



# Development of the E-PSU System to Improve the Quality of Housing, Infrastructure, Facilities and Utilities (PSU) Data Management in Bandung City

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**Abstract.** Bandung City is the main choice location for developers to build housing in the West Java region. Formal housing development is growing rapidly and the impact of the property sector is the backbone of the economy. One of the policies taken by the Bandung City Government is to encourage the provision and provision of housing infrastructure, facilities, and public utilities (PSU) is the issuance of the Minister of Home Affairs Regulation No. 9 of 2009 and Bandung City Regulation No. 5 of 2019 concerning the provision, handover and management of housing infrastructure, facilities, and public utilities (PSU). The implementation of the handover of housing infrastructure, facilities, and utilities (PSU) in Bandung City is still low, only 242 of 643 housing estates (37%) have been handed over to the local government by 2025. One of the obstacles to the low handover of housing PSU is the absence of an information system that facilitates developers in the process of handing over housing PSU to the local government. Currently, housing developers submitting the handover of housing PSU infrastructure must come directly to the Bandung City Government Housing and Settlement Office by filling out forms and filling in data repeatedly, so it takes a lot of time and effort. This research aims to design and build a housing public utility (PSU) data management system (E-PSU) to improve PSU handover from developers. The E-PSU system development method used is the Software Development Life Cycle (SDLC). The E-PSU system can facilitate the Bandung City government in improving the housing PSU handover process and the quality of regional asset governance.

**Keywords:** Housing, Developers, Infrastructure, Public Facilities and Utilities, PSU, E-PSU.

## 1 Introduction

Indonesia's consistent annual population growth has significantly increased the need for housing. By 2025, Indonesia's population is expected to reach 281.6 million, with a growth rate of 1.11 percent per year and a population density of 149 people per square kilometer [1]. This increase demands housing that not only provides shelter but also

adequate infrastructure, facilities, and utilities (PSU), especially for low-income communities. Regional governments play a crucial role in overseeing settlement and housing development to ensure compliance with applicable laws and regulations and ensuring the continued maintenance and management of housing PSU [2].

Indonesian regulations are clearly defined in Law Number 1 of 2011 concerning Housing and Settlement Areas, Article 1, number 2, which states that "Housing is a collection of houses equipped with infrastructure, facilities, and utilities as a result of efforts to provide habitable housing." Law Number 1 of 2011, Article 1, Numbers 21-23, defines infrastructure as the basic physical facilities of a residential environment that meet certain standards for the needs of a decent, healthy, safe, and comfortable place to live. Furthermore, facilities are facilities within the residential environment that function to support the organization and development of social, cultural, and economic life. Meanwhile, public utilities are supporting facilities for residential environmental services. This regulation affirms that the public has the right to occupy housing that meets livable standards, is safe, affordable for all groups, and is equipped with adequate housing supply.

Based on the policy, housing supply must be handed over by housing developers to the Regional Government. As stipulated in the Minister of Home Affairs Regulation Number 9 of 2009 concerning Guidelines for the Handover of Housing and Settlement Infrastructure, Facilities, and Utilities in Regional Areas, Article 2 states, "The handover of housing and settlement infrastructure, facilities, and utilities from developers to regional governments aims to ensure the continued maintenance and management of infrastructure, facilities, and utilities in housing and settlement areas" [3].

The handover of housing public assets (PSU) to regional governments is crucial because, upon handover, their status changes to Regional Property. With this change in status, the management and maintenance of PSU become the responsibility of the regional government, thus relieving the burden on developers and ensuring the public access to professionally managed public facilities. This also relates to a study on the implementation of policies on the utilization of Regional Property, which emphasized that ensuring the status of public assets is crucial to ensuring their continued maintenance [4].

The implementation of the handover of housing land rights (PSU) in Bandung City, with a population of 2,452,943 remains very low [5]. Data from the Bandung City Housing and Settlement Agency (DPKP) 2025 shows that out of a total of 643 housing complexes, only 242 (37.63%) have handed over their PSU.

This low PSU handover rate is due to weak local government oversight. One key factor contributing to this weak oversight is poor data management. The Bandung City Government still lacks an integrated data processing system that can be used to monitor and take action against developers who neglect their obligations to hand over housing PSU assets.

Furthermore, critical data for housing developers, particularly those related to housing information and housing handover requirements, is still managed conventionally. Not all stored data has been digitized, placing it at high risk of loss or damage. Furthermore, PSU data management remains fragmented, resulting in a lack of integration.

This research designs and builds a Housing, Infrastructure, Facilities and Utilities (E-PSU) Data Management system in Bandung City to improve services to developers in facilitating the process of handing over housing PSU to the Bandung City government.

## 2 Literature Review

All forms of basic physical equipment in a neighborhood, area, city, or region that enable the area to function properly are referred to as infrastructure [6]. On the other hand, facilities include everything that functions as a tool to achieve a goal [7].

Bandung City Regulation Number 5 of 2019 concerning the provision, delivery, and management of housing infrastructure, facilities, and public utilities (PSU) states that [13]:

- (i). Infrastructure is defined as the basic physical components of a residential environment that meet certain requirements for a respectable, safe, and healthy place to live.
- (ii). Facilities are amenities within a residential environment that support the functioning and development of social, cultural, and economic life.
- (iii). Residential environmental services are supported by public utilities, hereinafter referred to as utilities.
- (iv). The transfer of assets and administrative responsibility for land, with or without buildings, from a developer to a local government is known as the Transfer of Infrastructure, Facilities, and Utilities, or the Transfer of State-Owned Enterprises.
- (v). Housing is a collection of houses that function as a living space or residential area equipped with services, amenities, and infrastructure. Housing essentially includes low-rise housing and apartments.

The infrastructure, facilities, and utilities (PSU) provided by the developer consist of several components:

- (i). Housing infrastructure: Road network, Wastewater treatment plant system, Rainwater drainage network, and Waste disposal site.
- (ii). Housing facilities: Places of worship, Retail/commercial facilities, Facilities for government and public services, School equipment, Healthcare facilities, Tourism and sports facilities, Cemetery facilities, Park and green open space (RTH) facilities; and Parking facilities.
- (iii). Housing utilities: Clean water installation, Electrical network, Communications operator, Gas network, Vehicle system, Hydrant network, and Public street lighting installation.

Several previous studies have influenced the research on the Housing, Infrastructure, Facilities, and Utilities (E-PSU) Data Management System. The first study Developed a system for submitting housing PSU assistance requests from the community to the local government. The method used was Extreme Programming (XP). The results showed that the system for submitting housing PSU assistance could facilitate the community in requesting assistance for housing PSU improvements [8].

Another situation was also identified in a study that aimed to develop a data collection system for uninhabitable houses and housing PSU [9]. The system development method used Object-Oriented Analysis and Design (OOAD) with system modeling using Unified Modeling Language (UML). The results showed that the data collection system developed could present data on uninhabitable houses and housing PSU assets in an integrated manner.

Meanwhile, Developed an E-Lapor system to manage housing PSU issues in Sidoarjo Regency. This system was technically developed as a web-based system utilizing the Code Igniter framework and the MySQL database system. As a result, the E-Lapor system can facilitate monitoring, prevention, and enforcement activities for the Sidoarjo Regency government, particularly against developers who fail to comply with regulations regarding the provision of public utilities (PSU) in their housing complexes [10].

Previous research indicates that system development has been limited to data collection on housing infrastructure, facilities, and public utilities (PSU) in various regions. This challenge presents various challenges, such as the very low level of systems supporting the transfer of housing infrastructure, facilities, and public utilities (PSU) from developers to local governments. Therefore, the development of this E-PSU system is crucial, given the potential for problems with low PSU handover rates.

### **3 Method**

This study used a descriptive qualitative research method to analyze the implementation of the housing PSU handover process in Bandung City. Data collection was conducted through two main techniques: in-depth interviews and observations of the housing PSU handover process in the field. In determining the informants for this study, the researcher used a purposive sampling technique. Purposive sampling is a research sample selection technique that is chosen with specific considerations to facilitate the author's exploration of the object or social situation being studied [11].

#### **3.1 Data Analysis**

The data required to develop the E-PSU system is obtained from the Bandung City Government. This data comes from data submitted by developers to the Regional Government during the housing PSU handover process. The data types consist of developer profiles, housing data, and mandatory PSU handover requirements prepared by each developer. Details of the three data groups can be seen (see Table 1).

The data in Table 1 used to develop the E-PSU system are data from developers of completed housing developments. Developer profiles, data on completed housing developments and requirements for handover will be entered directly by the developer and verified by the Bandung City government.

**Table 1.** E-PSU system data details.

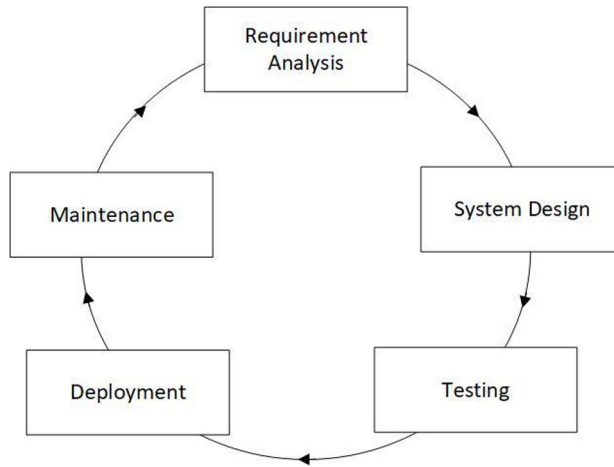
No	Data Type
<b>Developer Data</b>	
1	Developer Name
2	Manager Name
3	Address
4	Telephone
<b>Housing Data</b>	
1	Housing Name
2	Lokasi Location
3	Latitude, Longitude
4	Area
5	Unit
6	Photos
7	Type of PSU
8	Name of PSU
9	Length
10	Area
<b>Requirements Document</b>	
1	Company of Establishment
2	Company Taxpayer Identification Number (NPWP)
3	Application Letter
4	Land and Building Tax
5	Site Plan
6	Building Permit (IMB)
7	Land Certificate

The data in Table 1 that will be used to develop the E-PSU system comes from developers of completed housing developments. Developer profiles, completed housing data, and handover requirements will be entered directly by the developers and verified by the Bandung City government.

**3.2 E-PSU System Development Method**

The author used the waterfall approach to develop this E-PSU system using the SDLC (Software Development Life Cycle) model. The SDLC (Software Development Life Cycle) method is the process of developing or modifying a software system using the models and methodologies used to develop previous software systems [12].

The advantage of the SDLC (Software Development Life Cycle) is its clear system development phase structure, documentation is created for each development phase, and each phase is implemented after the previous phase is completed. The SDLC method provides a sequential software life cycle (see Fig. 1). The following steps, in accordance with the SDLC method, are:



**Fig. 1.** SDLC Method for E-PSU System Development.

### 3.3 E-PSU System Development Workflow

The development of the E-PSU system itself can be broadly divided into seven stages. The following visualization shows the general E-PSU system development flow (see Fig. 2). The first stage in website development is formulating the general concept for the E-PSU system. This concept was developed through consultation with the partner, the Bandung City Government. The second stage is the design of the E-PSU system features. This activity involves detailed development of the features to be presented in the E-PSU system.

Once the system is built and the features required for the E-PSU system are in place, historical data, including developer data, housing data, and requirements data, will be entered into the system. The fourth stage is website testing.

With the data and features entered into the system, a trial will be conducted to determine the system's reliability. The trial will provide an evaluation of the system, which will be used for improvements before the system is finalized and handed over to the Bandung City Government.

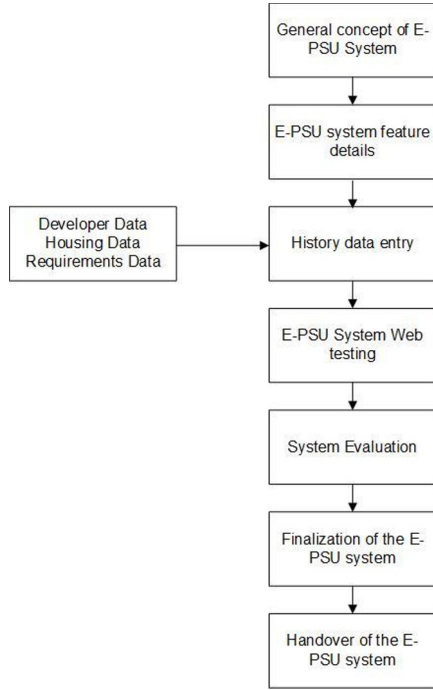
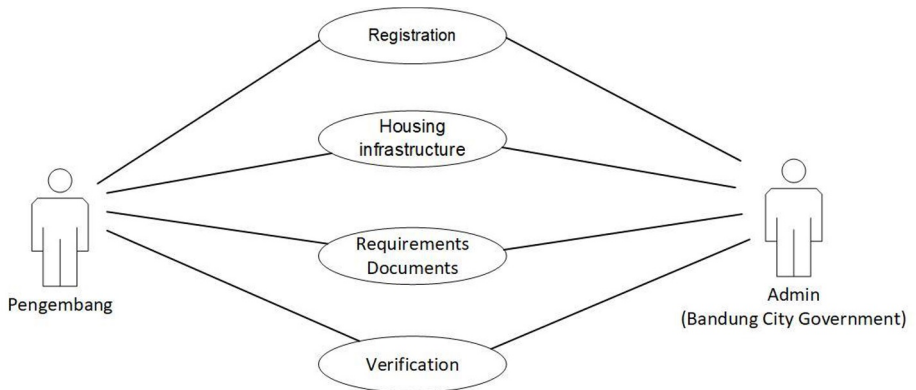


Fig. 2. E-PSU system development flow.

## 4 Results and Discussion

### 4.1 E-PSU System Design

Based on the data collection results, the relationship between users and the needs of the E-PSU system to be developed in the application can be described. The E-PSU system involves two main interacting users: the developer and the Admin (Bandung City Government) as the data manager for the housing PSU that will be submitted. Use case diagrams were used to design the services required by users in the E-PSU system (see Fig. 3).



**Fig. 3.** E-PSU System use case diagram.

A use case describes the services the system provides to users. A use case service contains a list describing the features the system can perform. The services provided in the E-PSU system shows in Table 2.

**Table 2.** List of services in the E-PSU system.

No	Use Case	Function
1	Registration	The system service manages the registration of applicants (developers) who will hand over housing PSU.
2	Housing Infrastructure	The system service manages housing PSU data.
3	Document Requirements	The system service manages data on required documents for the handover of housing PSU.
4	Verification	The system service verifies the completeness of applicants for the handover of PSU from developers.

#### 4.2 E-PSU System Implementation

This implementation phase explains the user interface for the E-PSU system, based on the design results from the previous phase. The E-PSU system will present two views: the developer's view and the Bandung City Government (Admin) view. The page accessed by the admin differs from the developer's view. The admin manages the verification data for handover applications from the developer, while the developer manages the housing PSU data (see Fig. 4).

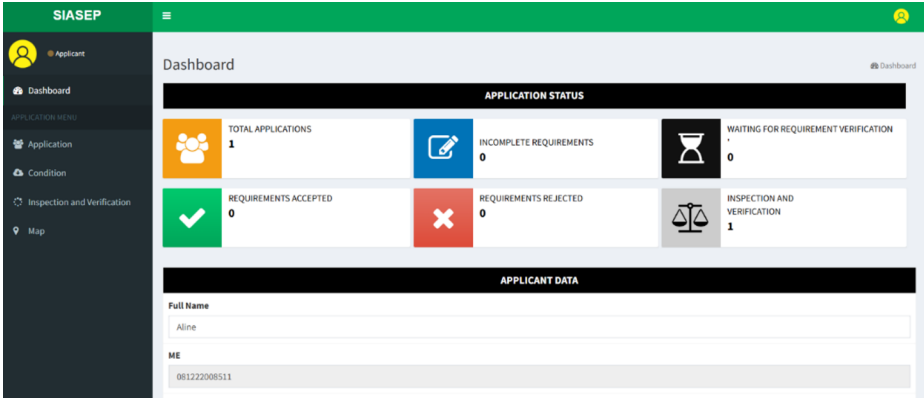


Fig. 4. Developer's main page.

The housing PSU handover application begins with the developer registering to obtain an account as an applicant and logging in with the registered username and password. The registration and login process for the developer's housing PSU handover application is illustrated (see Fig. 5).

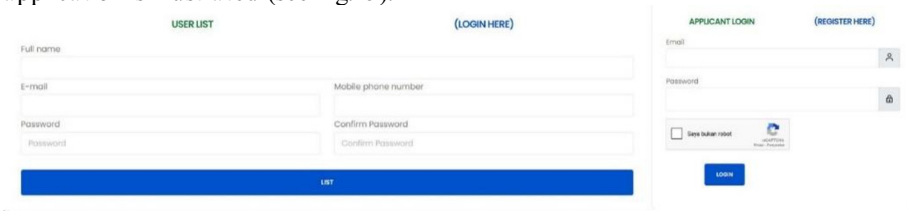


Fig. 5. Developer registration and login process.

Technically, the process of entering Housing PSU data into the E-PSU system occurs when the housing development has been completed. The Housing PSU data entry process is carried out directly by the developer by independently filling in and uploading the required information, and the results will be verified by the administrator. An overview of the workflow for the second situation is presented (see Fig. 6). In general, the PSU handover process feature contains information regarding housing data, PSU components, and required documents that developers must provide to the E-PSU system. The developer's data entry page displays housing data and handover requirements (see Figs. 7 and 8).

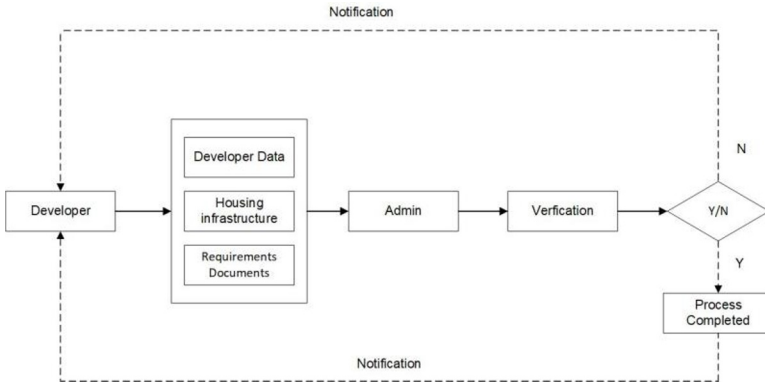



Fig. 6. Housing PSU data entry process flow in the E-PSU system.

HOUSING DATA			
Housing Name	Griya Wiwaha II Cimuncang	Location	Cimuncang
Ward	Everybody likes	Subdistrict	South Cibeunying
Number of Units	34	Wide	12000.00
Latitude	-6.893808751615767	Longitude	107.6441567783392
Development Year		Developer Name	PT. Dwi Elstis
Address	Jl. Endang Suwanda	Name of Leader	Dr. Indriyanti
Office Telephone No.	08233228372	Status	HANDOVER PROCESS

HOUSING PHOTOS



HOUSING MAP




Fig. 7. E-PSU Housing data entry page.

Required Documents Required Documents - Details

Entering the Examination and Verification Stage

**Announcement:**  
The process of uploading requirements can be carried out if the applicant has filled in the application and PSU data.

REQUIRED DOCUMENTS					
Company Leader's ID Card	ID card number	Upload Date	Verification Date	Status	Notes
	321112341234134	08/21/2024 11:13:02 AM	08/21/2024 11:13:02 AM	REQUIREMENTS ACCEPTED	
	7656585	08/21/2024 11:46:52 AM	-	WAITING FOR VERIFICATION	
	-	-	-	NOT UPLOADED YET	

Fig. 8. Upload required documents.

All data entered by the developer will go through a verification process on the admin page. The Bandung City Government (admin) verifies the developer's data. The admin provides feedback in the form of notifications to the developer. If the verification results are deemed incorrect or incomplete, the admin will contact the developer via the E-PSU feature and notify the developer to immediately correct/complete the data. Conversely, if all information and data entered by the developer is declared complete and correct based on the verification results, all data will automatically be entered into the E-PSU, as shown in Fig. 9.

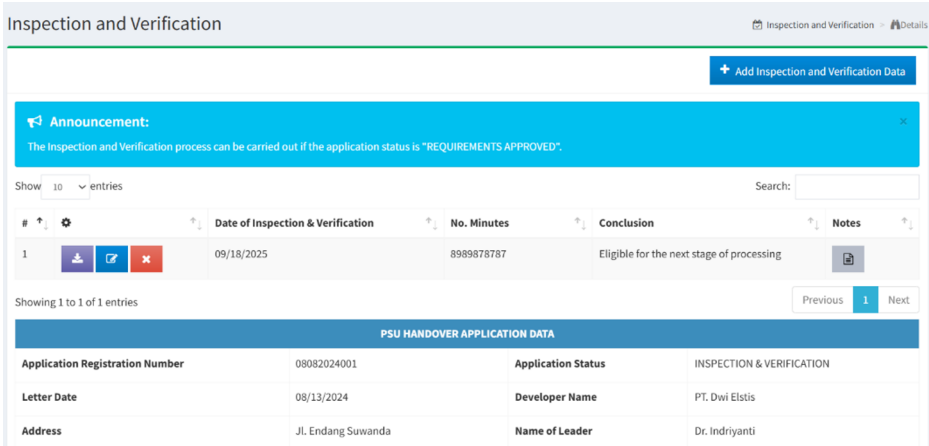


Fig. 9. Verification of developer requirements by admin.

The E-PSU system serves as the primary source of information for the Bandung City Government to monitor the provision and handover of public housing units (PSU) built by developers. The collected data from the E-PSU system is global and will be processed to support the monitoring system.

The presence of the E-PSU also explicitly transforms the PSU data management system in Bandung City, from a conventional one to a modern, digital-based system. Data is more secure and easily accessible to both the local government and developers. They can also access data relatively quickly. The E-PSU feature also provides developers with data storage facilities related to their housing development project activities in Bandung City. Finally, in the context of housing development management, the housing project data collected in the E-PSU feature can serve as a basis for information for the government in formulating policies and programs in the housing and settlement sector.

### 4.3 User Acceptance Testing (UAT)

This testing is conducted based on three criteria to ensure acceptable system quality: functional correctness and completeness, usability, and accuracy. Four statements will then be tested using five developer respondents (see Tables 3 and 4).

**Table 3.** UAT Statement.

No	Criteria	Statement	Description
1	Functional Correctness and Completeness	Focuses on ensuring the system operates according to user needs.	Do the features provided by the E-PSU system meet your needs ?
2	Accuracy	Focuses on ensuring that user input produces the desired output.	Do the input processes in the system produce the appropriate output ?
3	Usability	Focuses on how easy it is for users to use and learn the system.	Is the system easy to understand and easy to use ?

**Table 4.** UAT Testing Scores for Developers.

No	Criteria	Maximum Score	SS	S	N	TS	STS
1	Functional Correctness and Completeness	5 x 1	5 x 0	4 x 1	3 x 0	2 x 0	1 x 0
2	Accuracy	5 x 1	5 x 1	4 x 0	3 x 0	2 x 9	1 x 0
3	Usability	5 x 2	5 x 2	4 x 0	3 x 0	2 x 9	1 x 0
Total		20	15	4	0	0	3

Note : Strongly Agree: (SS), Agree: (S), Neutral: (N), Disagree: (TS), Strongly Disagree: (STS)

Next, we used a formula to find the acceptance index percentage and obtained the UAT test processing results, as shown in Table 5.

**Table 5.** Final results of UAT testing on developer.

No	Criteria	Percentage
1	Functional Correctness and Completeness	90 %
2	Accuracy	100 %
3	Usability	100 %

## 5 Conclusion

The implementation of the housing PSU handover in Bandung City still faces various challenges, particularly in terms of developer awareness, document completeness, effective oversight, and public participation. Existing regulations provide a clear legal basis, but implementation challenges remain, particularly related to the low rate of PSU handover from existing housing units.

This research aims to develop E-PSU as an information technology support effort to increase the number of housing PSUs handed over to local governments. Based on the findings, the development of this E-PSU provides several recommendations to improve the effectiveness of housing PSU handovers in Bandung City:

- (i). The development of a web-based housing E-PSU system will assist the Bandung City Government in improving the quality of its regional asset governance.
- (ii). The E-PSU system features make it easier for the Bandung City Government to evaluate the performance of housing developers in providing PSUs, monitor, and streamline the asset handover process.
- (iii). Finally, the E-PSU system features can increase the transparency of information related to the handover and governance of housing PSU assets and foster active community participation in managing housing PSU assets. In this way, the Bandung City Government can ensure the sustainability of asset management and the quality of the housing environment in its region.

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