Management Optimization Of Waste Management Facilities And Infrastructure At TPA (Final Processing Place) (Case Study At TPA Bengkala, Buleleng Regency)

Optimalisasi Pengelolaan Sarana Dan Prasarana Pengelolaan Sampah Di TPA (Tempat Pengolahan Akhir) (Studi Kasus Di TPA Bengkala, Kabupaten Buleleng)

Putu Agus Suma Astawa[1*], Ni Made Suci[2], Putu Indah Rahmawati[3]
Management Science Study Program, Postgraduate Program, Universitas Pendidikan Ganesha[1,2,3]
sumaastawa83@gmail.com[1], made.suci@undiksha.ac.id[2], indah.rahma@undiksha.ac.id[3]

*Corresponding Author

ABSTRACT
This study aims to (1). know the procedure for optimizing waste management in the Final Processing Site (TPA) area using the Sanitary Landfill system and the Landfill Control System in Bengkala Village, Buleleng Regency. (2). To find out the strategy for fulfilling and managing Bengkala landfill facilities and infrastructure. This type of research in this study uses case studies. Approach This research is a type of qualitative research. The location of this research is the Bengkala TPA, Bengkala Village, Kubudindingan District, Buleleng Regency. The methods used in this study are interviews, observation and documentation. Data analysis techniques used in this study are data reduction, data display, and conclusion. The results of this study are that revitalization or procedures for optimizing waste management at the Bengkala landfill can be carried out by means of planning carried out at the bengkala landfill, namely using 5 blocks (2). Using the landfill method at the Bengkala landfill, namely the trench or ditch method and the area method (3). Coating With Geotextiles. (4). Installing Leachate Pipes. (5). Perform Gas Release Pipe Installation. (6) perform Base Coating. (7). implemented a Sanitary Landfill at the Bengkala Landfill in collaboration with the Buleleng Regency Government and the Ministry of Energy and Mineral Resources utilizing waste as an alternative material for electrical energy. The strategy carried out by the Buleleng Regency Environmental Service for the fulfillment and management of Bengkala TPA facilities and infrastructure is the budgeting, planning, implementation and evaluation stages.
Keywords: Optimization, Facilities And Infrastructure, Waste Management

ABSTRAK
Penelitian ini bertujuan untuk (1). mengetahui prosedur optimalisasi pengelolaan sampah di area Tempat Pemrosesan Akhir (TPA) dengan menggunakan sistem Sanitary Landfill dan Landfill Control System di Desa Bengkala Kabupaten Buleleng. (2). Untuk mengetahui strategi pemenuhan dan pengelolaan sarana dan prasarana TPA Bengkala. Jenis Penelitian Jenis penelitian dalam penelitian ini menggunakan studi kasus. Pendekatan Penelitian ini merupakan jenis penelitian kualitatif. Lokasi penelitian ini adalah TPA Bengkala, Desa Bengkala, Kecamatan Kubudindingan, Kabupaten Buleleng. Metode yang digunakan dalam penelitian ini adalah wawancara, observasi dan dokumentasi. Teknik analisis data yang digunakan dalam penelitian ini adalah reduksi data, display data, dan kesimpulan. Hasil dari penelitian ini adalah revitalisasi atau tata cara optimalisasi pengelolaan sampah di TPA Bengkala dapat dilakukan dengan cara perencanaan yang dilakukan di TPA bengkala yaitu dengan menggunakan 5 blok (2). Menggunakan metode penimbunan sampah di TPA Bengkala yaitu metode parit atau ditch dan metode area (3). Pelapisan Dengan Geotekstil. (4). Memasang Pipa Air Lindi. (5). Melakukan Pemasangan Pipa Pelepas Gas. (6) Melakukan Pelapisan Tanah Dasar. (7). melaksanakan Sanitary Landfill di TPA Bengkala bekerja sama dengan Pemerintah Kabupaten Buleleng dan Kementerian ESDM memanfaatkan sampah sebagai bahan alternatif energi listrik. Strategi yang dilakukan Dinas Lingkungan Hidup Kabupaten Buleleng untuk pemenuhan dan pengelolaan sarana dan prasarana TPA Bengkala adalah tahap penganggaran, perencanaan, pelaksanaan dan evaluasi.
Kata Kunci: Optimalisasi, Sarana Dan Prasarana, Pengelolaan Sampah

1. Introduction

Buleleng Regency is the largest Regency compared to other Regencies/Cities in Bali Province. Buleleng Regency with an area of 1,365.88 km² or 24.25% of the area of Bali Province. Waste Management in Buleleng Regency that most people still handle it in the end-of-pipe approach, namely waste is collected, transported and disposed of to the Waste Final Processing Site (TPA), this final approach still places the transfer of problems so that the age of the Processing Site The Final Processing Site (TPA) is very short, so it requires infrastructure and facilities supported by operational facilities whose conditions are often damaged, which greatly hinders the progress of waste management activities that will be carried out at the Final Processing Site (TPA). The age of infrastructure and operational facilities such as Heavy Equipment (Buildozers, Excavators and Mini Loaders), 6-wheeled Dump Trucks that transport land and Trash Chopping Machines that exist today have an average age of over 10 years whose condition is heavily damaged and it is so difficult to procure spare parts on these heavy equipment, of course requires operational costs and very high maintenance costs.

In these problems resulting in non-optimal waste management. In optimizing waste management, the goal to be achieved is to reduce the volume of waste that goes to the TPA (Wahyuni et al., 2014). Based on initial observations, there is one TPA in Bengkala Village that has not been optimal in waste management, namely the Bengkala TPA. In managing the waste of the people of Bengkala Village, most of them still rely on the end-of-pipe approach, namely the waste is collected, transported and disposed of to the final waste processing site (TPA), on the other hand, the infrastructure and facilities for waste management in the area of the final processing site (TPA) Bengkala, which covers an area of 48,000 M² (4.8 ha), is in a declining condition and is often damaged, thus hampering waste management work activities in the Bengkala Final Processing Site (TPA) area. Besides that, the Bengkala Landfill, which until now has made 4 (four) Block holes with a depth of 7-8 M, is already experiencing an overload. The current condition is that the height of the waste pile at the Bengkala Final Processing Site (TPA) has reached approximately 16 M above the ground, because every day the arrival of waste until the end of 2021 averages 466 M³/day and the incoming waste in a year is 170,139 M3 (56,145, 87 tonnes). Assuming that each individual generates 0.5 kg/person of waste per day (SNI no. 39831995) and 20% of the waste from public facilities comes from waste generation, the waste generation at Bengkala TPA is estimated at 487.153 tonnes/day. More clearly presented in Table 1:

Table 1. Waste Generation Data at the Bengkala Landfill, Buleleng Regency

No	Year	Target (Tons/Year)	Achievement (Ton/Year)
1	2018	149.039,36	-
2	2019	152.020,14	112.337,78
3	2020	155.060,54	124.791,86
4	2021	158.161,75	123.771,50
5	2022	161.324,99	130. 558,00
6	2023	164.551,49	-
7	2024	167.842,52	-
8	2025	171.199,37	-

Source: Data from the Buleleng Regency Environmental Service, 2022

Based on table 1, it shows that the data on Waste Generation at the Bengkala TPA in 2018 set a target of 149,039.36 in which there was no achievement. In 2019 the set target was 152,020.14 in terms of achievement in the field of 112,337.78 or less than the specified target achievement of 1.36%. In 2020 the set target is 155,060.54 in terms of achievement in the field of 124,791.86 or less than the specified target achievement of 1.24%. In 2021 the set target is 158,161.75 in the field achievement of 123,771.50 or less than the specified target achievement

of 1.27%. In 2022 the set target is 155,060.54 in terms of achievement in the field of 130,558.00 or less than the specified target achievement of 1.23%. For the following years, the target for landfilling has been determined until 2025. Judging from the data, it means that the landfill in Bengkala has decreased from the target set every year.

The waste management carried out at the Bengkala landfill previously implemented 4R (reduce, reuse, recycle, and replace) and segregated organic and non-organic waste to replace old patterns of domestic waste management, for example from burning and disposing of it in waterways. In addition, the waste management carried out at the Bengkala TPA previously used a semi-aerobic landfill system. However, this strategy is not optimally implemented, this is because the volume of waste that enters the TPA every day is much higher than the initial estimate of the volume of waste at the time of the design of the Bengkala TPA. In optimizing waste management, referring to Law of the Republic of Indonesia Number 18 of 2008 concerning Waste Management, waste that is stockpiled in Final Processing Sites (TPA) must be handled by implementing a Sanitary Landfill System or at least with a Landfill Control System to avoid contamination of water. , land and air and waste have benefits. The Sanitary Landfill system is a method of collecting waste. Before stockpiling waste, this method prepares clay soil as a layer so that waste water or what is known as leachate is not absorbed directly into the ground so it does not cause soil pollution. The bottom surface of the sanitary landfill method is also equipped with leachate pipes and methane gas pipes which function to collect leachate and methane gas produced from the waste that is stockpiled. This method is considered the most effective for use in landfills.

Landfill Control System, namely waste is stockpiled with a certain area and then arranged, leveled and compacted to a certain thickness using bulldozers or excavators, then filled with piled up soil using a Dump Truck infrastructure with a thickness of 25 cm and then re-arranged, leveled, compacted with heavy equipment after that on top of that it is backfilled with trash, arranged, leveled, compacted with heavy equipment and so on. These activities are carried out alternately, waste piled up with a layer of soil piled up to a certain height to optimize and optimize existing land use so that waste that enters the Final Processing Site (TPA) every day can be properly accommodated and managed in accordance with the technical instructions mandated in statutory provisions. invitation for waste management, as well as for extending the life of the Final Processing Site (TPA).

Research conducted by Afriandi, 2020 stated that the available waste management system is still limited and still relies on vacant land where waste is disposed of and TPS there is still not good and the condition of waste containers in Medan Johor District is still mixed or without segregation, so that people who dispose of their waste has not been able to do sorting for various organic and inorganic waste. Judging from the number of residents and the amount of waste generated, it is planned to collect garbage every day, with housing conditions that are quite dense and have very close distances from one house to another. speed up the waste collection process. Another study was conducted by Triani, 2017 which stated that the results showed that the performance of solid waste services is related to various factors that affect the performance of waste management, including the number of personnel and infrastructure facilities which are still very limited, transportation operations that are not yet optimal, there is still a lack of clarity about the division of tasks, especially on the collection and transportation system and the lack of public awareness in supporting waste management. The recommendation from this study is that the government needs to increase the range of waste services, personnel, equipment and provide socialization regarding waste management to the community.

Research conducted by Nendia Nur Isni, et al in 2019 used the Sanitary Landfill System and Landfill Control System in waste management at the Kopi Luhur Landfill, Cirebon City. The results showed that the content of old waste in the Kopi Luhur landfill consisted of 9.09%

Hazardous Toxic Materials (B3), 12.91% biodegradable and 58% non-biodegradable. The composition of the waste is used as a reference in carrying out landfill mining and the process of rehabilitating the Kopi Luhur TPA into controlled landfill is applied after carrying out landfill mining. The new landfill area with a controlled landfill system has a length of 198 m and a width of 65 m, which has 3 layers with a waste thickness of 5 m. In addition, the piled up land is equipped with environmental protection facilities such as base layers, drainage systems, leachate collection networks and gas control systems. The application of the controlled landfill system makes new landfills have a useful life of 6.6 years.

2. Research Methods

This type of research in this study uses case studies. The case study in this study was at the Bengkala Landfill, Bengkala Village, Kubudindingan District, Buleleng Regency. Approach This research is a type of qualitative research. The qualitative approach in this research is descriptive. Descriptive research is research that seeks to describe current problem solving based on data to be analyzed and interpreted (Narbuko, 2004). The subjects of this study according to the formulation of the problem were 9 Structural Officers, 11 Young Expert Functional Officers, 5 environmental extension officers and 9 TPS3R managers. The location of this research is in the Bengkala TPA which is located in Bengkala Village, Kubutambahan District, Buleleng Regency. Data sources in this study can be divided into two, namely humans/people and non-humans. Human data sources function as subjects or key informants. Meanwhile, non-human data sources are in the form of documents that are relevant to the research focus, such as Cooperation MOUs, documents, visions, missions of the Environmental Service institutions that are related to the research focus.

The key informants in this study are those who have the following characteristics: (1). The subject has a long and intensive experience of integrating with the activity that is the target of research, (2). Subjects are still involved in activities that are the target of research, (3). The subject has sufficient time to be asked for information, (4). The subject is willing to provide actual information. The key informants in this study were taken using a proportional sampling technique, which in this case was part of the facilities and infrastructure of the Environmental Service, in this case the Bengkala TPA. From these key informants, it was then developed to find other informants using the snowball sampling technique. This snowball technique is used to seek information continuously from one informant to another, so that the data obtained is more numerous, complete, and in-depth. The method used in this study is the interview method. Observation and documentation. The data analysis technique used in this study is to use the concept of Miles and Huberman which suggests that there are 3 stages, namely data reduction, data display, and conclusion. Data Validation To test the validity of the data in this study the researchers used a triangulation technique, because the data sources and data collection techniques are numerous and varied, validity can be tested as data is said to be valid if there is the same information from different sources or by using different collection techniques.

3. Results and Discussions

Procedures for optimizing waste management in the Final Processing Site (TPA) area using the Sanitary Landfill system and the Landfill Control System in Bengkala Village, Buleleng Regency

The procedure for optimizing waste management at the Bengkala TPA can be done in the following way.

1. Planning

The planning stage can be seen in table 2.

Table 2. Block Revitalization

1. Blok-2 :	2. Blok-3 :

* Making Cells (garbage pits) in Block-2 and Blok Exsisting.
* Executed in April 2008 and completed
    done in December 2008..
* The built area is 4,322.37 m2 (0.43 Ha).
* Its capacity is 36,449.53 m3
* This block has been utilized since April 2009 and is expected to be full in May 2010.
* The cost of making this block is
    Rp.3.265.603.000,-
* The new trash can be used for
    compost is in 2015.
	* Making Cells (garbage pits) in Block-3 as well
	    manufacture of leachate tanks.
	* Executed in April 2009 and completed
	    done in December 2009.
	* The built area is 6,699.22 m2 (0.67 Ha).
	* Its capacity is 68,362.71 m3
	* This block has been utilized since May 2010 and is expected to be full on. month of May 2012.
	* The cost of making this block is
	    Rp. 11.266.489.000,-
	* The new trash can be used for
	    compost is in 2016.

3. Blok-4 :
    * Making Cells (garbage pits) in Block-4.
    * Done in April 2010 and finished
       done in July 2010.
    * The built area is 7,483.69 m2 (0.75 Ha).
    * Its capacity is 86,227.27 m3
    * This block was utilized in June 2012 and
       Fully expected in June 2014.
    * The cost of making this block is
       Rp.5.000.000.000,-   s/d.
Rp.6.000.000.000,-
    * New waste generated can be utilized
       for compost is estimated in 2019.	

Source: Processed Data, 2023

2. Landfill method at Bengkala TPA
    Garbage dumping methods based on topographical conditions, sources of cover material and groundwater depth are distinguished by trench and area methods.

3. Coating With geotextile
    Non Woven Geotextile Material for Landfill as separator material, liquid and gas filter and geomembrane protection.

4. Installation of Leachate Pipes
    Geopipe or Leachate Pipe (Corrugated Perforated Pipe) is used for leachate flow systems in landfill method disposal sites.

5. Installation of Gas Release Pipes
    Installation of gas collection pipes vertically The first approach is the installation of vertical wells. After all of the landfill has reached its final height, holes will be drilled and then gas-catching pipes will be installed. In this plan the distance between the pipes is 24 m. embedding depth is 75% of the landfill depth (Tchobanoglous, Theisen, and Vigil, 1993). A gas vent pipe with a diameter of 15 cm is installed by making a hole with a diameter of 60 cm. The pipe used has a perforated hole with a diameter of 1 cm to the height of the overburden. The circumference of the pipe is given a size of 2 cm.

6. Base Coating
    The base layer of the landfill must be impermeable so that leachate is prevented from seeping into the soil and does not contaminate groundwater. The coefficient of permeability of the landfill base layer should be less than 10-6 cm/s. Waterproofing of the base layer can be

done by lining the bottom of the landfill with compacted clay (30 cm x 2) or geomembrane 1.5-2 mm thick, depending on soil conditions. The base of the TPA must be equipped with a leachate collection pipeline and a minimum slope of 2% towards the leachate collection and storage channels. Formation of the TPA base should be carried out in stages according to the order of zones/blocks with the first order being as close as possible to the leachate treatment pond. If according to the design it is necessary to use geosynthetics such as geomembranes, geotextiles, non-wovens, geonets, and so on, the installation of these materials should be in accordance with the technical specifications that have been planned, and carried out by contractors who are experienced in this field and Ready to Use Blocks.

Strategy for the fulfillment and management of Bengkala TPA facilities and infrastructure.

Facilities and infrastructure are the main needs in the process of waste processing activities at the TPA and have a goal with the facilities and infrastructure for the Final Processing Site (TPA) to create ideal conditions for waste processing and the management is carried out properly and correctly so that it provides benefits to overcome waste generation. The strategy carried out by the Buleleng Regency Environmental Service for the fulfillment and management of Bengkala TPA facilities and infrastructure is:

1. Budgeting

In carrying out every activity cannot be separated from the name money (Money). Money is a vital tool in public and private organizations. The running of an organization also needs a budget. The budget is an embodiment of every organizational work plan that has been arranged systematically in the form of numbers. Based on activities carried out by the Buleleng Regency Environmental Service related to landfill needs such as repairs to Bengkala landfill, addition of heavy equipment, etc. For this strategy, the source of the budget is from the Regional Revenue Budget (APBD). The budget is one of the drivers in an organization to carry out an activity. To see the process of a strategy set by the leadership can be seen through one theory, namely Strategic Management. Strategic management includes the stages of planning, implementing and evaluating strategies.

2. Planning Stage

In carrying out a good activity, of course, a good plan is also needed so that the desired mistakes do not occur. Planning is an important point in an organization or institution. Without planning, we don't know what we are doing. And one of the strategic plans in improving infrastructure facilities at the Final Processing Site (TPA) carried out by the Buleleng Regency Environmental Service is to carry out plans in the form of providing, repairing or maintaining, utilizing and controlling infrastructure facilities so that the operational activities of waste processing at TPA run smoothly. fluent. It can be said that provision, control, utilization, repair or maintenance are part of facility and infrastructure management.

3. Implementation Stage

Implementation stage as the implementation stage. The Waste and Hazardous Waste Management Sector as policy implementer and supervision of Final Processing Sites (TPA). In the implementation stage of this strategy the Waste and Hazardous Waste Management Sector implements the management of facilities and infrastructure at the TPA which consists of several stages, namely:

a. Procurement

Procurement is all activities to provide all the necessary goods/objects/services for the purposes of carrying out tasks (Ary H. Gunawan 2006:17). the provision of facilities and infrastructure is the fulfillment of the needs that are urgently needed by the TPA in the

operational activities of waste processing at the TPA. Procurement is carried out like an open auction organized by the Government as a place for competition to see the best provider. The Public Works Department (PU) is in charge of seeing the best provider. The existence of this procurement has a good effect for the staff working at the TPA.

b. Utilization

According to Poerwadarminto (2002: 125) utilization is an activity, process, way or act of making something that exists useful. The facilities and infrastructure owned by the Alak Final Processing Site (TPA) are used according to their function. The use of garbage trucks is used to transport waste from Temporary Storage Sites (TPS) to Final Processing Sites (TPA) for disposal. Also, the area of land that has been excavated is then used by heavy equipment to displace the waste into the soil area and then leveled again using the soil. So it can be said that the utilization of facilities and infrastructure available at the Bengkala Final Processing Site (TPA) is used by staff to carry out waste processing activities according to the set working hours, namely 8 working hours. For waste processing using the Open Dumping method. The following table 3 uses the existing facilities and infrastructure at the TPA.

Table 3. Use of Bengkala Landfill Facilities and Infrastructure

No	Facilities	Usability
1.	Guardhouse	Used as a place to monitor and maintain the security of the area around the TPA
2.	Entrance gate	As a place for staff and garbage trucks to enter and exit
3.	Like Lindi	A place to collect leachate
4.	UPT Tinja Office	Management of sewage sludge
5.	Warehouse	Room for storing things
6.	Water tub	A place to collect clean water
7.	Old Management Office	A place to organize a variety of information in the implementation of a particular task
8.	Garbage Sorting Place	As a place to sort organic and non-organic waste
9.	Guard House	It is used as a guard's residence in charge of guarding the TPA area
10	Truck Wash	To wash the garbage truck
11.	Garage	A place to store heavy equipment
12.	Heavy equipment	Heavy equipment is used to level waste and compact waste and is used in the process of confining it to the ground
13.	Inorganic and Organic Waste Disposal Area	Location for storing organic and non-organic waste
14.	Garbage Incineration	Tool for burning waste and medical waste
15.	Fence	This fence surrounds the land area of the Alak TPA so that there are clear boundaries between the demolition sites
16.	Garbage truck	Trucks used to transport garbage

Source: Processed Data, 2023

c. Maintenance

Maintenance is an activity to maintain and maintain existing facilities and repair them (O"Connor 2001:407). It is understood that the maintenance of facilities and infrastructure from the Buleleng Regency Environmental Service has workshop technicians in the maintenance of garbage trucks and heavy equipment, so if there is a garbage truck or heavy equipment that is

damaged, the repair technician will do the repairs. Maintenance of facilities is carried out by officers such as garbage trucks that have finished operating for 8 working hours carrying out garbage truck vehicle washing activities, as well as internal (inside) maintenance of vehicles and heavy equipment such as changing oil. Maintenance of infrastructure such as wall fences is carried out in the form of repairing damaged wall fences. In this maintenance the head of the field conducts routine checks and receives reports from the chief of staff regarding the condition of the TPA facilities and infrastructure.

d. Reporting

Reports are a way of communication in which the author conveys information to a person or an entity because of the responsibilities assigned to him (Keraf 2001:284). Reporting is carried out by the TPA chief of staff in the form of verbal and written reporting to the Head of Division. This verbal reporting is carried out by the chief of staff reporting on the condition of facilities and infrastructure. Then reporting in writing is used to write the names of components that are damaged on heavy equipment. If there is damage that is not understood by the staff, then the agency will conduct a site inspection to find out which components are damaged.

e. Deletion

According to Subagya Malaya Suganda in Logistics Management (1988: 92), said the elimination of inventory items is an activity process that aims to remove / remove items from the inventory list because the items are considered to have no use value or are not functioning as expected, especially for service interests, for example damaged, reduced, dead or too expensive to maintain/repair. In deleting that the authorized party is the Regional Revenue and Assets Agency (BPAD) of Buleleng Regency. If the BPAD wants to write off assets, it will communicate with DLHK to find out the condition of the assets to be written off. In carrying out this asset write-off, the BPAD usually collaborates with the State Property and Auction Service Office (KPKNL) to hold an auction.

4. Evaluation Stage

Evaluation is the final stage in strategic management. Evaluation is carried out by assessing activities that require improvement. By conducting an evaluation, the leader is able to assess whether or not the implementation of the strategy has been good. The Buleleng Regency Environmental Service always evaluates every activity they carry out. The Buleleng Regency Environmental Service considers that evaluation is very important in terms of improving facilities and infrastructure at the TPA. In the report received by the service from the TPA staff, if there is damage to the facilities and infrastructure, the official will hold an evaluation meeting for the next year to make improvements with the new budget. The following is table 4 of the current condition of the facilities and infrastructure owned by the TPA.

Table 4. Condition and Use of TPA Bengkala Facilities and Infrastructure

No.	Description	Volume		Information
1	Truck Armroll	18	Unit	For Truck Arm Roll 1 in good condition, 2 units are in a slightly damaged condition and 13 units often experience damage because the vehicle is old and 2 new fleets
2	Dump Trucks	10	Unit	Dump trucks often experience damage because the vehicle is old.
3	4 Wheel Vehicle	3	Unit	Good condition
4	3 Wheel Vehicle	9	Unit	4 Often damaged, 5 units of new fleet (1 has not been used)
5	Bulldozer Heavy Equipment	1	Unit	For bulldozer heavy equipment in a state of severe damage

6	Excavator Heavy Equipment	2	Unit	For the excavator, 1 unit is in good condition and 1 unit is in a moderately damaged condition, so it requires a large amount of money
8	Depot transfers	13	Unit	There were some that suffered heavy, moderate and light damage
9	Transfer Stations	4	Unit	Moderate damaged condition
10	TPST	1	Unit	TPST Composting Plant in Jagaraga
11	TPA	1	Unit	TPA Bengkala (4.8 Ha) Over Capacity Condition
12	Generator	1	Unit	Good condition
13	Organic waste counter machine	4	Unit	1 unit of medium damaged condition, 2 units of good condition and 1 new procurement
14	Geranule machine	1	Unit	Good condition
15	Garbage sorting conveyors	1	Unit	Bad condition

Source: processed data, 2023

The table above shows the condition and use of good facilities and infrastructure, namely 1 unit Armrol Truck, 3 units of 4 wheels, 1 unit of Excapator, TPST, Genset Machine, 2 units of Organic Waste Chopping Machine, Geranule Machine. The condition of facilities and infrastructure that experienced minor damage and could still be used, namely 2 units of Armroll Trucks, 4 units of Transfer Stations, and an organic waste chopping machine. The condition of the facilities and infrastructure that have not been used is 5 units of 3-wheeled vehicles. The condition of the facilities and infrastructure that has just been procured is the organic waste chopping machine. Condition of Bengkala TPA facilities and infrastructure (4.8 Ha) Condition of Over Capacity.

The condition of unused facilities and infrastructure that were damaged were 13 units of Armroll Trucks, 10 units of Dump Trucks, 4 units of 3 Wheel Vehicles, Heavy Equipment Bulldozers, Heavy Equipment Excavators, 13 units of Transfer Depots, Garbage Sorting Conveyors. This shows that although the condition of the facilities and infrastructure is still not good, they can still be used. However, there are several facilities and infrastructure that are not good but are not used because in Open Dumping waste processing requires the necessary facilities and infrastructure such as garbage trucks, heavy equipment, waste disposal areas and walls to limit the waste disposal area so that when the waste is disposed of it does not contaminate the environment. other.

So the strategy to improve facilities and infrastructure at the Bengkala Final Processing Site (TPA) has been running but not yet optimal because the implementation of this strategy is in accordance with the funds, manpower and time owned by DLHK

Procedures for optimizing waste management in the Final Processing Site (TPA) area using the Sanitary Landfill system and the Landfill Control System in Bengkala Village, Buleleng Regency

Regulation based on Law no. 18/2008 stipulates that the closure of open dumping landfills to become sanitary landfills within 5 (five) years, so various efforts are needed to revitalize landfills. Revitalization or procedures for optimizing waste management at the Bengkala TPA can be carried out in the following way. The planning carried out at the bengkala landfill is (1). using 5 blocks including: Block-1 with an area of 8,504.76 m2 (0.85 Ha), Block-2 with an area of 4,322.37 m2 (0.43 Ha), Block-3 with an area of 6,99.22 m2 (0.43 Ha), 67 Ha), Block-4 with an area of 7,483.69 m2 (0.75 Ha), Existing Block with an area of 5,515.48 m2 (0.55 Ha). (2). Using the landfill method at the Bengkala landfill, namely the trench or ditch method and the area method (3). Coating With Geotextiles. (4). Installing Leachate Pipes. (5). Perform Gas Release Pipe Installation. (6) perform Base Coating. (7). implementation of the Sanitary Landfill System at the Bengkala Landfill through the collaboration of the Buleleng Regency

Government with the Department of Energy and Mineral Resources utilizing waste as an alternative material for electrical energy.

Strategy for the fulfillment and management of Bengkala TPA facilities and infrastructure.

Infrastructure as facilities used by the Buleleng Regency Environmental Service to carry out operational activities at the Bengkala Final Processing Site (TPA). Facilities and infrastructure are the main needs in the process of waste processing activities at the TPA and have a goal with the facilities and infrastructure for the Final Processing Site (TPA) to create ideal conditions for waste processing and the management is carried out properly and correctly so that it provides benefits to overcome waste generation. The strategy carried out by the Buleleng Regency Environmental Service for the fulfillment and management of Bengkala TPA facilities and infrastructure is: Budgeting, Planning Stage and Evaluation Phase. Regulation based on Law no. 18/2008 stipulates that the closure of open dumping landfills to become sanitary landfills within 5 (five) years, so various efforts are needed to revitalize landfills. Revitalization or procedures for optimizing waste management carried out at the Bengkala TPA, namely the selection of block locations, the method of landfilling at the Bengkala landfill. Lining With Geotextiles, Installation of Leachate Pipes, Installation of Gas Release Pipes, Base Coating. With the implementation of the Sanitary Landfill System at the Bengkala TPA in collaboration with the Buleleng Regency Government and the Ministry of Energy and Mineral Resources, waste is utilized as an alternative material for electrical energy.

The process of utilizing waste as. Renewable resources are methane gas released from landfills, captured and channeled through pipes and used to drive turbines which will generate electricity that can benefit the community around the landfill. The strategy of improving facilities and infrastructure at the Bengkala TPA where this strategy aims to have facilities and infrastructure for Final Processing Sites (TPA) can create ideal waste processing conditions and the management is carried out properly and correctly and provides benefits to overcome waste generation. The strategy carried out by the Buleleng Regency Environmental Service for the fulfillment and management of Bengkala landfill facilities and infrastructure, namely. Budgeting Planning Phase and Evaluation Phase.

Conclusion

The results of this study are that revitalization or procedures for optimizing waste management at the Bengkala landfill can be carried out by means of planning carried out at the bengkala landfill, namely using 5 blocks (2). Using the landfill method at the Bengkala landfill, namely the trench or ditch method and the area method (3). Coating With Geotextiles. (4). Installing Leachate Pipes. (5). Perform Gas Release Pipe Installation. (6) perform Base Coating. (7). implemented a Sanitary Landfill at the Bengkala Landfill in collaboration with the Buleleng Regency Government and the Ministry of Energy and Mineral Resources utilizing waste as an alternative material for electrical energy. The strategy carried out by the Buleleng Regency Environmental Service for the fulfillment and management of Bengkala TPA facilities and infrastructure is the budgeting, planning, implementation and evaluation stages.

References

Achmadi dan Narbuko (2004). *Metode Penelitian*. Jakarta: Bumi Aksara.

Afriandi, M. N., Harahap, R., & Sarifah, J. (2020). *Optimalisasi Pengelolaan Sampah Berdasarkan Timbulan dan Karakteristik Sampah Di Kelurahan Gedung Johor Kecamatan Medan Johor Kota Medan*. ISSN : 2598–3814 (Online), ISSN : 1410–4520 (Cetak), 15(3), 287–293.

Gunawan, Ary H. (2006). Sosiologi Pendidikan, Jakarta: PT Rineka Cipta,

Isni Nendia Nur, dkk. (2019). Upaya Teknis Rehabilitasi TPA Sampah Kopi Luhur dengan Sistem Lahan Urug Terkendali. Jurnal ilmiah lingkungan kebumian. Vol. 2(1): 24-33. ISSN 2460-691X

Keraf, Gorys. (2001). Argumentasi dan Narasi. Jakarta: PT Gramedia Pustaka

O'Connor, Patrick D.T. (2001). Practical Realibility Engineering, Fourth Edition. England: John Wiley & Sons. Ltd.

Poerwadarminta, W.J.S. (2002). Kamus Umum Bahasa Indonesia. Balai Pustaka. Jakarta.

Subagya, H. (1994). Manajemen Logistik. Cv. Haji Masagung. Jakarta.

Tchobanoglous, G, Theisen, H, Vigil, S, (1993). Integrated Solid Waste Management. Singapore: Mc Graw-Hill Book Co.

Triani Evy. (2017). *Optimalisasi Kinerja Pengelolaan Sampah Di Kota Palangka Raya. Skripsi. Program Magister Bidang Keahlian Manajemen Pembangunan Kota.* Jurusan Arsitektur Fakultas Teknik Sipil Dan Perencanaan Institut Teknologi Sepuluh Nopember Surabaya.

Undang-undang Nomor 18 Tahun 2008 tentang : Pengelolaan. Sampah, Jakarta.

Wahyuni, E. T., Sunarto, & Setyono, P. (2014). Optimalisasi Pengelolaan Sampah Melalui Partisipasi Masyarakat dan Kajian Extended Producer Responsibility (EPR) di Kabupaten Magetan. *Jurnal Ekosains*, *6*(1), 8–23.