number of staff if possible.

## SECTION 2: OTHER EXPENSES FOR INDIRECT STAFF

Definition

This section includes the annual expenses that are incurred on behalf of all indirect staff for items such as insurance and vaccinations that are not included in salaries. Note that the costs reported here should only reflect those incurred for indirect staff as similar costs for direct staff are reported elsewhere.

Parameters

All parameters are described previously in the overview section.

Cost items

* **Insurance:** Includes the combined costs for all insurances and other similar items. Examples include health insurance, disability insurance, workers’ compensation and social security if those are not previously included in the reported salary.
* **Annual vaccinations**: Includes annual costs associated with vaccinations and other annual or routine health checks provided for indirect staff
* **Other or combined staff expenses**: Provide the combined cost for any expenses that are not explicitly described above, or you may use this row to report the combined cost for two or more of the items above if your financial records group those costs together. Be sure to include the details of the included items in the notes cell.

## SECTION 3: PROFESSIONAL DEVELOPMENT AND TRAINING

Definition

This section includes all annual expenses incurred for professional development and staff training.

Parameters

All parameters are described previously in the overview section.

Cost items

* **All annual professional development and staff training**: Includes orientations, safety trainings, staff certification programs, and any annual staff development funds provided by the employer.

## SECTION 4: EQUIPMENT, LAND AND BUILDINGS

Definition

This section includes all indirect costs incurred for equipment, land and buildings. Costs can include routine maintenance, rent, or replacement of times if done on a routine basis.

Parameters

All parameters are described previously in the overview section.

Cost items

* **Office building:** Includes the office building rent if the building is not fully owned or long-term leased and any operational expenses for upkeep of the office that are not included elsewhere
* **Land:** Includes all rent or other operational expenses for land. This might be used if you pay rent specifically for the land that the office is built on, separate from the office itself. If there are multiple pieces of land that you incur annual costs for, you should enter the combined cost for all land here.
* **Office equipment:** Includes rent, maintenance, upkeep or routine replacement for office equipment such as computers, phones, desks, and chairs
* **Vehicles:** Includes rent, maintenance and upkeep on general use vehicles. These are vehicles used for general staff transportation and should not include any vehicles used directly for transportation of waste.
* **Other operational costs for buildings:** Include the combined cost for any annual expenses paid for buildings that should be classified as an indirect expense and are not the office building. This might include storage buildings or a warehouse.
* **Other or combined operational costs for equipment:** Include the combined cost for any annual expenses for equipment that were not included in the lines for office equipment or vehicles above.

## SECTION 5: CONSUMABLES

Definition

This section includes annual costs for items that are regularly consumed and replaced and that are considered indirect costs.

Parameters

All parameters are described previously in the overview section.

* **Utility expenses:**Includes utility expenses paid for the office such as water, electricity and internet. Input the cumulative utility expenses in this row and indicate the utilities that are included in the notes column.
* **Office supplies:** Includes any expenses associated with regularly purchasing consumables used in the office or to produce marketing materials such as paper, printer ink, pens, whiteboard markers, etc.
* **Fuel for general use vehicles:** Includes total annual expenditures on fuel for general use vehicles. Any fuel purchased for vehicles that directly provide waste transportation services, such as trucks used to transport waste to disposal or treatment, should not be reported here.
* **Other or combined consumable expenses:** Provide the combined cost for any consumables that are not explicitly described above, or you may use this row to report the combined cost for two or more of the items above if your financial records group those costs together. Be sure to include the details of the included items in the notes cell.

## SECTION 6: SERVICES

Definition

This section includes fees paid for professional services that support the fecal sludge management services offered by an organization

Parameters

All parameters are described previously in the overview section.

Cost items

* **Insurance:** Includes any insurance fees paid that are considered indirect expenses, excluding the insurance payments for employees which are included as staff expenses. Examples of insurance include fire insurance for the office building and liability insurance for the business.
* **Legal:** Includes fees paid to legal advisors for any legal processes required to operate the organization
* **Financial:** Includes any fees associated with financial advisory services received. Note that financing costs, such as interest on loans, are not included in this section.
* **Marketing:** Includes any fees paid for marketing services that are not already included as office supplies. This might include fees paid for radio advertisements or fees paid to a professional marketing firm.
* **Consulting or advisory:** Includes any fees associated with professional advisory or consulting services that are not considered financial, legal or marketing
* **Other or combined services:** Provide the combined cost for any professional services that are not explicitly listed above, or you may use this row to report the combined cost for two or more of the items above if your financial records group those costs together. Be sure to include the details of the included items in the notes cell.

## SECTION 7: ADMINISTRATIVE FEES, TAXES AND FINANCING

Definition

This section includes annual costs for licenses, permits, taxes, and financing charges that are not already accounted for in one of the CAPEX tabs.

Parameters

All parameters are described previously in the overview section.

Cost items

* **All administrative charges and permits considered indirect operating expenses:** Includes any administrative fees, licenses (including software licenses and general business licenses) and professional memberships for employees or for the organization
* **Annual taxes:** Includes any taxes paid annually that are not included elsewhere, such as property tax or income tax for a business
  + **Annual financing charges:** Includes annual financing charges that are not already accounted for in one of the CAPEX tabs