

# The Geographic Information System of Gas Station (SPBU) Location In Musirawas, Lubuklinggau, and North Musirawas Based on Mobile Web

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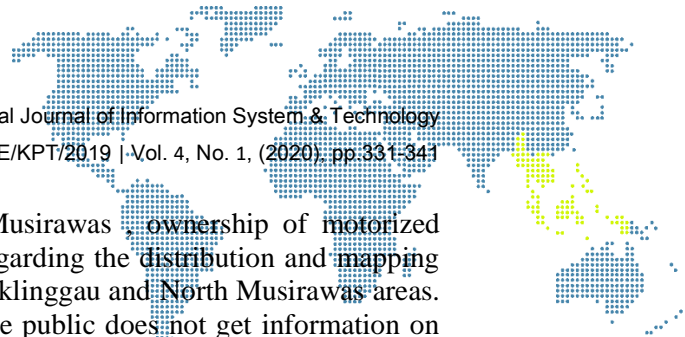
## Abstract

*Making a Geographical Information System for the Location of Public Fuel Filling Stations (SPBU) in Musirawas, Lubuklinggau, and North Musirawas based on Mobile Web, the community still has difficulty in finding the location for gas stations, especially people outside the region who also do not know the mileage so that they have the potential to run out of fuel and the community also does not know the types of fuel available at the gas station so that you have the potential to get lost when looking for a gas station location. This research uses data collection methods, by observing and recording directly at the research site (observation), conducting direct question and answer with the resource (interview) and documentation by reading existing books and literature. The results of the geographic information system design for the location of gas station stations (SPBU) in Musirawas, Lubuklinggau, and North Musirawas based on Web Mobile was made by using the PHP programming language and MySQL database and making program listings using the Adobe Dreamweaver application. The system created by this user can select directly the closest gas station menu by pressing the button where the nearest gas station is located so that the closest gas station location where you are is will appear. Information on gas stations can also be known with information which is located according to the location of the gas stations chosen and users can provide feedback in the form of comments or suggestions for improvements to the gas stations.*

**Keywords:** Web, Information, System, Geographic

## 1. Introduction

Geographic Information System (GIS) is a computer-based information system, designed to work using data that has spatial information (spatial reference). This system captures, checks, manipulates, integrates, analyzes, and displays data that spatially refers to earth conditions. Geographical Information Systems (GIS) technology integrates common database operations, such as query and statistical analysis, with mapping's unique visualization and analysis capabilities. This ability distinguishes GIS from other information systems that makes it useful for various groups to explain events, plan strategies, and predict what happens [1]. A Gas Station is a place where motorized vehicles can get fuel. In Indonesia, Gas Stations are known as SPBU (short for General Fuel Filling Stations) [2]. Gas Stations generally provide several types of fuel, namely: Gasoline and various product variants of Gasoline, Diesel, E85, LPG in various cylinder sizes, and Kerosene [2]. So far, it is difficult for the community to find gas stations, especially people outside the area, people do not know the distance so that they have the potential to run out of fuel, people also do not know the types of fuel available at the gas stations, and people have the potential to get lost when searching for gas stations. Sometimes the community is looking for a gas station and does not know the distance from the location to the gas station, which can result in running out of fuel on the road.



In Musirawas area, Lubuklinggau and North Musirawas, ownership of motorized vehicles has increased [3]. Information problems regarding the distribution and mapping of gas stations that are scattered in Musirawas, Lubuklinggau and North Musirawas areas. So that when the community need a gas station, the public does not get information on gas stations quickly and accurately. Therefore need geographic information. From the problems faced by the community to find gas stations, the authors conducted research using Geographical Information System (GIS) technology which is applied for Geographical Information System website to find out location of gas station (SPBU). Therefore the authors are interested in raising the problem to become a research entitled "Geographical Information System for Gas Station (SPBU) area in Musirawas, Lubuklinggau, and North Musirawas based on Mobile Web".

## **2. Research Methodology**

In this study the authors will design and create a Geographical Information System for the Location of Public Refueling Stations (SPBU) in Musirawas, Lubuklinggau, and North Musirawas based on Mobile Web, so that it can be accessed on the website via smartphones and computers to make it easier for the public to know gas stations location. (SPBU) in Musirawas, Lubuklinggau, and North Musirawas by accessing them on smartphones and computers online.

### **2.1. Literature Review**

#### **2.1.1. System**

The system is basically a group of elements that are closely related to one another, which function together to achieve certain goals. In simple terms, the system can be defined as a collection or set of elements, components, or variables that are organized, interact with each other, depend on each other and are integrated. The system can be either abstraction or physical [4]. The system is a collection of interrelated elements that are responsible for processing input to produce output[5].

#### **2.1.2. Information**

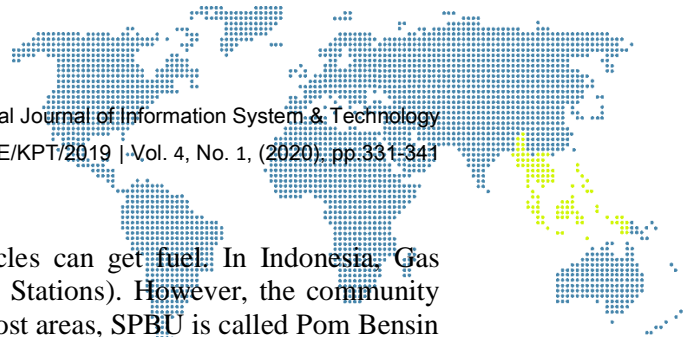
Information is basically a set of data that has been processed into something that has broader meaning and use. In his journals, in general, information is the result of data processing obtained from each element of the system into a form that is easily understood and constitutes relevant and useful knowledge[4]. Information is data that has been managed in such a way that it has added value and is used in decision making [6].

#### **2.1.3. Information System**

Information system is a formal (unitary) entity consisting of various physical and logical resources. An information system is a set of components that are interconnected and work together to collect, process, store, and distribute related information to support the decision-making process, coordination, and control[7].

#### **2.1.4. Geographic Information System**

Basically, the term Geographical Information System (GIS) is a combination of three main elements, such as systems, information and geography. By looking at these elements, it is clear that GIS is an information system that emphasizes the element of "geographic information". GIS consists of spatial and a special data [8]. Geographic Information Systems is a special information system that manages data in spatial information (spatial reference). Or in a more narrow sense, is a computer system that has ability to build, store, manage and display geographically referenced information, for example data identified by location, in a database [9].



### 2.1.5. Gas Station (SPBU)

A gas station is a place where motorized vehicles can get fuel. In Indonesia, Gas Stations are known as SPBU (General Fuel Filling Stations). However, the community also has another name for SPBU. For example, in most areas, SPBU is called Pom Bensin which stands for Petrol Pump. In some areas in Maluku, gas stations are called petrol stations [2].

### 2.1.6. Google Map Service (G-Maps)

Google Map Service is a free online virtual global map service provided by the company Google. Google Maps which can be found at <http://maps.google.com>. Google Maps offers drag gable maps and satellite images for the whole world [1].

### 2.1.7. Website

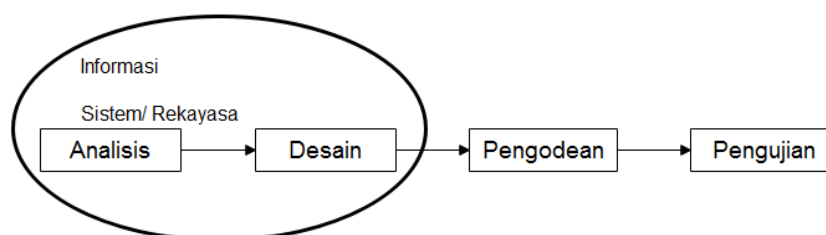
Web is an application that contains multimedia documents (text, images, sound, animation, video) in using the HTTP protocol (hypertext transfer protocol) and to access it by using software called a browser. Several types of browsers that are popular today include: Internet Explorer produced by Microsoft, Mozilla Firefox, and Safari produced by Apple. Web sites are web documents that are collected into a single unit that has a Unified resource locator (URL) / domain and is usually published on the internet or intranet [7]. The mobile web aims to access data services wirelessly using mobile devices such as cellphones, smartphones and portable devices connected to a cellular telecommunications network. A mobile web accessed via a mobile device needs to be designed by considering the limitations of a mobile device such as a mobile phone that has a screen with a limited size or some limitations on a mobile device[10].

### 2.1.8. UML (Unified Manual Language)

UML is a visual language for modeling and communication about a system using diagrams and supporting texts [11].

## 3.2. Systems Development Method

The system development method used in this research is the waterfall method. This SDLC model (System Development Life Cycle) is often called a linear sequential model or classic life cycle (Classic Life Cycle). This waterfall model provides a sequential or sequential approach to the software life flow starting from analysis, design, coding, testing, and support or maintenance [11].



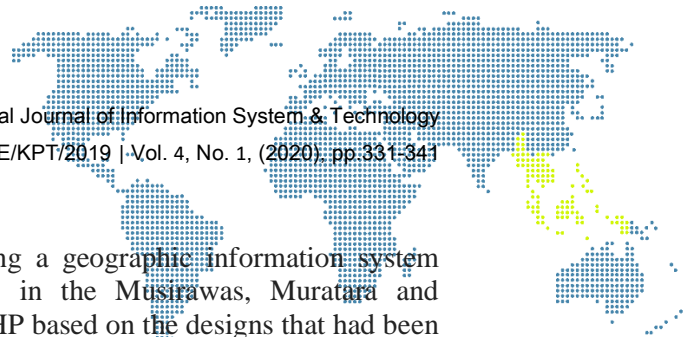
**Figure 1. Waterfall**

#### a) Software Analysis

The analysis process carried out by the author is to analyze the system requirements to build a geographic information system where gas stations are located in Musirawas, Muratara, and North Lubuklinggau.

#### b) Design

At this stage the authors design or design a geographic information system for the location of gas stations in the Musirawas, Muratara, and Lubuklinggau areas, in this case the authors use UML for system design and use class diagrams in database design (database), and Input / Output.



c) Creating Programing Code (*coding*)

At this stage, the coding process or making a geographic information system program for the location of gas stations in the Musirawas, Muratara and Lubuklinggau areas was carried out using PHP based on the designs that had been carried out in the previous stage.

d) Testing (*Testing*)

At this stage, testing of the geographic information system of the location of gas stations in the Musirawas, Muratara and Lubuklinggau areas was carried out which was coded using the PHP programming language.

## 2.2. Needs Analyse And System Design

### 2.2.1. Needs Analyse

In the needs analysis phase, the author looks at the current system and what is needed in the system and then provides a solution in solving the problem.

a) Needs Analyse

At this time, people searching for gas stations still rely on asking the surrounding community, especially people outside the area, this has resulted in the community having difficulty finding a gas station. Sometimes the community is looking for a gas station and does not know the distance from the location to the gas station, which can result in running out of fuel on the road.

b) Problem Solving Alternative

The alternative solution to the problem that will be made by the author is to use the current geographic information system (GIS), for information on previous gas stations from relatives, it will be more efficient. The public can find out the closest distance between the vehicle to stop and the nearest gas station. With smartphone technology, everyone can directly access information on the place for refueling (SPBU) to be easier

### 2.2.2. System Design

Based on the above problems, the authors try to provide solutions for solving the problems experienced by the community because of the difficulty in finding gas stations in Lubuklinggau, Musirawas and North Musirawas areas. The geographic information system that uses was G-Maps API can make it easier for people to find the nearest gas station because it uses the Google satellite for mapping.

a) Usecase Diagram

Designing a Use Case diagram is an illustration when the admin and user use a geographic information system where the general fueling station (gas station) is located, where in this use case the admin and user have their respective parts and duties. Use cases are on the next page:



**Figure 2. Usecase Diagram**



## b) Class Diagram

Class diagram is a diagram that is used to display several classes in the software system to be developed. Class diagrams show the relationships between classes in the system being built and how to collaborate with each other to achieve a goal.

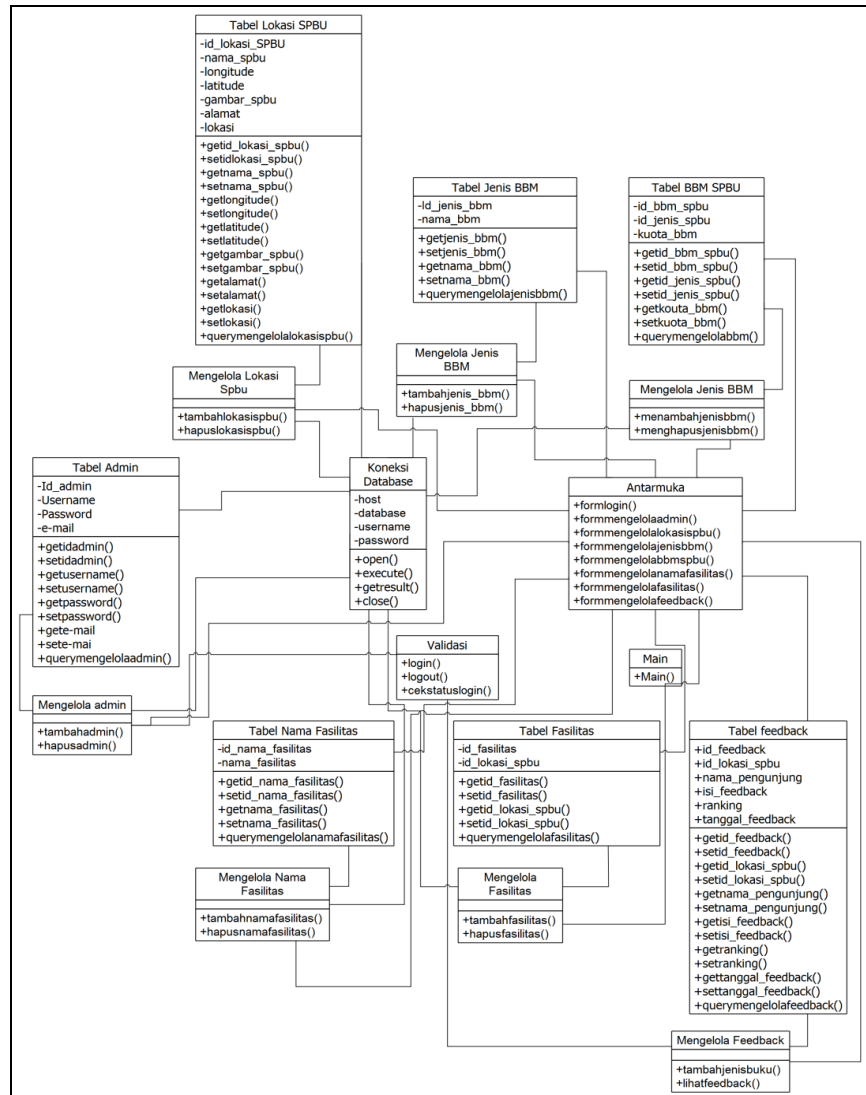


Figure 3. Class Diagram

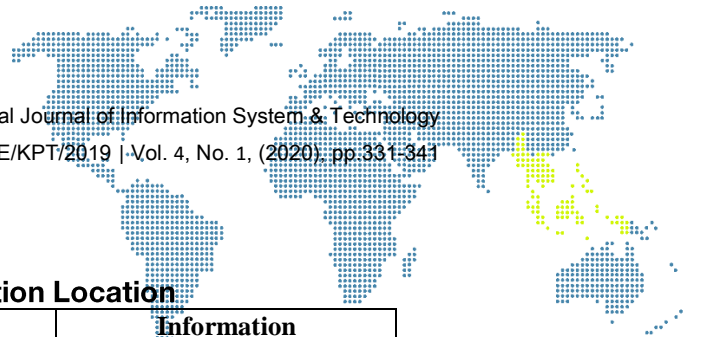
## c) Database Design

Table design is the creation of database tables that will be used in programming. The table design on the design of a geographic information system, the location of filling a general gas station based on Web Mobile, follows the table design, which can be seen on the next page:

### 1) Table of Admin

Table 1. Admin Table

Field	Type	Information
Id_Admin	Integer(5)	Admin Identity
Username	Varchar(255)	Admin Name
Password	Varchar(255)	Password Admin
Email	Varchar(255)	Admin Email



2) Table of Gas Station Location

**Table 2. Table of Gas Station Location**

<i>Field</i>	<i>Type</i>	<i>Information</i>
<u>id_lokasi_spbu</u>	<i>integer(5)</i>	Gas Station Identity
nama_spbu	<i>varchar(255)</i>	Gas Station Name
longitude	<i>varchar(255)</i>	Gas Station Location
latitude	<i>varchar(255)</i>	Gas Station Location
gambar_spbu	<i>varchar(255)</i>	Gas Station Figure
alamat	<i>varchar(255)</i>	Gas Station Address
lokasi	<i>varchar(255)</i>	Gas Station Location

3) Table of Kinds of Gas

**Table 3. Table of Kinds of Gas**

<i>Field</i>	<i>Type</i>	<i>Information</i>
<u>id_jenis_bbm</u>	<i>integer(5)</i>	Gas Identity
nama_bbm	<i>varchar(255)</i>	Gas Name

4) Table of Gas Available at Gas Station

**Table 4. Table of Gas Available at Gas Station**

<i>Field</i>	<i>Type</i>	<i>Information</i>
<u>id_bbm_spbu</u>	<i>integer(5)</i>	Gas Identity
Id_jenis_bbm	<i>integer(5)</i>	Kind of Gas Identity
Kuota_bbm	<i>Varchar (255)</i>	Available Gas

5) Table of Name Facility

**Table 5. Table of Name Facility**

<i>Field</i>	<i>Type</i>	<i>Information</i>
<u>id_nama_fasilitas</u>	<i>integer(5)</i>	Facility Identity
Nama_fasilitas	<i>Varchar (255)</i>	Facility Name

6) Table of Facility

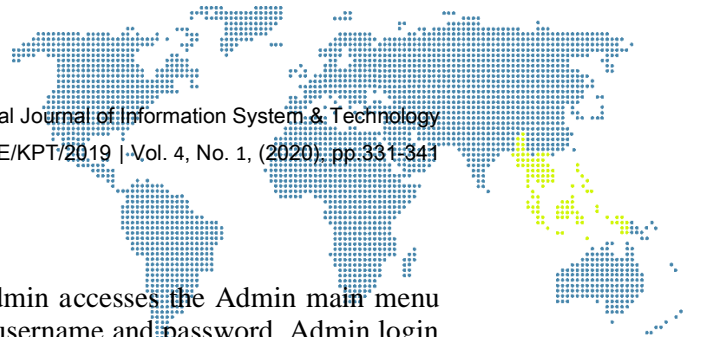
**Table 6. Table of Facility**

<i>Field</i>	<i>Type</i>	<i>Information</i>
<u>id_fasilitas</u>	<i>integer(5)</i>	Facility Identity
Id_lokasi_spbu	<i>integer(5)</i>	Gas Station Identity

7) Table of Feedback

**Table 7. Table of Feedback**

<i>Field</i>	<i>Type</i>	<i>Information</i>
<u>id_Feedback</u>	<i>int(5)</i>	<i>Feedback Identity</i>
id_lokasi_spbu	<i>int(5)</i>	Gas Station Identity
nama_pengunjung	<i>varchar(255)</i>	Visitors Name
isi_Feedback	<i>varchar(255)</i>	Visitors Information
ranking	<i>varchar(255)</i>	Gas Station Score
tanggal_Feedback	<i>date</i>	<i>Feedback Date</i>



### 3. Results and Discussion

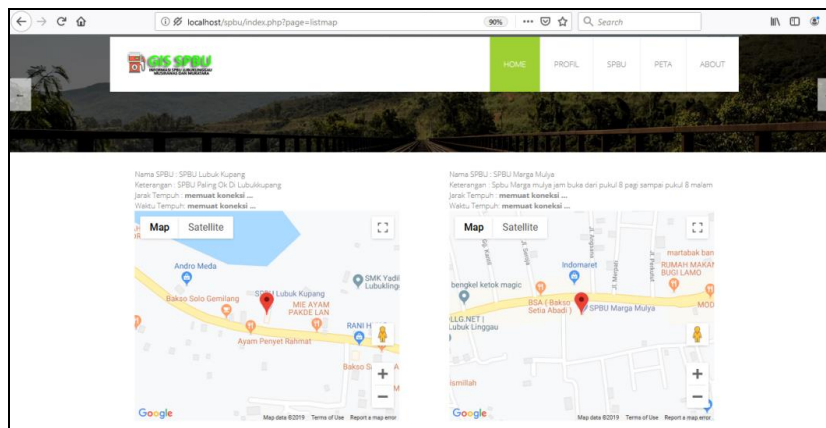
#### a) Login Admin Page

The Admin login page is the first page when Admin accesses the Admin main menu page, on this page the Admin is required to fill in a username and password. Admin login page can be seen in the image below:

**Figure 4. login admin Page**

#### b) Gas Station Geographical Information System Page

The main menu page of the visitor is the main page used by the user in selecting several functions of this menu. The main menu page of the visitor consists of the home menu, profile, gas station, map, about. Admin main menu page can be seen in the image below:



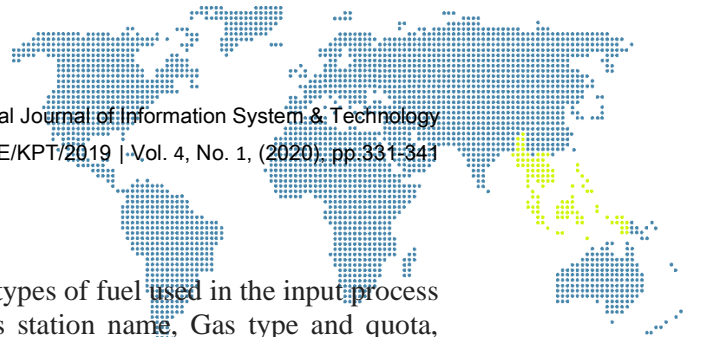
**Figure 5. Gas Station Geographical Information System Page**

#### c) Gas Station Location Input page

The gas station location data input page consists of filling in the gas station location forms used in the process of inputting the location of the gas station, the form consists of the x coordinate form, the y coordinate, the gas station name, description, address, and image from this data, it will be continued with gas station data storage process. The data input page for gas stations can be seen in the following figure:

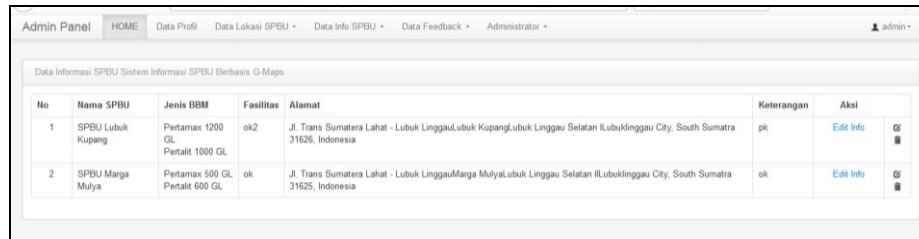
NAMA	SPBU	Lat	Long	Status
SPBU Lubuk Kumpang	SPBU Paling Ok Di Lubuk Kumpang	-0.2719742835457988	102.9374645596029	
SPBU Marga Mulya	Spbu Marga mulya jam buka dari pukul 8 pagi sampai pukul 8 malam	-0.273216748968539	102.9374645596029	

**Figure 6. Page of Senoir High School admin**



#### d) Gas Type Input page

Gas type data input page consists of forms of the types of fuel used in the input process of fuel types, the form consists of the form of gas station name, Gas type and quota, facilities, gas station information from this data, it will be continued with the process of storing gas station data. . The gas station data input page can be seen in the picture:

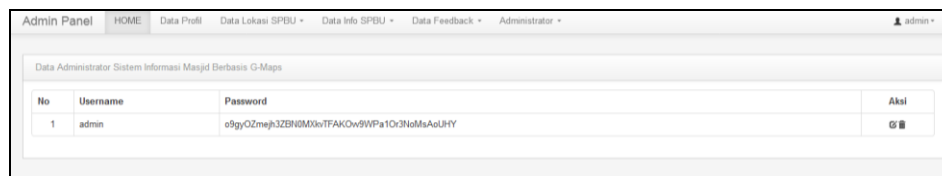


No	Nama SPBU	Jenis BBM	Fasilitas	Alamat	Keterangan	Aksi
1	SPBU Lubuk Kupang	Pertamax 1200 GL Pertalit 1000 GL	ok2	Jl. Trans Sumatera Lahat - Lubuk LinggauLubuk KupangLubuk Linggau Selatan II Lubuklinggau City, South Sumatra 31626, Indonesia	pk	<a href="#">Edit Info</a>
2	SPBU Marga Mulya	Pertamax 500 GL Pertalit 600 GL	ok	Jl. Trans Sumatera Lahat - Lubuk LinggauMarga MulyaLubuk Linggau Selatan II Lubuklinggau City, South Sumatra 31625, Indonesia	ok	<a href="#">Edit Info</a>

Figure 7. Gas Type Input page

#### e) Admin data output page

The Admin data output page is a page that displays the output data from the Admin data input process which is inputted by the Admin on the Admin data input page, this page consists of a table with a username and password as well as an edit and delete option menu. The following Admin data output can be seen in the picture:

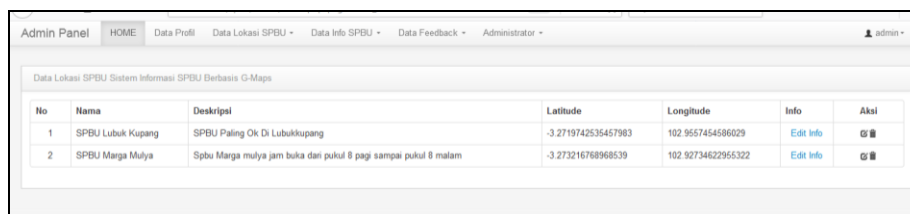


No	Username	Password	Aksi
1	admin	c8gy0Zmejh3ZEN6M0x0TFAKOw9WPa10r3NoMsAoUHY	<a href="#">Edit Info</a>

Figure 8. Admin data output page

#### f) Gas Station Location Data Output Page

The SPBU location data output page is a page that displays the output data from the process of inputting gas station location data which is inputted by the Admin on the Gas Station location data input page, this page consists of a table of names, descriptions, latitude, longitude, info and an edit and delete option menu. The following output location of gas stations can be seen in the picture:



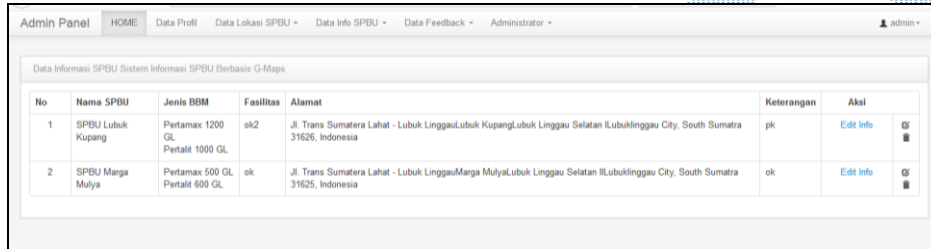
No	Nama	Deskripsi	Latitude	Longitude	Info	Aksi
1	SPBU Lubuk Kupang	SPBU Paling Ok Di LubukKupang	-3.2719742535457983	102.9557454586029	<a href="#">Edit Info</a>	
2	SPBU Marga Mulya	Spbu Marga mulya jam buka dari pukul 8 pagi sampai pukul 8 malam	-3.273216768968539	102.92734622955322	<a href="#">Edit Info</a>	

Figure 9. Gas Station Location Data Output Page

#### g) Output page for fuel types and facilities

The data output page for fuel types and gas station facilities is a page that displays the output data from the input process for fuel types and gas station facilities that are input by the admin on the input page for fuel types and gas station facilities, this page consists of a table of names of petrol stations, types of fuel, facilities, addresses, Description and edit and delete options menu. The following data output types of fuel and gas station facilities can be seen in the figure:



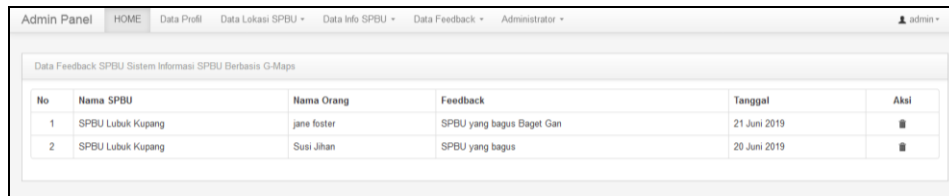


No	Nama SPBU	Jenis BBM	Fasilitas	Alamat	Keterangan	Aksi
1	SPBU Lubuk Kupang	Pertamax 1200 GL Pertalite 1000 GL	ok2	Jl. Trans Sumatera Lahat - Lubuk LinggauLubuk KupangLubuk Linggau Selatan ILubuklinggau City, South Sumatra 31626, Indonesia	pk	<a href="#">Edit Info</a>
2	SPBU Marga Mulya	Pertamax 500 GL Pertalite 600 GL	ok	Jl. Trans Sumatera Lahat - Lubuk LinggauMarga MulyaLubuk Linggau Selatan ILubuklinggau City, South Sumatra 31625, Indonesia	ok	<a href="#">Edit Info</a>

**Figure 10. Output page for fuel types and facilities**

#### h) Output Data Feedback Page

The Output data feedback page is a page that displays the output data from the visitor process. Input feedback input by visitors on the Input page for gas types and gas station facilities, this page consists of a table of gas station names, names of people, feedback, dates and menu of edit and delete options. The following output data feedback can be seen in the picture:



No	Nama SPBU	Nama Orang	Feedback	Tanggal	Aksi
1	SPBU Lubuk Kupang	jane foster	SPBU yang bagus Baget Gan	21 Juni 2019	
2	SPBU Lubuk Kupang	Susi Jihan	SPBU yang bagus	20 Juni 2019	

**Figure 11. Output page for Output data feedback**

## 4. Conclusion

After completing the design and creation of the Geographical Information System application of the location of gas station (SPBU) in Musirawas, Lubuklinggau, and North Musirawas based on Mobile Web, the authors draw the following conclusions:

- The community has no difficulty finding gas stations, especially people outside the area, because the location of the gas stations is already integrated with the G-Maps API.
- The community knows the distance to the nearest gas station so that when it runs out of gas, motorists can immediately fill it up at the nearest gas station or if it is critical, they can temporarily fill it at retail.
- It is easy for the public to know the types of gas available at the nearest gas station because the information is accurate and easy to use.
- The community does not have the potential to get lost when looking for a gas station location because the directions on the G-Maps API are well integrated by the satellite.

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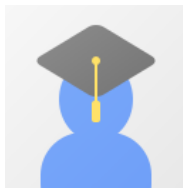
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