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DISTRIBUTION OF SUBSIDIZED DIESEL FUEL ON FISHING VESSELS IN PPI LHOK BENGKUANG, SOUTH ACEH

Distribusi BBM Solar Subsidi pada Kapal Perikanan di PPI Lhok Bengkuang, Aceh Selatan

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ABSTRACT

Fishers at PPI Lhok Bengkuang, South Aceh Regency, are still unable to obtain subsidized fuel oil. This is influenced by the increasing demand and the limited fuel supply at nearby fuel station. The purpose of this study is to calculate the amount of diesel fuel distributed to fishers, the service capacity of the fuel station at PPI Lhok Bengkuang, and the amount fuel supply. Data were collected through observation and direct interviews with fishers who buy fuel regularly, which are then analyzed using simple math. The results of this study show that 125 L of diesel fuel were subsidized subsidies for 4 months, with a monthly average requirement of 31.92 liters. Fishing vessels with a size of 1–10 GT consumed most diesel fuel ranging from 85 to 285 liters. The tank capacity of the fuel station is 20,000 liters, and to fullfil the demand, diesel fuel is delivered 1-2 times per month.

Keywords: *fishing vessels, fishing port Lhok Bengkuang, fuel, subsidized diesel.*

ABSTRAK

Bahan bakar minyak yang digunakan nelayan untuk kapal perikanan yaitu jenis solar yang diperoleh dari SPBU-N. Nelayan di PPI Lhok Bengkuang Kabupaten Aceh Selatan masih susah dalam memperoleh bahan bakar minyak subsidi. Kondisi ini dipengaruhi oleh meningkatnya kebutuhan bahan bakar minyak dan kurangnya stok BBM pada SPBU-N. Tujuan dari penelitian ini adalah untuk menghitung jumlah BBM solar yang didistribusikan kepada nelayan serta mengetahui kapasitas tangki SPBU-N yang ada di PPI Lhok Bengkuang, dan jumlah penyuplaian. Metode pengambilan data berupa wawancara langsung dengan nelayan pemilik kapal dan pengelola SPBU-N kemudian data dianalisis dengan matematika sederhana. Hasil penelitian ini yaitu distribusi BBM solar subsidi selama 4 bulan sebanyak 125.164 L dengan rata-rata kebutuhan setiap bulan 31.291 liter. Kapal dengan ukuran 1-10 GT konsumsi BBM solar terbanyak yaitu 85.285 liter. Pemasokan BBM solar di SPBU-N yaitu 1-2 kali sebulan dengan kapasitas tangki 20.000 liter solar.

Kata kunci: BBM, kapal perikanan, PPI Lhok Bengkuang, solar subsidi.

INTRODUCTION

Geographically, the South Aceh district is between 02°23' 24" and 03°44' 24" N and 96°57' 36" and 97°56' 24" N, with an average height of 25 meters above sea level (mdpl). South Aceh Regency has a lot of different types of land, including lowlands, rolling hills, and mountains. The area of South Aceh district is 4,173.82 km^2, which extends from north to south (DKP South Aceh Report Book 2022). South Aceh has 7,008 fishermen, consisting of 6,567 permanent fishermen and 441 part-time fishermen. In 2020, Aceh Selatan will have a fleet of 1,862 fishing boats, including motorboats and boats without motors. Statistics of Departement Marine and Fisheries (DKP) South Aceh says that the fish caught by fishermen in 2020 was 31,621.56 tons.

PERMEN KP (2006) on fishing ports, categorizing the Lhok Bengkuang Fishing Port in the South Aceh Regency is called the Fish Landing Base (PPI), a type D fishing port. Fishing port facilities consist of basic, functional, and supporting facilities. SPBU-N is a fuel oil procurement facility part of a functional fishery anchorage facility (PERMEN KP 2012).

Fuel oil or *BBM* is one of the most important components of ship propulsion (Almuzani *et al.* 2020). The fuel oil used by fishermen for fishing boats is diesel, which is obtained from SPBU-N No. 18232009 manage by PT. Aceh Selatan Jaya. Refueling stations are located within the port complex, so fishermen can benefit from the distance to buy BBM, but only in obtaining subsidized fuel if the fisherman already has a BBM recommendation letter. Fishermen in Aceh can get free fuel with a recommendation letter based on the size of their ship and how far it is from the sea (Fadhillah and Thahir 2022). The number of fishing trips determines the operational costs; the distance traveled to the sea, and the number of catches. (Sudrajat *et al.* 2014) It says that if the distance to the sea is farther, the operational costs will be higher, especially the fuel cost. So income is one of the factors that becomes a problem that is often experienced by fishermen. (Musdalipa 2021). There are fishermen who have to obtain diesel fuel at high prices because they do not get subsidized diesel fuel, so they have to buy outside the SPBU-N, which results in a lack of income for fishermen. The higher the price of diesel fuel, the lower the income of fishermen, so this problem needs to be resolved with the first step of knowing the amount of diesel fuel distribution..

Following current developments, many fishermen still have difficulty in obtaining diesel fuel, both subsidized and non-subsidized. This problem has resulted in many fishermen being unable to fish. (Iswantoro *et al*. 2023). Likewise, PPI Lhok Bengkuang fishermen still experience difficulties in obtaining subsidized diesel fuel. This problem is influenced by the increasing need for diesel fuel, but the stock of diesel fuel is still lacking at the SPBU-N. Based on the problems that occur at PPI Lhok Bengkuang, this research was conducted with the aim of knowing the amount of diesel fuel distribution and the capacity of the SPBU-N tank. This research was also conducted to be a source of information for fishermen and related agencies.

METHODS

This research was conducted in September until October 2022 at PPI Lhok Bengkuang, South Aceh Regency. Surveillance and direct interviews with fishermen who own boats and gas station managers are used to get the information. Primary data were obtained from fishermen and managers of SPBU-N through interviews with questionnaires regarding the amount of diesel fuel consumption, vessel size, engine power, length of operation per trip, trip, distance to sea and tank capacity and the amount of diesel fuel supply. Secondary data were obtained from DKP South Aceh regarding the number of fisheries fleet at PPI Lhok Bengkuang, types of fishing gear and subsidized diesel fleet.

The fleet at PPI Lhok Bengkuang is 111 units of motor boats with a ship size of 1-30 GT (DKP South Aceh Report Book 2022). The size of the ship was used to decide who could respond. One hundred and six ships were 1–10 GT, four ships were 11–20 GT, and one ship was 21–30 GT. Determination of respondents: if the study population is less than 100, the researcher should take all of them; if the population is more than 100, the researcher can take a sample of 50% (Arikunto 2020). The respondents interviewed, in this case, were 59 respondents including the manager SPBU-N.

In this data analysis, several steps are taken to achieve the research objectives. Based on Aldifron *et al.* (2022), research procedures are steps that are taken before implementation, and in research treatment, the steps taken go through several stages. Research procedures include steps to achieve the objectives of the research (Wawan and Aat

2021). Research procedures are carried out systematically and logically in order to achieve certain goals (Mukhtazar 2020). Rizal *et al*. (2021) states that, the steps that will be taken in data analysis are as follows:

1. Inputting the results of fishermen's interviews about the use of fuel oil (primary data), namely, data on fuel needs for each trip of fishing operation and the number of trips each month. The amount of fuel and trips are determined by the size of the fishing vessel.
2. Calculate the amount of fuel needed based on ship data in the nth month, namely by multiplying the amount of fuel per trip in the month with the number of trips in the month. This calculation is applied to each ship with different fishing gear.
3. Calculate the monthly fuel needed for all ships on each fishing gear. The ship sizes calculated in this formula are 1-12 GT, 11-20 GT, and 21-30 GT. The initial stage is to multiply the fuel needed per ship in the nth month by the number of fishing fleets operating in the nth month, which is then totaled for each month. The number of fishing fleets operating is taken from data in the DKP South Aceh. The second stage is to divide the total results of fuel needs by the number of months of operation.
4. Calculating the amount of fuel needed for all ships (1-10 GT, 11-20 GT, and 21-30 GT) for two months by summing up the amount of fuel needed each month.
5. Sharing the amount of fuel consumption with the amount of supply from gas stations (N) to produce data on the amount of fuel supply each month.
   The data analysis used in this study used simple mathematics to calculate the need for subsidized diesel fuel used by fishermen.

This research was analyzed using quantitative with simple mathematics to calculate the need for subsidized diesel fuel used by fishermen. The data obtained is then processed using the Ms. Excel program and presented in the form of tables and graphs, which are then analyzed descriptively. Descriptive analysis is used to analyze and interpret data by describing or illustrating data on the Fuel Needs of Fishing Vessels PPI Lhok Bengkuang. The collected data comes from the needs of researchers, making it easier to understand according to the researcher's goals (Kartika *et al.* 2020).

Data analysis is one of the important things in completing research, which contains methods used to determine the description of data and data relationships (Sastypratiwi and Nyoto 2020). Data analysis is also carried out to classify or group data (Aditiawan 2020). The data analysis technique consists of data reduction, data presentation, and conclusion drawing (Lilawati 2020). This is one of the research processes that must be carried out. In calculating the need for subsidized diesel fuel, a formula is needed to get the results of calculating the amount of subsidized diesel fuel based on the ship in months 1, 2, 3, and 4. The formula for calculating the amount of subsidized diesel fuel required per ship is used, according to the formula (Rizal *et al*. 2021):

$$SBn = BTn \times Tn \quad \text{..... (1)}$$

With:

SB_n = number of fuel needs per ship in the nth month (L/Units)
BT_n = number of fuel needs per ship trip in the nth month (L/Trip)
T_n = number of trips per month
n = 1st month, 2nd month, 3th month and 4th month

In accordance with the research procedure, after calculating the amount of subsidized diesel fuel needs per vessel, calculate the amount of subsidized diesel fuel needs based on the month for the entire ship. At this stage, a formula is needed to determine the amount of subsidized diesel fuel required. The amount of fuel needed comes from the calculation of the amount of subsidized diesel fuel consumption used on the ship. The specific diesel fuel requirement on the ship is the amount of diesel fuel consumed (Utomo 2020). The formula for calculating the amount of monthly subsidized diesel fuel requirements for all vessels on each fishing gear is as follows (Rizal *et al*. 2021):

$$\overline{BB} = \frac{\sum_{z=1}^{2} BBn \times JKn}{2} \quad \text{.....(2)}$$

With:

$\overline{BB}$ = Average number of monthly fuel needs of the entire ship (L)
BBn = number of fuel needs per ship in the nth month (L/Units)
JKn = number of ships and in the month
n = month of operation

Table 1 Determination of Respondents

Respondent	Ship Size	Respondent Retrieval	Number of Respondents
Fishermen's	1-10 GT	106 ships × 50%	53 Respondents
	11-20 GT	4 ships	4 Respondents
	21-30 GT	1 ship	1 Respondent
Manager SPBU-N		1 person	1 Respondent

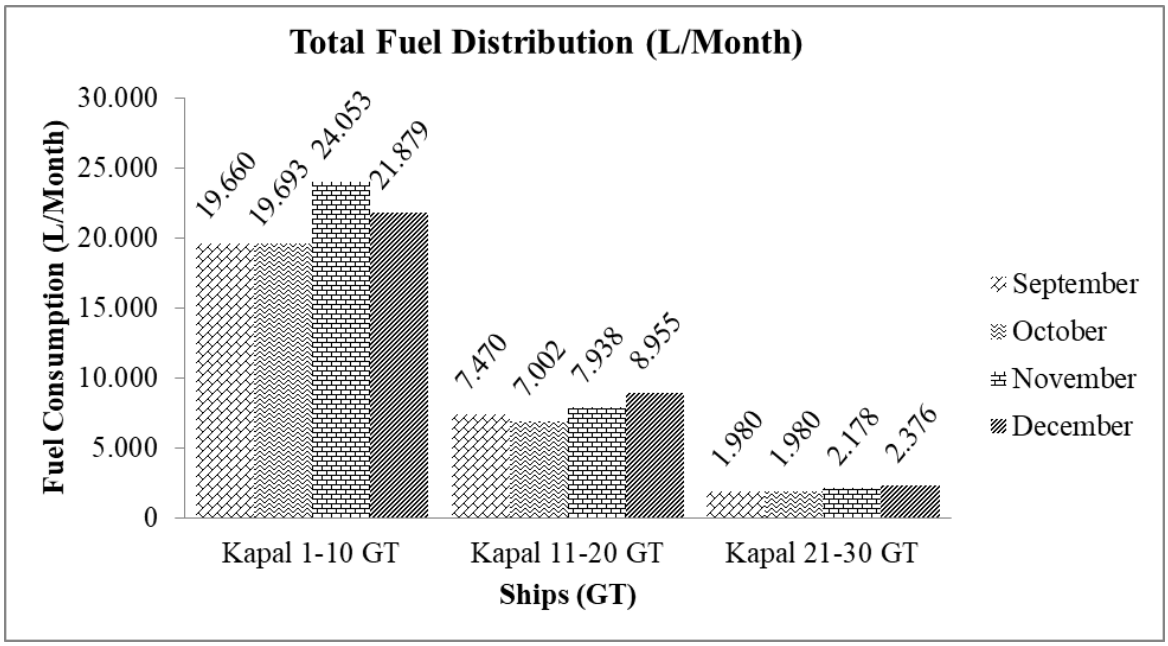
RESULTS

The fishing boats at PPI Lhok Bengkuang are 1–30 GT in size with varying engine power. The fishing area in PPI Lhok Bengkuang is at WPP 571 and 572, dengan jenis hasil tangkapan yaitu ikan cakalang, ikan kembung, ikan tongkol, ikan teri, ikan layang dll. The PPI fishing vessel Lhok Bengkuang, South Aceh Regency, uses diesel fuel, a type of subsidized diesel. The results of calculating fuel needs for each ship size in each month can be seen in Figure 1.

Fishing vessels with a size of 1–10 GT are the vessels with the highest fuel consumption in PPI Lhok Bengkuang, with a total of 85,285 liters. The fishing gear used on ships measuring 1–10 GT is a bottom swamp boat and a fishing rod with different fishing trip durations. Meanwhile, fuel consumption is low on ships with sizes of 11–20 GT and 21–30 GT with mini purse seine fishing gear.

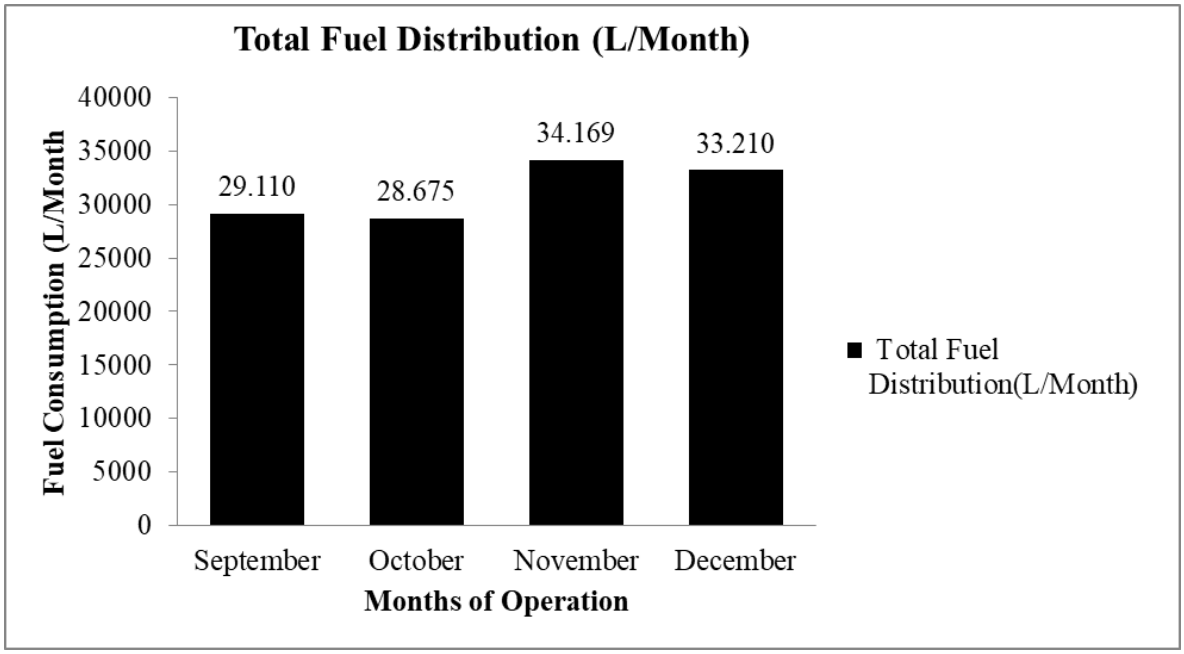
The highest fuel consumption occurred in November, namely 34,169 liters of diesel; this is suspected to be because the weather this month was good. Diesel fuel consumption on fishing vessels at PPI Lhok Bengkuang for four months was 125,164 liters.

The need for diesel for fishing vessels at PPI Lhok Bengkuang is supplied by SPBU-N No. 18232009, managed by PT. Aceh Selatan Jaya. The type of diesel sold to fishermen is subsidized diesel; this is supported by the distribution of fuel, which must use an oil recommendation letter from the DKP South Aceh. Once filled through an oil recommendation letter, the diesel distributed to fishermen was rationed every 10 days. The oil storage tank belonging to gas station N 18232009 has a capacity of 20,000 liters of diesel. The total supply of diesel per month is 40,000 liters, with a large supply of 1-2 times the supply. Filling is carried out by employees or officers of gas stations in Nebraska by filling jerry cans brought by fishermen. The highest consumption is in November and December. Following the research results, the most fuel consumption occurred in November.



Source: Reprocessed Primary Data

Figure 1 Total fuel distribution of Fishing Vessels 1-30 GT per month during September - December



Source: Reprocessed Primary Data

Figure 2 Total fuel distribution each month during September - December

Table 2 Distribution of PPI Lhok Bengkuang fuel per ship-class interval during September-December

No.	Months of Operation	Ships 1-10 GT	Ships 11-20 GT	Ships 21-30 GT	Total Fuel Distribution (L/Month)
1	September	19.660	7.470	1.980	29.110
2	October	19.693	7.002	1.980	28.675
3	November	24.053	7.938	2.178	34.169
4	December	21.879	8.955	2.376	33.210
Total		85.285	31365	8.514	125.164
Average		21.321	7.841	2.129	31.291

Source: Reprocessed Primary Data

DISCUSSION

Fishing vessels are one of the important components in conducting fishing business activities (Apriliani *et al.* 2022). Differences in ship size can affect the method of operation of the ship, such as the distance of the fishing gear and the fishing device used, thus causing the engine power used to be different and the ability of the ship to face ocean currents and waves (Rizal *et al.* 2021).

Ministry of Marine Affairs and Fisheries (2008) WPP 571 is located in the waters of the Malacca Strait and the Andaman Sea, which have three provinces, namely Aceh, North Sumatra, and Riau, with the dominant types of catches being mackerel, cob, kitefish, etc. While WPP 572 is located in the waters of the Indian Ocean, West Sumatra, and the Sunda Strait with six provinces, namely Aceh, North Sumatra, West Sumatra, Bengkulu, Lampung, and Banten, The dominant catches in WPP 572 are skipjack tuna, mackerel, anchovies, etc. WPP 571 and 572 catch types follow the fishermen's catches in PPI Lhok Bengkuang.

Typically, petroleum is the go-to gasoline for automobiles (Rifqi and Rizanizarli 2022). Petroleum is also crucial for sustainable social and economic growth (Subekti *et al.* 2023). On fishing boats, fuel is required for propulsion and for the primary engine to operate. The need for fuel on fishing

vessels is used for the driving thrust and running the main engine of the ship; besides that, it is also used for fishing aids such as light fishing and fish storage hatches (Agus 2018; Almuzani *et al.* 2020; Rizal *et al.* 2021). Fuel is one of the dominant logistics procurements with large procurement costs (Aries 2018). The provision of diesel fuel as a necessity for fishing is a culmination of the preparations made for fishing vessels (Sahulata *et al.* 2022). In addition, fuel is one of the major operational costs because in addition to being used for engine operation it is also used to generate electricity for lighting at night (Rismi *et al.* 2022). According to the research (Sahulata 2021), the provision of diesel fuel oil supports all activities at fishing ports.So Government subsidies for the diesel fuel used by fishermen are intended to assist them in obtaining fuel that is suitable for their requirements at reasonable prices, thereby increasing their income (Wulandari *et al.* 2023). In accordance with (Yulianto *et al*. 2021) that one of the things that has a significant positive effect on the catch of fishermen is fuel consumption.

The basic swamp is a fishery fishing gear composed of three parts: the main rope, the branch rope, and the attached fishing rods at the end of the branch line. The bottom swamp is outfitted with ballast and buoys at each end of the main rope for each set of basic swamps (Lisdawati *et al.* 2016). The number of fishing rods on fishing boats usually characterizes this fishing gear. Ships with basic fishing gear at PPI Lhok Bengkuang are 2–6 GT-sized with Dongfeng engines with a power rating of 23 PK, Tianly at 28 PK, and Yanmar at TS230. The size of the ship greatly affects the power of the ship's engine (Rizal *et al.* 2021). The engine power used by a ship must be in accordance with the size of the ship, the greater the GT of the ship, the greater the engine power that must be used. (Chaliluddin *et al.* 2019). (Imanda *et al.* 2016) also suggests that the use of fuel affects the movement of the ship, which means that the greater the engine power, the more fuel use.

Rawai Dasar is a ship that uses a large amount of fuel because of the length of the capture trip. The number of trips averages twice a month, a long trip of 5–10 days per trip of capture. It is also part of a boat measuring 1-10 GT, in addition to the bottom of the boat with fishing gear. The fishing boat at PPI Lhok Bengkuang is identified as a ship measuring 1-3 GT and made primarily of wood. The length of time the fishing boat operates is one day of fishing, with a total of 18–26 days of fishing every month. Usually, fishing boats at PPI Lhok Bengkuang use Dongfeng engines with a power of 6 PK and 10 PK, Kubota 8 PK, and Yanmar TF 15 with dominant catches of kurisi, snapper, and other reef fish because fishing boats usually catch fish at a distance of 8–20 miles.

Ships of 11-20 GT and 21-30 GT are ships with mini purse seine fishing gear in PPI Lhok Bengkuang, and they use Mitsubishi Ps160 and Mitsubishi Ps170 engines. Mini purse seine fishing gear is operated with light fishing aids with modern technology and DPI distances are concentrated around coastal waters because operations are limited to a one day fishing system. (Tanjov dan Yusfiandayani 2016). The mini purse seine ship at PPI Lhok Bengkuang was arrested by one-day fishing. This ship operated from the afternoon before night to the early morning before dawn. Mini purse seine ships operate at a distance of 25–30 miles, so although the engines used by these ships are large and have a lot of fuel consumption, mini purse seine ships have the lowest fuel consumption due to the small number of ships and their operation trips, namely one-day fishing. Unlike the 1–10 GT size ship, which has the highest number in PPI Lhok Bengkuang, two types of fishing gear are used with different trip durations: one-day fishing and 5–10 days. By (Wulandari *et al.* 2023) that the amount of fuel used is influenced by the size of the ship, the length of time at sea, trips, and fishing distance. However, based on research (Utomo 2020) that fuel consumption will always be related to engine speed and engine speed.

November is the month with the highest fuel consumption, presumably due to favorable weather for fishing. November includes transitional season 2 with favorable weather conditions for making arrests that cause high catches (Prayoga *et al.* 2017). The month with the lowest diesel fuel consumption was October, with a total of 28,675 liters, because the weather at PPI Lhok Bengkuang was very bad that month, so fishing was not very productive. October is a west monsoon month with high rainfall (Yananto dan Sibrani 2016). This results in fishermen being unable to carry out fishing activities. This results in fishermen being unable to carry out fishing activities and a lack of income for fishermen. State that a very significant influence on fishermen's income is weather changes (Lukum *et al.* 2023). Bad weather is an obstacle that is often experienced by

fishermen because they cannot go to sea because of high waves (Maulana *et al.* 2020).

The amount of diesel fuel consumption for four months at PPI Lhok Bengkuang is 125,164 liters. While the data from the study (Rizal *et al.* 2021) shows that the fuel consumption calculation for fishing vessels over 12 months is 568,041 liters of subsidized diesel. The high consumption of subsidized diesel on fishing vessels is influenced by the engine's power and the time the ship's engine is started in fishing operations, which means that the longer the engine is started, the more diesel is used (Shafira *et al.* 2021).

SPBU-N is a special diesel refueling station for fishermen. It is on the ground and has a system for filling jerry cans, which can then be taken on a rickshaw to the ship. SPBU-N are located near or in the middle of the sea, allowing boats and ships to fill up on fuel (Iswandi and Kurniawati 2020). Similarly, Pelabuhanratu fishermen charge diesel using jerry cans (Nugraha *et al.* 2022). Based on information from gas station N, the highest fuel distribution occurred in November and December, with up to 40,000 liters of diesel. This is due to good weather conditions, which allow fishermen to fish optimally. Transition greatly affects the fishing business concerning the number of fishing trips (Damayanti 2018).

Fuel Distribution Recommendations

In issuing oil recommendation letters, PPI Lhok Bengkuang still involves the DKP South Aceh to make oil recommendation letters with several conditions and a series of processes until fishermen can obtain the letter. The requirements for obtaining a fuel recommendation letter at the DKP South Aceh can be seen in Table 3.

Referring to the existing requirements, fishermen go through several processes, namely, submitting files in SKPPN, SIPI, SIUP, PAS large or small, a certificate from the commander of the laot or keuchik, and a photocopy of the previous oil recommendation letter. Then the DKP South Aceh will verify the file; if there is an incomplete or dead letter, the file is rejected, and a recommendation letter cannot be issued. After the file is complete, a record of the amount of diesel will be recommended, and a recommendation letter will be issued. BBM is one of the sensitive areas of fraud and suspicion in its use (Gustiawan 2021). So it is necessary to make a better and faster selection of documents. Fishing vessels in PPI Lhok Bengkuang use subsidized diesel fuel. Fuel at subsidized prices is provided by the government to help small people in obtaining fuel with expensive prices to be cheaper (Tambunan et al. 2022). The price of subsidized fuel is regulated by the government and applies throughout Indonesia. (Putra et al. 2021). Following PERPRES (2014), fishing vessels with sizes ranging from 5 GT to 30 GT use subsidized solar fuel. The distribution of subsidized diesel fuel is still not considered and there is a need for improvement in the distribution of subsidies (Muhaymin 2023). Therefore, it is necessary to collect data on fishing vessels that are useful for supporting the distribution of subsidized diesel fuel.

Based on the information provided by fishermen, there are still fishermen who still need to get diesel at subsidized prices or buy it from other fishermen because of the difficulty of obtaining diesel fuel. This is due to a need for more information about the number of subsidized fuel quotas that make fishermen worry about fuel stocks. So it is necessary to implement transparency regarding fuel information and correctly calculate the amount of fuel consumption that is following the needs of fishermen on oil recommendation letters so that fishermen continue to get subsidized diesel fuel.

Table 3 Requirements for taking fuel recommendation letters

No.	Fuel Recommendation Terms
1.	Fishermen bring complete boat documents (SKPPN, SIPI, SIUP, and PAS large/small).
2.	Fishermen bring a certificate from the commander of the laot/keuchik.
3.	Fishermen bring a photocopy of the previous oil recommendation letter.
4.	Bring the shipowner's power of attorney if the person accepting the recommendation letter is not the ship's owner.

CONCLUSION

PPI Lhok Bengkuang subsidized diesel fuel meets the needs of fishermen, with a total need for subsidized diesel fuel for 4 months of as much as 125,164 liters and an average monthly need of 31,291 liters. The amount of diesel fuel supply at SPBU-N is 1-2 times a month with a tank capacity of 20,000 liters of diesel. Based on the findings of the aforementioned study, PPI Lhok Bengkuang ought to be able to exercise control over the issuance of oil recommendation letters to ensure that subsidies for diesel fuel are distributed fairly. Likewise, the N-SBU ought to make the stock of diesel fuel that is made available to fishermen transparent so that the distribution and stock of fuel can be managed and tailored to the requirements of fishermen. To determine the amount of fuel used by PPI Lhok Bengkuang fishermen and how they use it, more research on fuel over an extended time horizon and with different fuel types is required.

RECOMMENDATIONS

Based on the findings of the aforementioned study, PPI Lhok Bengkuang ought to be able to exercise control over the issuance of oil recommendation letters to ensure that subsidies for diesel fuel are distributed fairly. Likewise, the N-SBU ought to make the stock of diesel fuel that is made available to fishermen transparent so that the distribution and stock of fuel can be managed and tailored to the requirements of fishermen. To determine the amount of fuel used by PPI Lhok Bengkuang fishermen and how they use it, more research on fuel over an extended time horizon and with different fuel types is required.

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