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Sea Water Reverse Osmosis (Swro) Program Strategy for Blud Uptd Spam in Tanjungpinang City

Anggi Syahfitriani[1], Edy Akhyary[2], Okparizan[3]
Universitas Maritim Raja Ali Haji

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Abstract
This research aims to determine the Sea Water River Osmosis (SWRO) program strategy, obstacles in the program strategy for providing clean water in Tanjungpinang City. This research uses a qualitative descriptive approach with the data source used is data*primary*and secondary, research uses Strategy theory according to Hadari Nawawi, namely Planning, Organizing, Implementing, Budgeting, Supervision/Control. There is a brief explanation of the 5 Planning Indicators that have been carried out optimally by looking at the existing urgency, but according to the researchers the existing zones are still not optimal because only 583 connected houses are electrified, less than the number of people in Tanjungpinang City, the organization is already in shape. mutually responsible for their respective duties and functions, implementation is quite optimal looking at the existing success indicators but still has not reached the SWRO capacity of 5000 Connected Houses, Budgeting is more than optimal looking at APBD revenues and clean water sales from the SWRO program, and Supervision It has not been achieved optimally due to lack of supervision from the maintenance of the SWRO equipment which sometimes experiences problems with the SWRO equipment. Then, the inhibiting factors for the program strategy are natural conditions and system errors, broken pipes, and less clean water felt by the community or SWRO customers.

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Abstract
Penelitian ini bertujuan Untuk mengetahui Strategi program Sea Water Riverse Osmosis (SWRO) hambatan dalam Strategi program Dalam Penyediaan Air Bersih Di Kota Tanjungpinang. Penelitian ini menggunakan pendekatan deskriptif berjenis Kualitatif dengan sumber data yang digunakan adalah data primer dan sekunder, Penelitian menggunakan teori Strategi Menurut Hadari Nawawi yakni Perencanaan, Pengorganisasian, Pelaksanaan, Penganggaran, Pengawasan/Kontrol. Adapun Penjelasan singkat dari 5 Indikator Perencanaan yang dilakukan telah terlaksana dengan optimal baik dengan melihat urgensi yang ada namun zona-zona yang ada menurut peneliti masih belum optimal karena rumah sambung teraliri hanya 583 kurang dari jumlah masyarakat yang ada di Kota Tanjungpinang, pengorganisasian sudah adanya bentuk saling bertangung jawab atas tugas dan fungsinya masing-masing, pelaksanaan dalam pelaksanaan sudah lumayan optimal dilihat indikator keberhasilan yang ada namun masih belum mencapai kapasitas SWRO 5000 Rumah sambung, Penganggaran lebih dari optimal dilihat dari pendapatan APBD dan penjualan air bersih dari program SWRO, dan Pengawasan Belum tercapai dengan optimal karena kurangnya pengawasan dari pemeliharaan alat SWRO yang kadang kala mengalami trauble pada alat SWRO. Kemudian, Faktor penghambat dari strategi program yakni kondisi alam dan system yang error, Pipa yang pecah, Serta air yang kurang bersih yang dirasakan oleh masyarakat atau pelanggan SWRO.

Corresponding Author:
Anggi Syahfitriani, Edy Akhyary, Okparizan
King Ali Hajj Maritime University
Email:190563201010@student.umrah.ac.id

1. INTRODUCTION

The availability of water on a large scale determines the survival of allIt cannot be denied that water is the main need for humans. The existence of water is so important for humans that clean water is a service that must be provided by the government. In the 1945 Constitution, article 33 paragraph 3 states that "Earth, water and the natural resources contained therein are controlled by the State and used for the prosperity of the people". This shows that water is a natural resource that is very vital for society and is controlled by the State, and it is completely the right of citizens to get clean water services from the government. Today's problem phenomena that occur in the Riau Islands Province regarding water are the level of water loss such as illegal water pipes, water theft by reducing water use, reducing water rates and others.

So, what is urgent for clean water in the Riau Islands Province itself is that there is sufficient clean water which will be useful for the people of Tanjungpinang city. In addition, based on the Tanjungpinang City SPAM Master Plan, the forecast of Tanjungpinang City's drinking water needs is calculated by considering factors that support or can cause an increase in drinking water needs, these factors include:

a. Population increase
b. Socioeconomic level of population
c. Increased activity in the city
d. Service area plans and possible expansion
e. Regional government policy
f. National scale strategic plans for provinces and cities/districts.

Several other problems that people often complain about include the quantity, but also the quality of the water. As a result of the poor quality of raw water, the processed water supplied by PDAM to the community often does not satisfy customers, and leaks often occur in water pipes.(Natasya, 2022). There is a difference in challenges in getting clean water on land and water from the sea. We usually get water from land through wells, however, according to environmental engineering experts from UI, the contamination of e.coli bacteria in wells is very high. Around 80-90 percent of wells are contaminated with bacteria. The presence of e.coli bacteria in water indicates the presence of other pathogenic bacteria in the water, such as salmonella, which causes diarrhea and typhus. Apart from the quality continuing to deteriorate, the quantity of groundwater is also decreasing. Due to uncontrolled siphoning by industrial players, commercial houses or luxury houses. Data from the Regional Environmental Control Agency (BPLHD) states that the excess groundwater extraction reaches millions of cubic meters. Very high groundwater suction will not only reduce the quantity of groundwater, but also raise the ground level. Apart from that, we can also get water from the sea, namely by desalination.

In a distillation-based process, fresh water is obtained through the evaporation method and trapping the condensate as a fresh water product. One of the modern applications is Multi-stage Flash (MSF). MSF operates by "flashing" some water into steam in several stages in what is essentially a countercurrent heat exchanger. MSF itself is widely used and has contributed around 26% of all desalinated water in the world.

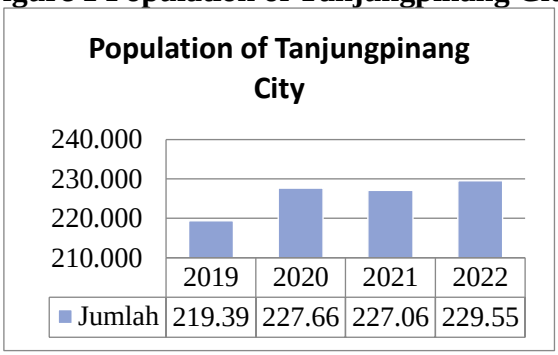
However, the weakness of MSF is that the operating costs are quite high and require special conditions to achieve economic feasibility, especially compared to Reverse Osmosis (RO) technology. Other popular distillation-based technologies are MED (Multiple-effect Distillation) and VCD (Vapor Compression Distillation). In a filtration-based process, fresh water is obtained by “filtering” salt from water using a membrane.

The main process for desalination in terms of installed capacity and annual growth is filtration-based Reverse Osmosis (RO). Reverse Osmosis is the process of forcing a solvent from an area of high solute concentration through a semi-permeable membrane to an area of low solute concentration by applying a pressure exceeding the osmotic pressure. The application in desalination is the separation of pure water from sea water by pressing the side with a high salt concentration, causing fresh water to emerge from the other side.

This process requires high pressure and therefore high energy usage. But with the growing market and improving technology, RO efficiency is getting better over time. However, in reality, everything has its own challenges, but if you look at this data, the ocean area is 242,825 km2 (96%) and the land area is 10,595.41 km2 (4%).

So this is what strengthens the researcher's argument that clean water is mostly obtained from sea water using the Sea Water River Osmosis (SWRO) program, where the Riau Islands Province itself has this program in several places, one of which is apart from Tanjungpinang, namely in the Rear Padang District. Researchers took research in Tanjungpinang City, Riau Islands Province, which has an increase in population every year as in the picture below.

Figure 1 Population of Tanjungpinang City



Source: BPS Tanjungpinang City

From the data above, it can be concluded that the population in Tanjungpinang City will increase every year, and the demand for clean water will also increase.

Table 1 Tanjungpinang City Water Production Capacity

Production capacity	Clean Water - Clean Water Production Capacity (Liters/Second)		
	2018	2019	2020
Potential	5060	4955	4950
Effective	4200	4564	4385

Source: BPS Riau Islands Province

From the table data above, it can be seen that existing water production sources are still minimalcompared to data from population distribution in each sub-district of Tanjungpinang City. Therefore, there is a need for the government's role in solving clean water problems, especially in Tanjungpinang City. Because the government's role in managing water resources is stated in Article 33 (3) of the 1945 Constitution of the Republic of Indonesia.

And it is also clearly confirmed by article 5 which states that the state guarantees everyone's right to obtain clean water for basic needs(Indonesia, 2004). This means that there is a need for a new innovative strategy which can increase clean water for the people of Tanjungpinang City. So the Regional Public Service Agency SPAM Regional Technical Implementation Unit.

Under the auspices of the Public Works and Spatial Planning Service which was formed in 2017, it was included in the organizational structure of the PUPR Service in 2016 in Perwako Number 44 of 2016, concerning job descriptions, organizational functions and work procedures of the Tanjungpinang City PUPR Service. After 2017, UPTD SPAM was formed in Perwako Number 18 of 2017.

The Perwako concerns the formation of the organization and work procedures of the regional technical implementing unit for the drinking water supply system at the Tanjungpinang City PUPR Service.This is what shows that the initial background for SPAM management in the Tanjungpinang City Public Works Department of Spatial Planning was because SPAM in Tanjungpinang City was previously managed by BAPELAM.

It is a community group appointed to manage drinking water facilities and infrastructurein the regionsub-district and under the authority of the sub-district authority. Then, in 2017 a Departmental Technical Implementation Unit was formed to handle the Drinking Water supply system in the Tanjungpinang City area as stated in Perwako No. 18 of 2017.

Functions to carry out Monitoring and Evaluation of all SPAM managed by BAPELAM. Then as time goes by, we review the extent of the service areaUPTDSPAM and the idle capacity of the managed SPAM units were put together by a team to form a BLUD by the Tanjungpinang City government, chaired by Drs. Riono, M.Si as regional secretary of Tanjungpinang.

As stated in the minutes No.01/BAHP/PPK-BLUD/XI/2018.BLUD UPTD SPAM is a regional public service agency that is authorized/trusted by the Tanjungpinang city government to manage groundwater and seawater resources which are said to be trying to implement the Sea Water River Osmosis (SWRO) program, which is a water management system that uses advanced technology.

This management must be given great attention in order to achieve an efficient goal.The legal basis for the formation of BLUD in the UPTD SPAM of the Tanjungpinang City Public Works and Spatial Planning Service is as stated in Law no. 32 of 2004 concerning Regional Government; finalized by Law No.12 of 2008 concerning regional government.

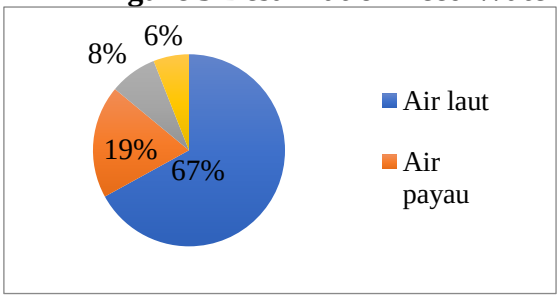
Updated with Law No.23 of 2014 concerning Regional Government. Then the law was driven by the Minister of Home Affairs Regulation, namely Permendagri No. 61 of 2018 concerningVillage Community Institutions and Traditional Institutions; and most recently updated with Minister of Home Affairs Regulation No. 79 of 2018 concerning Public Service BodiesArea.

Figure 2 Sea Water River Osmosis (SWRO) Equipment

Source: Researcher Observations, 2023

BLUD UPTD SPAM also has the main task of improving the quality of drinking water services to the community to realize the implementation of regional government tasks in advancing general welfare and making the nation's life intelligent. Mezher et al (2011) conducted research on several water sources used as desalination feed which are shown in the image below.

Figure 3 Desalination Feed Water



Source:(Nurbanie, 2011)

Sources of information were obtained from the BLUD UPTD SPAM Office that the total access to SWRO Water Services in Tanjungpinang City is 3 water depot units and 2026 house connections. However, in the SWRO management process itself there are several obstacles and problems as follows:

1. Traouble on SWRO tool
2. Due to the limited electricity available, the management of SWRO stopped
3. Regarding the ability to manage SWRO in Tanjungpinang both in terms of human resources and non-human resources.

Starting from that, it encouraged researchers to find out what kind of strategic planning was in implementing the Sea Water River Osmosis (SWRO) program. Therefore, based on the

background above, researchers are interested in finding out what the "Sea Water Reverse Osmosis (SWRO) Program Strategy in BLUD UPTD SPAM in Tanjungpinang City" is..

2. RESEARCH METHODS

In this research, the method used is qualitative, the research approach used in this research is descriptive. To properly understand the phenomena experienced by the subject,In qualitative research, the 'process' of research is more important than the 'results' obtained. Therefore, the researcher as a data collection instrument is a main principle. Only with the involvement of researchers in the data collection process can research results be accountable(Murdiyanto, 2020).Descriptive research refers to studies that use data to describe the ways in which current problems are being solved. To explore the Sea Water Reverse Osmosis (SWRO) Program Strategy at BLUD UPTD SPAM in Tanjungpinang City.

3. RESEARCH RESULTS AND DISCUSSION (12 Pt)

The Tanjungpinang City Government uses a program strategy namely Sea Water Reverse Osmosis (SWRO) in an effort to increase sustainable clean water for the daily needs of the people of Tanjungpinang City. Through the Department of Public Works and Spatial Planning, the City of Tanjungpinang established an agency under its auspices, namely the Regional Public Service Agency (BLUD) Regional Technical Implementation Unit (UPTD) SPAM.

In this strategic effort, the Tanjungpinang City Government and other institutions have carried out a process. To measure the strategy process, in this case the researcher used 5 (five) stages from Hanawi's theory, namely: (1) Planning, (2) Organizing, (3) Implementation, (4) Budgeting, and (5) Supervision/Control.

1. Planning

   Based on the results of interviews with all informants, it can be seen that the planning in the SWRO strategy process for providing clean water in the city of Tanjungpinang already exists and the strategy has been implemented in line with the urgency that occurs in the community of Tanjungpinang city, apart from the planning. This SWRO program makes it very easy for the public, especially SWRO customers, to get clean water for their daily needs. Which is stated in the Institutional Development Planning and SPAM strategic plan for 2023. It can be seen from the success in several zones that have been flooded and the number of each area that is active to date. The active and irrigated areas from 2019 to 2023 are 291 connected houses in zone C and 1,078 connected houses in zone D.

2. Organizing

   Based on the results of interviews with all informants, it can be seen that the organization between parties involved in managing clean water using the SWRO method is in accordance with the main tasks and functions which are clearly recorded in the RBA which was made directly by them. This division of work is in accordance with each individual's abilities and experience. Because the division and grouping of work must be adjusted to the main tasks and clear functions, so that it can ensure the smooth implementation of the work and obtain maximum results. Work division and grouping activities include collaboration with various parties to help make it easier to achieve goals.

3. Implementation

   Based on the results of interviews with all informants, it can be seen that the implementation of the SWRO program has been running properly and the impact felt by the people of Tanjungpinang city, especially those who are well-watered, is clearly felt. The existence of basic infrastructure has a vital impact on health and the environment.

   It is hoped that the availability of adequate drinking water facilities will increase understanding about clean living to prevent the spread of COVID-19 while reducing the risk of diseases that impact health and reducing cases of malnutrition and stunting. However, as far as the indicators of success are concerned, there are several things that have not been achieved because the price of SWRO is quite expensive, which is IDR. 15,000 and others.

4. Budgeting

Based on the results of interviews with all informants, it can be seen that budgeting in the SWRO program has almost no obstacles, the only difficulty is spending the existing budget because there must be an accountability report for each year. However, the community or SWRO customers feel burdened by the tariffs charged.

Table 2 SWRO Program Rates

No	Tariff Type	Cost
1.	Charity	
	- Social	IDR 12,000
	- Household	IDR 15,000
	- Commerce/Business	IDR 25,000
2.	Factory	
	- Industry	IDR 25,000
	- Special Group	Depends on Agreement

Source: BLUD UPTD SPAM, 2023

5. Supervision/ Control

Based on the results of interviews with all informants, it can be seen that supervision/control in the SWRO program has been carried out optimally by the relevant institutions, but sometimes there are errors in the equipment due to salt water. Apart from that, they also check the water pipes to the houses. customers of the SWRO program.

Then the obstacle is:

- There are changes to conditions in nature, so
- The technological changes that are faced must be in accordance with the conditions on the maintenance side, for example if there is equipment leakage due to salt water
- Understanding of HR is still lacking
- Many of the pipe sections that are supplied are damaged/broken

4. CONCLUSION

To create clean water in the city of Tanjungpinang, the government is trying to meet this need by creating a strategy in the SWRO Program where because the Riau Islands Province is surrounded by the sea, it is utilized by following the 4.0 development era which utilizes technology. Then there are several factors that become obstacles in this SWRO program strategy, namely changing natural conditions resulting in changes in technology, in addition to problems with the SWRO equipment, broken pipes which result in several weeks of water not being able to run according to what the community said. zones C and D. The indicators that serve as references in the strategy are Planning, Organizing, Implementing, Budgeting, Supervision/Control. So that this SWRO Strategy can be implemented optimally, the Regional Public Service Agency (BLUD), Regional Technical Implementation Unit (UPTD) SPAM and the Public Works and Spatial Planning Service to meet the clean water needs of the people of Tanjungpinang City, suggestions from the author, namely the government or related agencies to be more focused on providing clean water services through the SWRO program up to a capacity of 5000 SR so that the flow of water from the SWRO program is not only limited to certain zones. and there should be more relief for paying for clean water services because considering the large income, even the BLUD UPTD SPAM says that the existing budget needs to be used up, and it is better if the water runs longer than 5 hours. And the quality of the water content needs to be paid more attention because many residents say that the water is not clean with a yellow and brackish color through the water content analysis method.

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