

# DESIGN OF ENTERPRISE ARCHITECTURE IN E-GOVERNMENT DEVELOPMENT USING TOGAF ADM 9.2 FRAMEWORK IN ELECTRICITY SECTOR OF DEPARTMENT ENERGY AND MINERAL RESOURCE OF WEST JAVA PROVINCE

Adam Satya Kencana<sup>1)</sup>, Asti Amalia Nur Fajrillah<sup>2)</sup>, Ridha Hanafi<sup>3)</sup>

<sup>1, 2, 3)</sup> Study Program S1 Information System, Faculty Industrial Engineering, Telkom University  
Jl. Telekomunikasi No. 1, Sukapura, Kec. Dayeuhkolot, Kabupaten Bandung, Jawa Barat 40257  
e-mail: adamkencana@student.telkomuniversity.ac.id<sup>1)</sup>, astiamalia@telkomuniversity.ac.id<sup>2)</sup>,  
ridhanafi@telkomuniversity.ac.id<sup>3)</sup>

## ABSTRAK

*Selama beberapa tahun terakhir, Pemerintah telah menggunakan teknologi informasi dan komunikasi untuk mengintegrasikan fungsi internal mereka dan meningkatkan pemberian layanan. Sebagai bagian dari Pemerintah Provinsi Jawa Barat, Dinas Energi dan Sumber Daya Mineral berperan aktif di Pemerintah Provinsi Jawa Barat dalam target Pemerintah Provinsi Jawa Barat meningkatkan infrastruktur energi listrik yang mendukung pertumbuhan ekonomi dan akses listrik bagi rumah tangga hingga daerah terpencil. sehingga dapat berkontribusi dalam peningkatan pelayanan sistem pemerintahan berbasis elektronik di Provinsi Jawa Barat. Penelitian ini akan bekerja untuk membantu efektivitas dan efisiensi pelayanan publik melalui perancangan Enterprise Architecture (EA). Penelitian ini akan fokus pada proses bisnis, data dan informasi, aplikasi, dan layanan (tidak termasuk infrastruktur dan keamanan). Hasil akhir dari penelitian ini adalah cetak biru desain EA yang berisi usulan solusi untuk perbaikan proses bisnis, integrasi data, pengembangan aplikasi, dan pemenuhan kebutuhan pelayanan publik bidang Ketenagalistrikan Dinas Energi dan Sumber Daya Mineral Provinsi Jawa Barat dengan harapan dapat mempermudah aksesibilitas ke pelayanan kelistrikan di Jawa Barat.*

**Kata Kunci:** Bidang Ketenagalistrikan, Enterprise Architecture, Sistem Pemerintahan Berbasis Elektronik. TOGAF ADM 9.2

## ABSTRACT

*Over the past few years, the Government has used information and communication technology to integrate its internal functions and improve service delivery. As part of the West Java Provincial Government, the Department of Energy and Mineral Resources has an active role in the West Java provincial government. The West Java Government's target is to improve electrical energy infrastructure that supports economic growth and access to electricity for households in remote areas so that they can contribute to improving electronic-based government system services in West Java Province. This research will be aimed at helping the effectiveness and efficiency of public services through the design of Enterprise Architecture (EA). This research will focus on business processes, data and information, applications, and services (excluding infrastructure and security). The final result of this research is an EA design blueprint that contains proposed solutions for business process improvements, data integration, application development, and fulfillment of public service needs concerning the Electricity Sector of the West Java Province ESDM Department in the hope of facilitating access to electricity services in West Java.*

**Keywords:** Electricity Sector, Enterprise Architecture, Electronic-Based Government System, TOGAF ADM 9.2

## I. INTRODUCTION

OVER the past few years, the Government has used information and communication technology to integrate their internal functions and improve service delivery [1]. The role of technology and information affects various sectors in realizing an effective, efficient, transparent and accountable system so as to improve work results more quickly and accurately [2] E-Government also has a role in smart cities as part of a broad smart city in the context of the city and involves the transformation of Government to a modern ICT-based [3].

With the urgency in administering e-government, governments from various countries have developed electronic-based government services in their countries, including Indonesia.

In 2020, the United Nations (UN) published the e-Government Survey 2020, ranking the E-Government Development Index (EGDI) in 193 countries. Indonesia is ranked 88th out of 193 countries [4]. This ranking is still below several Southeast Asian countries, including Singapore, Malaysia, and Brunei Darussalam. This ranking shows that the Indonesian Government still needs to improve the Electronic-Based Government System to catch up with other countries.

In order to increase the quality of e-government in Indonesia, the Government, through Presidential Decree No.

95 of 2018, establish a presidential regulation on an electronic-based government system, which is used as a reference by the Central Government and Regional Governments in managing e-Government. The purpose of this regulation is to create clean, effective, transparent, and accountable governance along with quality and reliable public services that require an electronic-based government system [5] The Electronic-Based Government System Architecture (SPBE) is a foundation that describes the integration of business processes, data and information, infrastructure, applications, and security to produce an integrated SPBE service with one another [6]

With this regulation, every government agency, the central and regional governments, make a work plan to construct e-Government. However, in development, there is still some obstacles faced by the Government. The main challenge faced by every Government in implementing e-government is proper planning and management [7]. This problem is shown by the Ministry of Finance, which states that the total ICT expenditure of the Central and Regional Governments increases every year, resulting in a waste of funds. From 2014 to 2016, government ICT spending reached 12.7 trillion rupiahs. In the Information and Communication Technology Council findings, this wastage occurred due to constructing an unintegrated silo system because each Ministry, Institution, and Government built their government applications without proper plans and strategies. The silo construction system causes the disintegration of the existing information system in the Government, thus causing data security and data validity not to be fully trusted because the government data are not integrated. Therefore, both the Central and Regional Governments must improve to prevent the chain effects caused by these problems.

One of the Governments in Indonesia that is improving e-Government services is the West Java Provincial Government. Based on the 2019 SPBE monitoring and evaluation data accessed on the SPBE website, the West Java Provincial Government received a 'Good' predicate with an index of 3.12. Despite receiving a 'Good' rating, the Government of West Java has still not met the National SPBE target in the policy aspect of SPBE services. In this aspect, the West Java Government only got an index of 2.4 out of a target of 2.6. This index shows that it is necessary to improve the service policy, which will later assist the West Java Government in achieving its goals and objectives.

As part of the West Java Provincial Government, the Department of Energy and Mineral Resources (ESDM Department) has an active role in the West Java provincial government in the West Java Government's target to improve electrical energy infrastructure that supports economic growth and access to electricity for households to remote areas so that they can contribute in improving SPBE services in West Java Province. To overcome this difficulties, proper planning is needed in maximizing IT. The solution that can be done is to carry out Enterprise Architecture Design which is carried out to define business architecture, data architecture, application architecture, and technology architecture by creating business models, business strategies, and business processes that are aligned with the infrastructure of IT organization [8] Enterprise architecture is a conceptual blueprint that outlines an organization's structure and operations. The goal of enterprise architecture is to figure out how an organization may fulfill its present and future goals in the most efficient way possible [9]

Based on the background of the writing above, this research will focus on designing Enterprise Architecture using the TOGAF ADM framework. The TOGAF Standard is mainly used for its process completeness, Architectural Development Methodology (ADM), interoperability or flexibility in employing the elements, availability of architectural knowledge, vendor neutrality, and alignment with industry standards[10]TOGAF Framework has also been applied in the implementation of world front-runner countries in E-Government [11] TOGAF ADM is used to develop enterprise architecture, where there are detailed methods and tools for implementing it [12] The Enterprise Architecture design phase using TOGAF ADM will focus on the domains of Business Processes, Data and Information, Applications, and Services (excluding SPBE Infrastructure and SPBE Security) at the Department of Energy and Mineral Resources of West Java Province by focusing on Electricity Sector.

## II. RESEARCH METHOD

Combining behavioral-science and design-science paradigms, a conceptual framework is used to analyze, execute, and evaluate IS research [13]. This conceptual model will be used in conducting research on the preparation of Enterprise Architecture artifacts in the Energy and Mineral Resources Sector of West Java. the conceptual model can also describe this research through the structure of the Research Methodology in the following Table I.

TABLE I  
 RESEARCH METHODOLOGY

Aspects in research methodology	This research	Description
Conceptual Model	Design Science Research for the design of Enterprise Architecture (EA) or Information System Architecture.	It oriented scientific development through relevant architectural design and solutions to a context.
Framework / flow / theoretical model / engineering methodology	<ul style="list-style-type: none"> <li>• TOGAF ADM</li> <li>• Presidential Regulation on the Architecture of the National Electronic-Based Government System</li> <li>• Ministerial Regulation of PAN RB No.19 of 2018 Concerning the Preparation of Regional Agencies Business Process Map Concerning the Preparation of Regional Agencies Business Process Map</li> </ul>	In the architectural design process, the steps taken refer to the ADM component in TOGAF and •Presidential Regulation on the Architecture of the National Electronic-Based Government System for Reference and Architecture Design in this research. In addition, this research will refer to Ministerial Regulation of PAN RB No.19 of 2018 for the design of business process architecture.
Data collection method	Organizational case studies through interviews and observation of organizational documents.	Data collection method uses case studies to analyze the gaps and design needs based on the potential problems encountered.
Methods of data analysis and architectural design	<ul style="list-style-type: none"> <li>• Analysis of qualitative data on interviews and observations</li> <li>• Study of literature based on organizational documents, scientific theory, and previous research</li> </ul>	Interview data were processed qualitatively to identify the organization's problems, potentials, and needs. Then direct observation through the existing documents in the organization. Afterwards, a literature study was carried out on EA science with TOGAF ADM, applicable laws related to e-Government and local government, and previous research relevant to the research.
Tools in architectural design	Draw.io Bizagi Modeler	Architectural design in this research uses Draw.io tools and Bizagi Modeler.
Result verification method	Final evaluation of aspects of rigor (contribution to science) and relevance (suitability to needs in the field) according to the Design Science Research Cycle through feedback from stakeholders.	Research validation is carried out by evaluating stakeholders using the principle of relevance parameter on the design artifact results through the presentation of the final architecture and obtaining feedback from stakeholders.

The design of enterprise architecture in this study uses a reference based on the National SPBE Architectural Presidential Regulation, which is adapted to the TOGAF ADM 9.2 method. TOGAF ADM 9.2, is an update to the prior version that offers better guidance, corrects errors, enhances the document's structure, and gets rid of out-of-date material. Updates to the Business Architecture and the Content Metamodel are two of the most significant improvements achieved in this edition[14].

In addition, this research will refer to Ministerial Regulation of PAN RB No.19 of 2018 for the design of business process architecture. Enterprise architecture is widely acknowledged as the only management and technology discipline capable of producing holistic, all-encompassing designs for businesses [15]. TOGAF ADM has 8 (eight) main phases and a preliminary phase, as shown in Figure 1.



Figure 1 TOGAF ADM Phase[14]

The Architecture Development Method, as defined by TOGAF, is a thorough method for developing and implementing EA and information systems (ADM) [8]. The TOGAF phase used in this study starts from the preliminary phase, architecture vision, and business architecture, and Information System Architecture which is adapted to the SPBE architecture into business process architecture, data and information architecture, and application architecture. The description of each main phase used in this research is as follows:

1. Preliminary Phase, this phase highlights the actions that go into preparing and launching an Architecture Capability, such as customizing the TOGAF framework and defining Architecture Principles
2. Architecture Vision, this phase covers topics such as establishing the scope of the architecture development project, identifying stakeholders, generating the Architecture Vision, and securing consent to move forward with the architecture development
3. Business Process Architecture, this phase describes the interaction of interrelated business activities carried out by the organization.
4. Service Architecture, this phase aims to identify user-focused SPBE services oriented to business processes and applications through an integrated information system
5. Data and Information Architecture, this phase is used to identify data entities that will be used in designing the enterprise architecture blueprint.
6. Application Architecture, this phase is used to define the types of applications needed to manage data and support the organization's business activities.

### III. ANALYSIS AND RESULT

#### A. Preliminary Phase

The preliminary phase is where the EA design process begins. This phase entails beginning the EA design process and addressing any requirements for executing the target architecture. The output to be achieved in this stage is the Principles Catalog. The principles catalog captures the Business and Architecture Principles that describe what a "good" solution or architecture should look like. The following Table II is a principles catalog from the ESDM Department of West Java Province.

TABLE II  
PRINCIPLES CATALOG

Domain	Principles	Statement
Business Process Principles	Common Use	Applications used by the Department of Energy and Mineral Resources follow applications that the central or provincial government has developed.
	Information Management is Everybody's Business	All Department of Energy and Mineral Resources parties participate in information management decisions needed to achieve the existing vision and mission.
	Compliance with Law	All business processes within the ESDM Department must comply with all relevant laws, policies, and regulations.
	Service Orientation	IT Architecture Design at the ESDM Department focuses on integrated and easily accessible services.
Service Principles	Simple	Service Standards are easy to understand, follow, implement, and measure, with clear procedures and affordable costs for the community and organizers.
	Participative	Preparation of Service Standards by involving the community and related parties to discuss together and obtain alignment based on commitments or the results of an agreement
	Accountable	Subjects regulated in the Service Standards must be implemented and accounted for by interested parties.
	Sustainable	Service standards must be continuously improved to improve service quality and innovation.
	Transparency	Service Standards must be easily accessible to the public.

Domain	Principles	Statement
	Fairness	Service standards must ensure that the services provided can reach all people with different economic statuses, geographical locations, and differences in physical and mental capabilities.
Data Principles	Data is an Asset	Data is an asset that has value to the organization and is managed as needed.
	Data is Shared	Data is distributed to all work units and organizations in the ESDM Department
	Data is Accessible	The data can be accessed by users in the ESDM Department to carry out their functions.
	Common Vocabulary and Data Definitions	The data must be classified consistently across each stakeholder, and each stakeholder must understand the definition of the data.
	Data Security	Data must be protected from unauthorized use.
	Data Integration	Data can be integrated between users so that it can support business processes.
Application Principles	Technology Independence	The application used is independent, so it can be operated without regard to a particular technology platform.
	Ease-of-Use	The application is easy to use by the user.
	Application Integration	The application used is already integrated with other related applications.

**B. Architecture Vision**

The first stage of TOGAF ADM is called Architecture Vision. This stage aims to create a high-level aspirational concept of the capabilities and business value that the proposed Enterprise Architecture will deliver. The output of this phase is a value chain diagram and a solution concept diagram. In figure 2, the Value Chain diagram is a diagram that aims to classify, analyze, and understand the activities that exist within the organization. At the same time, Figure 3 Solution Concept Diagram is a diagram that illustrates the high-level orientation of the solution being considered to meet the objectives of the architectural engagement.

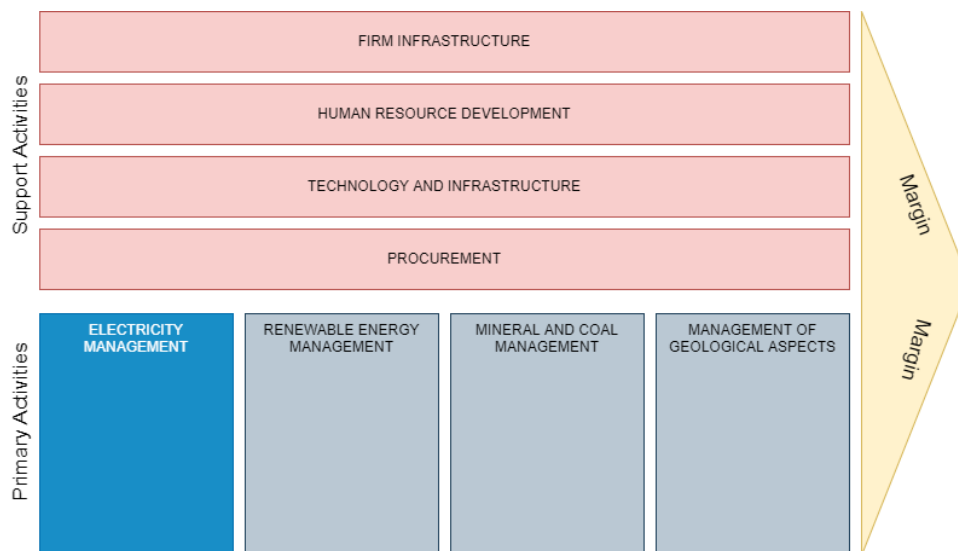


Figure 2 Value Chain Diagram

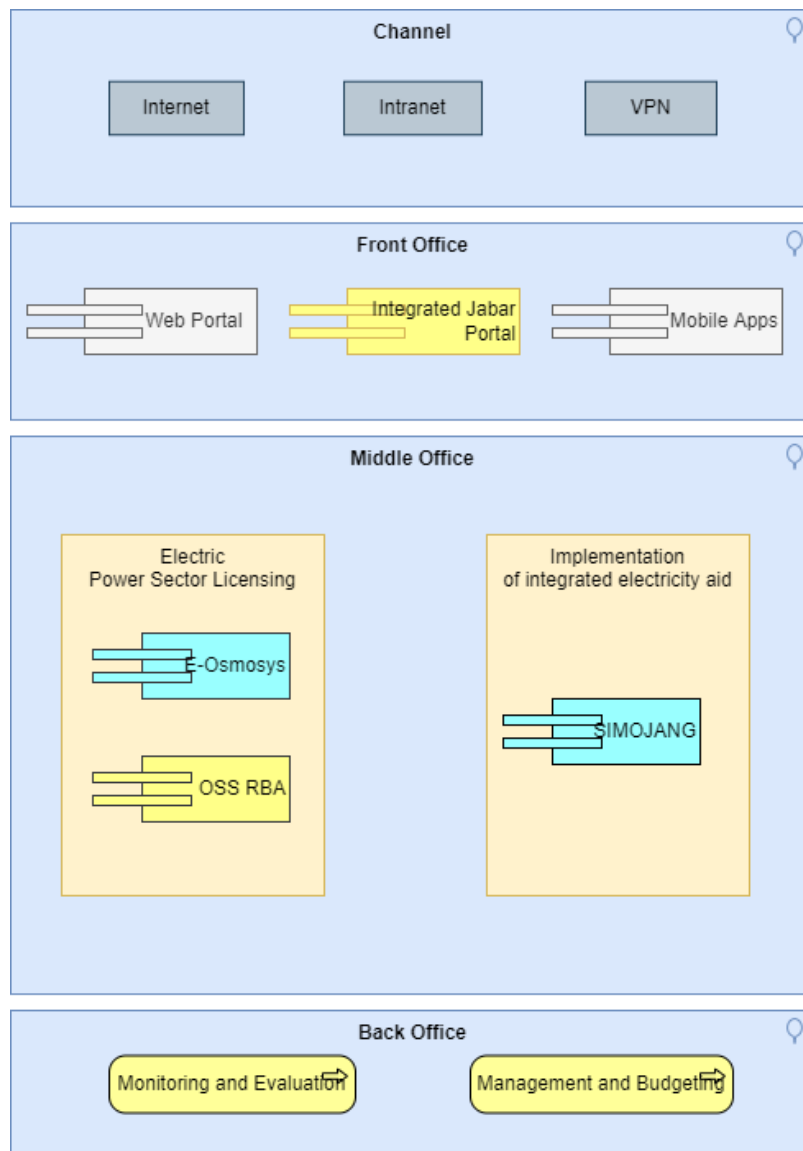
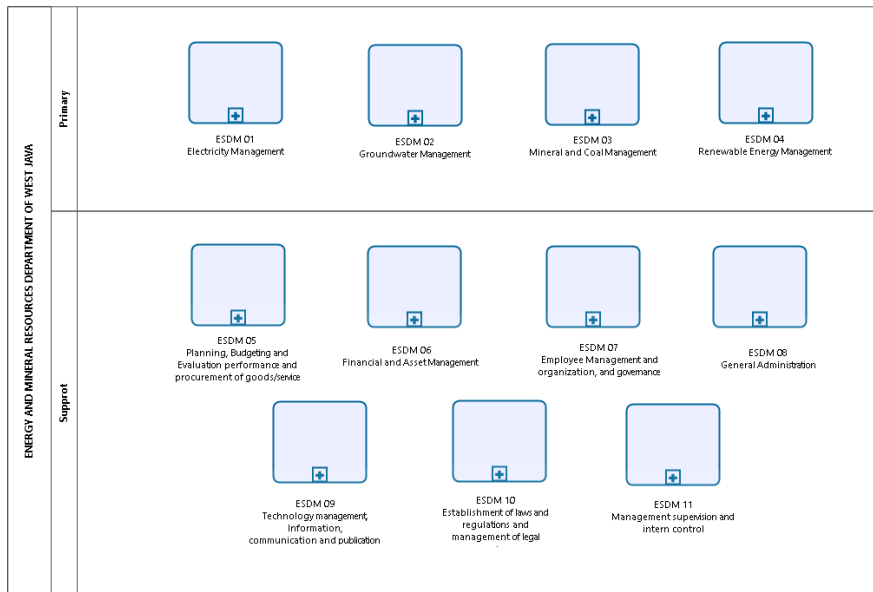


Figure 3 Solution Concept Diagram

### C. Business Process Architecture

Business Process Architecture phase is the next in EA design. The Business Process phase will refer to the National SPBE Presidential Regulation. This phase describes the interaction of interrelated business activities carried out by the organization. In this phase, identifying existing business processes and targeting the organization/government will be carried out. The artifacts produced in this phase will follow the guidelines of Ministerial Regulation of PAN RB No.19 of 2018.

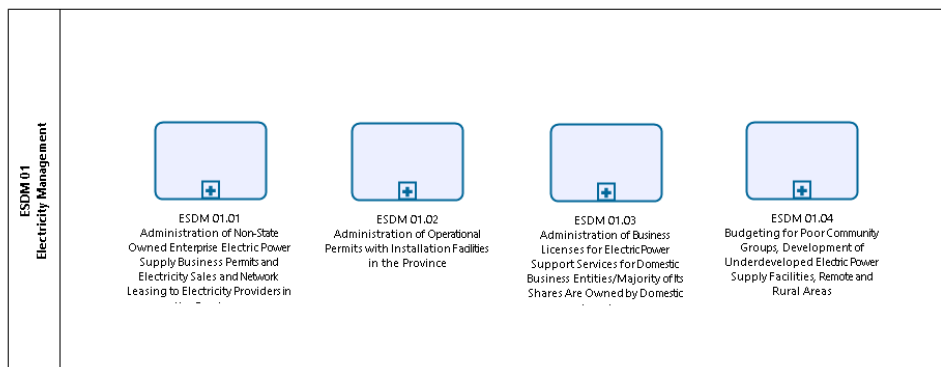
Business Process Level 0 contains all government agency business processes, business management processes, and supporting business processes. The Level 0 Business Process Map is made regarding the organization's vision, mission, and goals, which can be seen from the organization's strategic plan document, the organization's task and function documents, as well as other supporting documents that can describe the main outputs of the stakeholders. The agency's core processes are processes that directly impact the success of government agencies in achieving their vision, mission, and goals, as well as meeting the needs of external and internal government users. While supporting processes are processed for managing the operations of a system and ensuring the core processes run well. The figure 4 following is a Level 0 Business Process Map at the ESDM Department of West Java Province.



Powered by bizagi Modeler

Figure 4 Business Process Level 0

Business Process Map Level 1 is a more detailed description of the level 0 business process map. At this level, detailed processes are described by each process at level 0. Level 1 describes a map of business processes carried out by organizational units and the relationship between one process and other processes. The figure 5 following is a Level 1 Business Process Map at the ESDM Department of West Java Province for the Electricity Sector.



Powered by bizagi Modeler

Figure 5 Business Process Level 1 Electricity Sector

The Level 2 Business Process Map is a more detailed description of each process at level 1. The level 2 business process map will describe the existing level 2 business processes and targeting at the ESDM Department of West Java Province. Figure 6 below is business process map level 2 – ESDM 01.01.01 (Controlling and Supervising the Implementation of Business Licenses for the Provision of Electric Power by Non-State-Owned Enterprises and Sales of Electricity and Network Leasing to Electricity Providers in the Provinces).

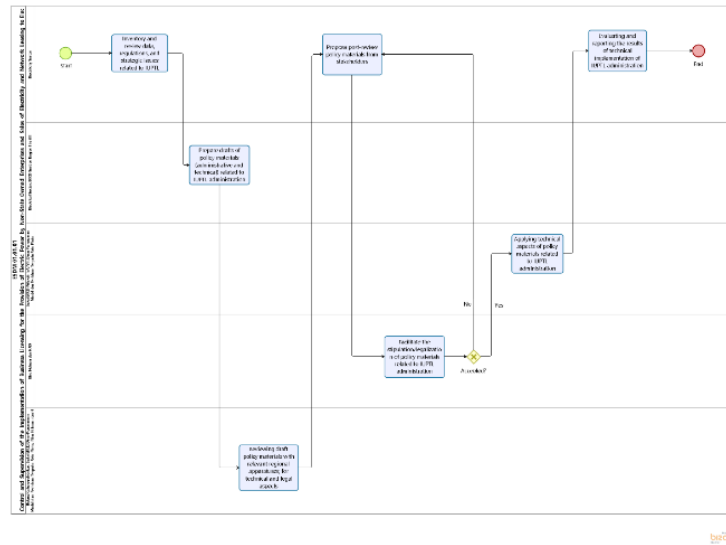


Figure 6 Business Process Level 2

**D. Service Architecture**

Service Architecture aims to identify user-focused SPBE services oriented to business processes and applications through an integrated information system. Services are categorized into two categories: Public Services and Government Administration Services. Public Service is a Service that supports implementing public services in Central and Government Agencies. Meanwhile, Government Administration Services will support bureaucratic management to improve government performance and accountability in Central and Regional Government Agencies. In this research, the services relevant to the Department of Energy and Mineral Resources of West Java Province are public services for the energy sector.

Service Catalog contains a mapping of services at the ESDM Department of West Java Province. This catalog will explain public services in the Electricity Sector of the ESDM Department of West Java Province. This catalog will contain what services are provided and supported by the application and the service provider. Table III will show a catalog of public services in the Electricity Sector of the ESDM Department of West Java Province.

TABLE III  
 SERVICE CATALOG

Services in the Provincial Government	ESDM Service	Supporting Application	Service Provider
Electricity Management	Administration of Electricity Supply Business License (IUPTL).	OSS RBA, IJP	Electricity Sector
	Operational License Administration (IO) Service.	E-Osmosys, IJP	Electricity Sector
	Electricity Support Services Business License Administration (IUJPTL)Services.	OSS RBA, IJP	Electricity Sector
	Electricity Supply Services for underprivileged groups.	SIMOJANG, IJP	Electricity Sector

**E. Data and Information Architecture**

Data and Information Requirements are carried out to find out the data requirements needed by the organization in the continuity of business process activities and the Principles Catalog that has been defined in the preliminary phase. Data Dissemination Diagram shows the data entities, services, and components that exist in the application in the electricity service sector. Figure 7 shows the Data Dissemination Diagram in the Electricity Sector of the ESDM Department of West Java Province.



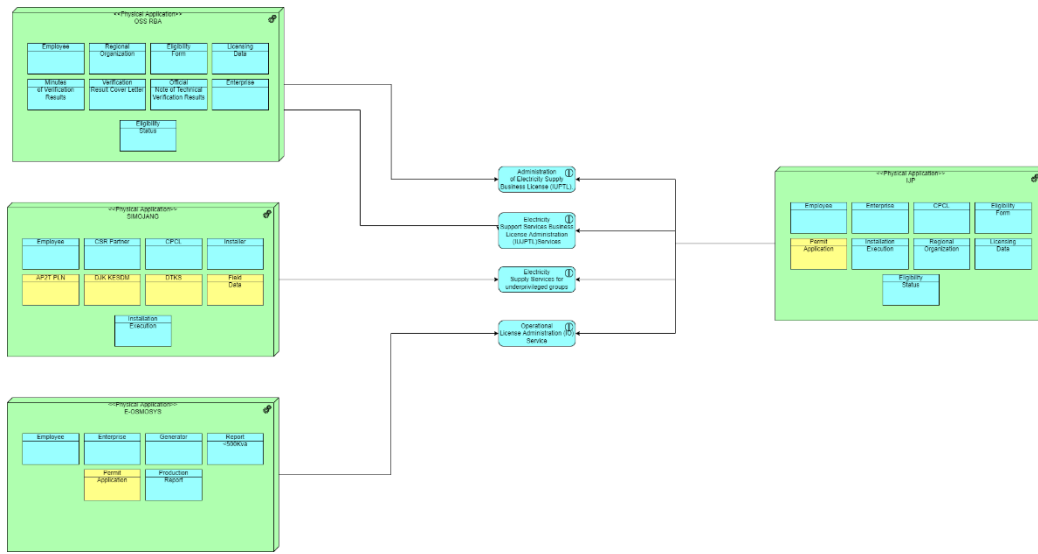


Figure 7 Data Dissemination Diagram

**F. Application Architecture**

Application Architecture phase is a phase that is used to define the types of applications needed to manage data and support the organization's business activities. In this research, an analysis of the application's condition is used to determine the extent to which the application supports the organization's business activities, then design the target application and use gap analysis to determine the gap between the existing architecture and the target architecture. Application Catalog describes what applications are used in the Electricity Sector of the ESDM Department of West Java Province. This catalog contains existing and target applications that will be developed or added. Table IV is a catalog of applications in the Electricity Sector of the ESDM Department of West Java Province.

TABLE IV  
 APPLICATION CATALOG

Physical Application	Logical Application	Application Description	Application Provider	Related Work Unit
Integrated Jabar Portal (IJP)	Application for Generating IO Permits <500Kva  Business Licensing Medium-High and High Risk for Enterprises  Business Licensing Medium-High and High Risk for Individual  Installation Process Monitor	Integrated Jabar Portal is a Web-based application that is used as a decentralized forum for local governments to provide public services for the people of West Java.	West Java provincial government	Electricity Sector
E-Osmosys	Application for Generating IO Permits <500Kva  Generator Production Report	E-Osmosys or Electrical - One-Stop Monitoring System is an application managed by the Department of Energy and Mineral Resources of West Java Province to register generators below 500kVa, report monthly production of generators, and calculate electricity per capita.	Department of Energy and Mineral Resources	Electricity Sector
OSS RBA	Business Licensing Medium-High and High Risk for Enterprises  Business Licensing Medium-High and High Risk for Individual	The Online Single Submission (OSS) system implements Law Number 11 of 2020 concerning Job Creation. Risk-Based OSS must be used by Business Actors, Ministries/Institutions, Local Governments, Special Economic Zone Administrators (KEK), and Free Port Free Trade Zones (KPBPB).	Ministry of Investment/BKPM	Electricity Sector  DPMPTSP of West Java Province

Physical Application	Logical Application	Application Description	Application Provider	Related Work Unit
SIMOJANG	Installation Process Monitor Benchmarking CPCL Data	SIMOJANG (Jabar Caang Monitoring Information System) is an application that provides real-time information in the West Java Caang program, namely providing electricity access assistance for the poor and underprivileged in West Java.	ESDM Department of West Java	Electricity Sector

### G. Consolidated GAP Analysis

Consolidate Gap Analysis explains the identification of each gap to produce a solution that follows the proposed project. This gap analysis is used to analyze requirements from business, data, application, and service domains to determine whether the implemented domains functions have met the requirements. The table V GAP Analysis below will explain the GAP Analysis from the phases of business process architecture, data and information architecture, application architecture, and service architecture.

TABLE V  
CONSOLIDATED GAP ANALYSIS

Requirement	Fulfillment			Description	Alternative Solution
	N	P	F		
<b>Business Process Architecture</b>					
Business processes are clearly defined in accordance with the Vision, Mission, RPJMD, and the Strategic Plan of the Service.			V	The business processes have been mapped out in accordance with the Vision, Mission, RPJMD, and the Strategic Plan of the Service.	-
The business process design complies with the rules for compiling a business process map as regulated through Ministerial Regulation of PAN RB No.19 of 2018.			V	The business process has been mapped following the rules of the business process map of the PANRB Regulation No. 19 of 2018, but the content that is entered into the business process reaches the set standard.	Updating business processes, especially in the content section of business process artifacts.
Business processes must be integrated with the West Java provincial government through application integration and easy access to information.			V	Business processes have begun to be integrated with the West Java provincial government but still, need the development of the application to be fully integrated.	Perform a thorough business process mapping to map integration after application development so that it can be integrated optimally.
Business processes comply with applicable laws, rules and policies.			V	The business process complies with applicable laws, rules and policies.	-
<b>Data and Information Architecture</b>					
The data contained is an essential asset that has value to the organization.			V	There is no identification and documentation of data assets.	Identify and document existing data.
Existing data and information must be allocated to all work units and organizations in the ESDM Department to be accessed to meet business process needs.			V	Data and information for work units in the ESDM Department organization have not yet been mapped.	Mapping data from each work unit in accordance with existing business processes
All users in the Department of Energy and Mineral Resources can access the existing data and information to carry out their functions.			V	The data authority has not identified and documented yet.	Identify the data authority for the work unit that has the authority.
Data must be classified consistently and easily understood by every stakeholder, who must understand the data definition.			V	Data and information have not been classified and documented.	Perform data classification and documentation.
Data must be protected from unauthorized use so that exploitation does not occur by implementing access rights controls for interested parties.			V	Documentation of data control access rights is still not provided.	Identify and document access rights to each data.
Existing data and information can be integrated between users so that they can support business processes.			V	Some of the existing data and information has not been fully integrated.	Perform data analysis and integration with existing applications and services.

Requirement	Fulfillment			Description	Alternative Solution
	N	P	F		
<b>Application Architecture</b>					
No duplication of applications with business processes.		V		Some applications for permissions use different applications, resulting in duplication.	Make use of the OSS RBA application that combines permission requests in one application.
Applications used follow adaptive technology standards.		V		The application is already website-based and can be accessed by the public, but there has not been a standard application for the applications to be developed and added.	Designing the target application.
Applications used to support services in the Electricity Sector.		V	-		-
Applications used are already integrated with other related applications.		V		The application is not fully integrated well.	Controlling the application and validating data integration in each application.
Application is easy to use by the user.		V	-		-
<b>Service Architecture</b>					
Services can be accessed and monitored by the public.		V		Some of the existing services are not yet accessible to the general public.	Automating the application/submission of electricity connection assistance services for the underprivileged.
Quality service, easy to understand, fast, accurate and accountable.		V		Service is still not fast and accurate.	Automating and integrating services to be fast, accurate, and accountable.
Services innovate continuously.		V		The service is still having problems with accessibility.	Carry out automation to facilitate access to services for the community.
Services cover all business processes and applications in the Electricity Sector.		V	-		-

#### IV. CONCLUSION

Based on the results of Enterprise Architecture design research focusing on the Electricity Sector of the Department of Energy and Mineral Resources of West Java Province. The results are an Enterprise Architecture Blueprint, designed by implementing TOGAF ADM as a best practice and the National Architectural Presidential Decree as a reference for preparing the SPBE architectural domain. Enterprise Architecture Blueprint was compiled through the preliminary phase. Phase Architecture Vision, Business Process Architecture, Data and Information Architecture, Application Architecture, and Service Architecture outputs in the form of matrices, catalogs, and diagrams. These stages produce inputs and outputs for the EA design in order to be a solution to the problems faced by the organization.

In realizing the sustainability of SPBE development and improving public services in the Electricity Sector, further research on the Infrastructure and Security architecture domain is needed per the Presidential Regulation on Electronic-Based Government Architecture to become a complete and comprehensive SPBE Architecture. In addition, it is hoped that the scope of research can also be broader than the regional level.

#### REFERENCES

- [1] A. P. Manoharan and A. Ingrams, "Conceptualizing E-Government from Local Government Perspectives," *State and Local Government Review*, vol. 50, no. 1, pp. 56–66, Mar. 2018, doi: 10.1177/0160323x18763964.
- [2] A. A. Bouty, M. Hidayat Koniyo, and D. Novian, "THE EVALUATION OF ELECTRONIC BASED GOVERNMENT SYSTEM USING E-GOVERNMENT MATURITY MODEL (CASE IN GOVERNMENT OF GORONTALO CITY)."
- [3] L. G. Anthopoulos and C. G. Reddick, "Understanding electronic government research and smart city: A framework and empirical evidence," *Information Polity*, vol. 21, no. 1, pp. 99–117, Feb. 2016, doi: 10.3233/IP-150371.
- [4] U. Nations, "E-Government Survey 2020 Digital Government in the Decade of Action for Sustainable Development With addendum on COVID-19 Response," New York, 2020.
- [5] P. Indonesia, "Peraturan Presiden Republik Indonesia Nomor 95 Tahun 2018," 2018.
- [6] V. Dwiana Putri, S. G. S. Fajar, and R. A. Nugraha, "Arsitektur Sistem Pemerintahan Berbasis Elektronik (SPBE) Pada Domain Aplikasi di Lingkungan Daerah Kabupaten Kuningan," *Jurnal Ilmiah Penelitian dan Pembelajaran Informatika*, vol. 06, no. 02, pp. 379–386, 2021.
- [7] M. A. Sarrayrih and B. Sriram, "Major challenges in developing a successful e-government: A review on the Sultanate of Oman," *Journal of King Saud University - Computer and Information Sciences*, vol. 27, no. 2, pp. 230–235, 2015, doi: 10.1016/j.jksuci.2014.04.004.
- [8] D. Rusli and Y. Bandung, "Designing an Enterprise Architecture (EA) Based on TOGAF ADM and MIPI," *2017 International Conference Technology System and Innovation (ICITSI)*, pp. 38–43, 2017.
- [9] A. S. Gillis, "Enterprise Architecture (EA)," <https://searchcio.techtarget.com/definition/enterprise-architecture>, 2020.
- [10] B. H. Cameron and E. McMillan, "Analyzing the Current Trends in Enterprise Architecture Frameworks," *Journal of Enterprise Architecture – February 2013*, pp. 60–71, Feb. 2013, [Online]. Available: [www.globalaea.org/journal](http://www.globalaea.org/journal).
- [11] T. Mayakul, P. Sa-Nga-Ngam, W. Srisawat, and S. Kiattisin, "A Comparison of National Enterprise Architecture and e-Government Perspectives," *The 2019 Technology Innovation Management and Engineering Science International Conference (TIMES-iCON2019)*, 2019.



- [12] E. Nurmiati, Zulfiandri, and A. M. A. Syafi'i, "Perencanaan Enterprise Architecture Menggunakan TOGAF Architecture," *Applied Information Systems and Management (AISM)*, vol. 3, no. 1, pp. 59–68, 2020, [Online]. Available: <http://journal.uinjkt.ac.id/index.php/aism>
- [13] A. Hevner and S. Chatterjee, "Design Science Research in Information Systems," 2010, pp. 9–22. doi: 10.1007/978-1-4419-5653-8\_2.
- [14] The Open Group, *The TOGAF® Standard, 9.2.*, vol. 9.2. 2018. [Online]. Available: [www.opengroup.org/legal/licensing](http://www.opengroup.org/legal/licensing).
- [15] S. A. Bernard, *An Introduction to Enterprise Architecture - Third Edition*, Third. Bloomington: AuthorHouse, 2012.