

## RISK ANALYSIS OF BULK LPG DISTRIBUTION IN WEST NUSA Tenggara PROVINCE WITH HOUSE OF RISK AT INDONESIA OIL AND GAS COMPANY REGIONAL JATIMBALINUS

Cucuk Basuki<sup>1</sup>, Iwan Vanany<sup>2</sup>

Institut Teknologi Sepuluh Nopember, Jawa Timur, Indonesia<sup>12</sup>  
cucukbasuki2203@gmail.com

### ABSTRACT

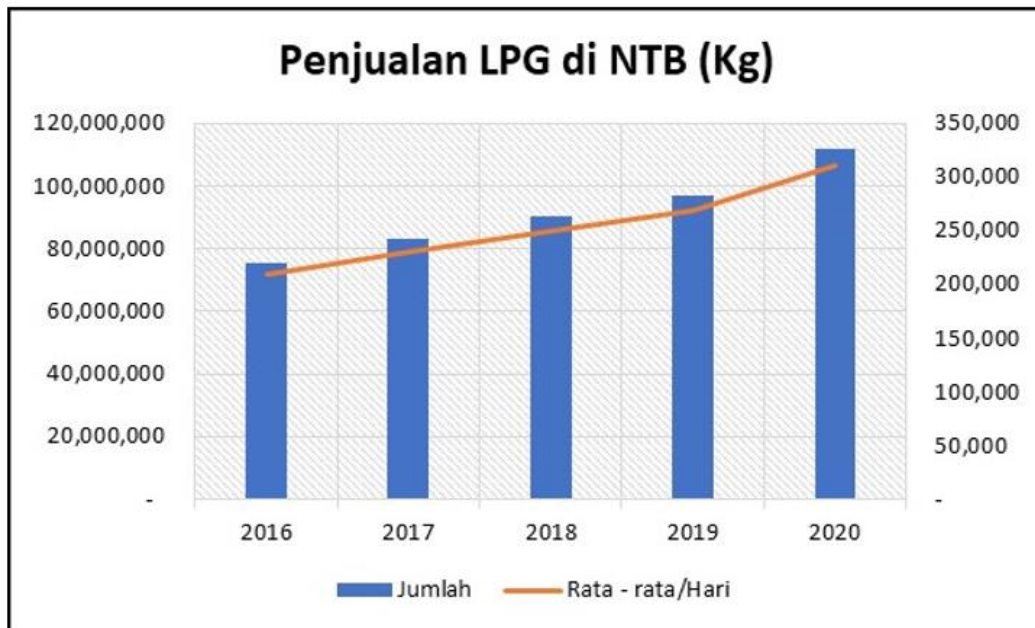
Since 2007, the Indonesian government has started a program to convert kerosene to Liquid Petroleum Gas (LPG). Over time, the use of LPG is one of the primary needs that must be met. Besides that, Company X as oil and gas company follows the Indonesian government regulations regarding the COVID-19 restriction which in this case it will add to the increasingly complex problems of the supply chain network. This is what makes bit a challenge for Company X to meet consumer needs with the availability of existing LPG. This causes the risks that demand for LPG cannot be fulfilled on certain days because the number of requests is greater than the amount of supply. In this study, a house of risk was conducted in Company X's bulk LPG supply chain. The results of this study produce risks, causes of risk along with comprehensive prevention strategies to help Company X supply chain complexity.

**Keywords:** Entrepreneur, Risk Analysis, Bulk LPG Distribution, House of Risk

### INTRODUCTION

West Nusa Tenggara Province is a province consisting of islands and has two large islands namely Lombok and Sumbawa. The two islands are the most populated areas among the other islands in the province of West Nusa Tenggara. The difference between the province of West Nusa Tenggara compared to other provinces that have been converted to LPG is that it lies in the distribution channel of bulk LPG. The LPG bulk distribution route in the province of West Nusa Tenggara uses two modes of transportation, namely land transportation and sea transportation. By using this transportation, the more complex the risks that occur in the distribution of bulk LPG in the province of West Nusa Tenggara, so that strategies are needed to control these risks so that the reliability of the distribution of bulk LPG runs smoothly and the availability of LPG is guaranteed in the province of West Nusa Tenggara.

Company X is an Indonesian state-owned company engaged in the oil and gas energy sector from upstream to downstream. Company X is currently focusing on developing the upstream business in the production chain and increasing business efficiency in the upstream sector. Company X aims to expand the production chain of the upstream sector into a special function that connects the upstream and downstream sectors. This function is called the Integrated Supply Chain (ISC). In the organizational structure of the ISC function, there is specifically an organization that manages LPG operations. The task of the LPG operational function is to maintain the continuity of national LPG storage by carrying out operations, integrated management, objectives, efficiency and effectiveness through the supply and distribution of imported and domestic LPG. As time goes by, the demand for consumption of LPG is increasing, both for household energy needs, restaurants, hotels, and industry. This causes the risk that demand for LPG cannot be fulfilled on certain days because the number of requests is greater than the amount of supply.



**Figure 1: LPG SALES IN WEST NUSA TENGGARA PROVINCE**

The main cause causing this phenomenon is the limited number of LPG tankers, namely there are 45 units of tankers currently operating with a capacity of 13,000 kg each. The highest demand for LPG in an average day in West Nusa Tenggara is 330,000 kg, so it can be compared between the availability of LPG tankers and the demand for LPG, which is still not balanced. The limited capacity of LPG storage tanks and the number of fleets is a factor that causes the phenomenon of limited availability of 3 kg LPG in the community. In addition to these two factors, there are also several causes that also affect the distribution of bulk LPG from the LPG Terminal to SP(P)BE in the West Nusa Tenggara region, namely the distance between the LPG Terminal (supply point) and SP(P)BE, road conditions the traffic traversed by the LPG tanker, the availability and capacity of the crossing vessel for cross-island distribution, the condition of the crew of the tanker and the LPG tanker itself. These factors form a series of activities in fulfilling reliable LPG distribution and must be managed properly. Each of these factors has risks that can result in poor LPG distribution achievements, so they need to be identified and managed properly so that the phenomena that arise can be minimized.

Besides that, Company X should follows Indonesian government regulations, which in this case will increase the complexity of the supply chain network problems at Company X. This results in delays and hinders the ongoing supply chain process and is a risk that must be identified early on. In its operational process, Company X only manages operational risks within its own environment, namely those related to the use of facilities, work safety, occupational health, and others in the work environment of Company X. In the LPG bulk distribution process apart from Company X as the main actor, Company X also involves subsidiaries and several work partners. Therefore, it is necessary to mitigate the risks that occur so that they can be integrated so that they do not interfere with the distribution of bulk LPG in the Company X supply chain network.

In this study, one of the methods that will be used is House of Risk (HOR) which is based on the idea that active supply chain management should always try to focus on a preventive action, for example minimizing the probability of a risk agent occurring. Based on this, in this study risk identification and its mitigations were conducted in Company X's bulk LPG supply chain in West Nusa Tenggara province.

## RESEARCH METHOD

The techniques used for data collection methods are as follows: (1) Observation; (2) Focus Group Discussion (FGD); (3) Interview.

## RESULTS AND DISCUSSION

The initial step in this study was to collect data to start identifying risks starting from business processes in the distribution of bulk LPG in the West Nusa Tenggara region. The identification of this business process follows the method of determining SCOR, namely adopting five management processes including Plan, Source, Make, Deliver and Return. This risk identification was obtained from the observations of researchers and from related sources. In determining the results of risk identification, the researchers poured them into two locations, namely the LPG Terminal as a supply point for bulk LPG distribution and SP(P)BE as part of packaged LPG distribution. In addition, risks and risk causes that have been identified are then assessed for their severity and occurrence values. The results of determination and assessment of risk identification from the two locations are as follows:

**Table 1**  
**SEVERITY VALUE OF RISK EVENTS IN THE TERMINAL**

| Business Process | Sub-Process                        | Code (Ej) | Risk Event   | Severity |
|------------------|------------------------------------|-----------|--|----------|
| Plan             | Demand                             | E1        | Distribution data that is still not accurate                 | 1        |
|                  |                                    | E2        | Request planning error                                       | 4        |
|                  |                                    | E3        | Delay in requesting orders                                   | 7        |
| Source           | Order Process                      | E4        | Delay in sending LPG vessel request documents                | 4        |
|                  |                                    | E5        | The length of the ship document verification process         | 3        |
|                  | Delivery Process                   | E6        | The length of time in the process of shipping bulk LPG       | 8        |
| Make To Order    | Stock Availability at LPG Terminal | E7        | Discrepancy of available stock with stock in the data system | 4        |
|                  |                                    | E8        | LPG stock is less or not available                           | 3        |
| Deliver          | Distribution Process               | E9        | Contaminated product   | 1        |
|                  |                                    | E10       | LPG bulk filling process time                                | 3        |
|                  |                                    | E11       | Product does not meet specifications (contaminated)          | 1        |
| Return           | Product Return                     | E12       | The product return approval process takes a long time        | 1        |
|                  |                                    | E13       | The terminal does not accept return products (contamination) | 1        |

**Table 2**  
**SEVERITY VALUE OF RISK EVENTS IN THE SP(P)BE**

| Plan   | Business Process | Sub-Process | Code (Ej)                        | Risk Event | Severity |
|--------|------------------|-------------|----------------------------------|------------|----------|
|        | Proses order     | E15         | Terlambat dalam permintaan order | 6          |          |
| Source | Proses           | E16         | Lamanya dalam proses             | 8          |          |

| pengiriman    |                              | pengiriman bulk LPG |  |   |
|---------------|------------------------------|---------------------|--|---|
| Make To Order | Ketersediaan stok di SP(P)BE | E17                 | <i>Discrepancy</i> stok yang tersedia dengan stok yang di sistem data  | 7 |
|               |                              | E18                 | Stok LPG kurang atau tidak tersedia                                    | 8 |
| Deliver       | Proses Penyaluran LPG        | E19                 | Produk terkontaminasi  | 1 |
|               |                              | E20                 | Lama proses pengisian LPG  | 4 |
|               |                              | E21                 | Berat isi LPG tidak sesuai spesifikasi                                 | 3 |
| Return        | Pengembalian Produk          | E22                 | Proses <i>approval</i> pengembalian produk yang membutuhkan waktu lama | 2 |
|               |                              | E23                 | Keterbatasan jumlah tabung LPG layak yang dimiliki oleh SP(P)BE        | 4 |

The probability of the cause of the risk is how often the frequency that arises from the cause of the risk occurs. Causes of risks that have a high probability value, then the probabilities and causes of these risks must be minimized. If this probability is not minimized, it will cause a risk event caused by the cause of the risk. Given that a cause of risk can encourage the occurrence of risk events. In assessing the level of probability using a measurement scale that is 1-10.

| No | Code (Aj) | Risk Cause   | Occurrence |
|----|-----------|--|------------|
| 1  | A1        | Breakdown on the Company's IT system                                       | 7          |
| 2  | A2        | There are manual transactions  | 2          |
| 3  | A3        | Transaction input delays in the system                                     | 2          |
| 4  | A4        | Distribution history data is limited                                       | 1          |
| 5  | A5        | Demand forecasting uses distribution data when converting fuel to 3 kg LPG | 1          |
| 6  | A6        | Authorized limitations on the Company's IT systems                         | 1          |
| 7  | A7        | Significant increase in demand   | 5          |
| 8  | A8        | There is a new policy from the Government                                  | 5          |
| 9  | A9        | There is a transfer of requests from other terminals                       | 5          |
| 10 | A10       | The length of the approval process for the relevant officials              | 2          |
| 11 | A11       | Limited manpower in verifying ship documents                               | 1          |
| 12 | A12       | Limited communication system between parties                               | 7          |
| 13 | A13       | Long time in document verification process                                 | 2          |
| 14 | A14       | Limited number of ships available  | 8          |
| 15 | A15       | Non-performing ship company  | 6          |
| 16 | A16       | Vessel documents expire  | 2          |
| 17 | A17       | Queue in the motion of the ship at the port                                | 7          |
| 18 | A18       | Bad weather  | 6          |
| 19 | A19       | The gauge is no longer working   | 1          |
| 20 | A20       | There is a product line leak   | 1          |
| 21 | A21       | Delay in delivery by LPG vessels   | 8          |

| No | Code (Aj) | Risk Cause  | Occurrence |
|----|-----------|---|------------|
| 22 | A22       | Limited mothership as a supply point  | 8          |
| 23 | A23       | Limited number of ships available   | 8          |
| 24 | A24       | Product off specification   | 1          |
| 25 | A25       | There is a shortage of products during delivery                             | 6          |
| 26 | A26       | Long queue  | 6          |
| 27 | A27       | Suggestions and charging facilities are limited                             | 5          |
| 28 | A28       | Limited number of available LPG skid tanks                                  | 6          |
| 29 | A29       | Coordination up to the Top Management level                                 | 1          |
| 30 | A30       | Limited facilities and amenities  | 5          |
| 31 | A31       | There is no storage tank for off specification products                     | 1          |
| 32 | A45       | Breakdown on the Company's IT system  | 6          |
| 33 | A46       | There are manual transactions   | 5          |
| 34 | A45       | Delays in depositing at banking   | 3          |
| 35 | A47       | Disruption to the banking sector  | 6          |
| 36 | A48       | The length of the approval process for the relevant officials               | 1          |
| 37 | A49       | The communication system between parties is still less effective            | 7          |
| 38 | A50       | Late delivery of order documents  | 3          |
| 39 | A45       | Delays in the approval process for order requests                           | 1          |
| 40 | A51       | Queue at the supply point   | 7          |
| 41 | A52       | Traffic density on the track of the LPG skid tank                           | 8          |
| 42 | A50       | Inadequate road facilities for LPG skid tanks                               | 7          |
| 43 | A53       | Delay in the crossing ship  | 8          |
| 44 | A54       | Non-performing ferry company  | 4          |
| 45 | A55       | Keterbatasan jumlah skid tank LPG yang tersedia                             | 9          |
| 46 | A56       | Kapasitas skid tank LPG yang terbatas                                       | 8          |
| 47 | A57       | Kurang perform armada transportasi yang digunakan                           | 8          |
| 48 | A58       | Alat ukur sudah tidak berfungsi   | 1          |
| 49 | A59       | Adanya kebocoran jalur produk   | 1          |
| 50 | A60       | Keterlambatan pengiriman  | 8          |
| 51 | A45       | Produk off spesifikasi  | 1          |
| 52 | A61       | Adanya Produk shortage saat pengiriman                                      | 1          |
| 53 | A62       | Saran dan fasilitas pengisian terbatas                                      | 7          |
| 54 | A63       | Keterbatasan jumlah truk agen LPG yang tersedia                             | 6          |
| 55 | A62       | Keterlambatan input transaksi pada sistem                                   | 3          |
| 56 | A58       | Kurangnya stok tabung LPG yang layak pakai                                  | 5          |
| 57 | A59       | Kerusakan pada tabung LPG dan aksesorisnya                                  | 4          |
| 58 | A64       | Dokumen dan Sertifikasi fasilitas pengisian LPG sudah habis masa berlakunya | 2          |
| 59 | A65       | Adanya kebocoran pada tabung LPG  | 4          |
| 60 | A62       | Ketidaksesuaian pada sarana fasilitas pengisian tabung LPG                  | 4          |
| 61 | A53       | Koordinasi sampai ke level Top Management                                   | 2          |
| 62 | A66       | SP(P)BE kurang beli tabung LPG layak ke PT Pertamina                        | 2          |
| 63 | A67       | SP(P)BE tidak memiliki lahan untuk menampung tabung LPG bocor               | 2          |

## CONCLUSION

Based on the validity analysis, the validators, who are experts selected by the researcher and qualified to assess the questions on the applied learning media, stated that the media was highly feasible with a percentage of 96%. As for the media used, namely Wordwall, it obtained a rating of 100% or a score of 3. Based on these two types of validation, it can be recommended as a learning media to evaluate students' understanding. The effectiveness of the media was evaluated based on the scores obtained by the students for the questions provided in the media, and they were able to answer on average 17 out of 19 questions or 89% of the students got satisfactory scores. The application of Wordwall learning media was also considered very interesting with a rating of 92.7% rated as attractive. Overall, the questions in the Wordwall learning media are valid and effective in the process of evaluating Indonesian language teaching and learning on procedural text material at SMP Negeri 12 Makassar. The applied 4D model, which consists of define, design, development, and disseminate, has been carried out and applied properly.

## REFERENCES

- Arsyad, A. (2009). *Media Pembelajaran*. Raja Grafindo.
- Hamalik. (1994). *Media Pendidikan*. Citra Aditya Bakti.
- Hanafi Halid Dkk. 2021. *Profesionalisme Guru Dalam Pengelolaan Kegiatan Pembelajaran Di Sekolah*. Yogyakarta: Cv Budi Utama
- Mardiasmo, 2009, *Akuntansi Sektor Publik*. Andi. Yogyakarta
- Nana, S. S. (2007). *Metode Penelitian pendidikan*. PT Rosda Karya.
- Singarimbun, M. (1991). *Metode Penelitian Survei*. LP3ES.
- Suherianto. 2020. *Wordwall Aplikasi Bermain Sambil Belajar*. (<http://www.cocokpedia.net/2020/07/wordwall-aplikasi-bermain-sambilbelajar.html>.)
- Sudjana, N. R. (2002). *Penilaian Proses Belajar Mengajar*. Remaja Rosdakarya.
- Suherli, Maman Suryaman, Aji Septiaji, dan Istiqomah. 2017. *Bahasa Indonesia SMA/MA/MAK Kelas XI*. Jakarta: Kemendikbud RI.
- Thiagarajan, Sivasailam, dkk. (1974). *Instructional Development for Training Teachers of Exceptional Children*. National Center for Improvement Educational System.
- Zulganef, 2006. *Pemodelan Persamaan Struktur dan Aplikasinya Menggunakan AMOS 5*. Bandung: Pustaka.