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Structural Gaps in Regional Infrastructure Financing: an Analysis of Horizontal Coordination Barriers and an Alternative Framework of Vertical Aggregation

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ABSTRACT

This study examines the feasibility of the Build-to-Lease (BTL) model within the framework of Indonesia's PPP for regional infrastructure financing, as well as formulates the principle of regulatory reform if the model cannot be implemented. With a descriptive-comparative quantitative approach using secondary data from the Ministry of Finance's DJPK, Bappenas PPP Book, SPAM Tuk Jambe project documents, and PPP regulations, as well as a survey of 35 PPP experts, the study found that the structural gap was very high with an Implementation Gap Index (IGI) of 86.6%, consisting of Fiscal Gap (86%), Scale Gap (93%), Coordination Gap (100%), and Regulatory Gap (67.5%). An analysis of the content of the Regulation of the Minister of National Development Planning/Head of Bappenas Number 9 of 2025 shows that the BTL model cannot be applied under the current PPP regulations. The Tuk Jambe case is reframed as an illustration of BTL's counterfactual, where horizontal coordination is not the root of the problem but a consequence of the conditions of ownership consolidation. Empirical Discounted Cash Flow (DCF) simulation proves that vertical aggregation through SOEs is an absolute prerequisite for financial feasibility. The research formulated three principles of directional reform: the expansion of the definition of Availability Payment (multi-party), the timing of asset transfers at the beginning, and the easing of sectoral requirements for SOEs as PJPK.

Keywords: *Build-to-Lease, structural gaps, horizontal coordination, PPP, vertical aggregation, SOEs, regional infrastructure financing.*

INTRODUCTION

The Golden Indonesia Vision 2045 and the Asta Cita mission of President Prabowo Subianto, especially the sixth point regarding village development and economic equity, places regional infrastructure development as one of the main prerequisites for improving community welfare. In addition to supporting the equitable distribution of public services, infrastructure development is also an important instrument to achieve the national economic growth target of 8%. However, the provision of basic infrastructure at the regional level still faces structural challenges, especially the limited fiscal capacity of local governments and weak coordination between local governments.

Data from the Directorate General of Financial Balance shows that the average ratio of Regional Original Revenue (PAD) to total revenue of district/city governments is only around 10-15%, while transfer funds from the central government still dominate up to 70-85% of total regional revenue. This condition creates a policy paradox. On the one hand, local governments obtain the authority to provide infrastructure based on Law Number 23 of 2014 concerning Regional Government, but on the other hand, limited fiscal capacity hinders the implementation of this authority. Most regional infrastructure projects have a relatively small investment value, generally below Rp100 billion, making

them less attractive to private investors because they are not able to produce adequate economies of scale (Hill, 2012; Prasetyo et al., 2022). As a result, the cost *of funding (cost of capital*) becomes higher and reduces the financial feasibility of the project if it is implemented independently by each local government.

In addition to fiscal limitations, infrastructure development is also faced with the problem of horizontal coordination between regions. Post-decentralization of authority fragmentation has led to many projects with cross-regional linkages being managed separately, reducing efficiency and potential economies of scale. Although Government Regulation Number 28 of 2018 has regulated the Regional Cooperation (KSD) mechanism, its implementation still faces various obstacles, such as differences in development priorities, insynchronization of the budgeting cycle, and the change of regional heads that affect the continuity of cooperation commitments (Kumorotomo, 2020; Suryanto et al., 2021).

This problem is reflected in the Tuk Jambe Regional Drinking Water Supply System (SPAM) project in the Bregasmalang area. The project worth IDR 195.6 billion is designed to meet the clean water needs of Tegal Regency by utilizing raw water sources from Pemalang Regency. Although it received state budget financing support of around 87% and a memorandum of understanding was signed in 2022, until 2025 the project has not been completed due to land acquisition problems in the Pemalang Regency area. The delay resulted in clean water services in Suradadi and Warureja Districts not being fulfilled optimally. This case shows that central government funding support has not been able to overcome horizontal institutional coordination obstacles.

As an alternative to infrastructure financing, the government has developed a Government Cooperation with Business Entities (PPP) scheme through Presidential Regulation Number 38 of 2015 which was later strengthened through the Minister of VAT Regulation Number 7 of 2023 and the Minister of VAT Number 9 of 2025. The regulation provides greater flexibility to the implementation of PPP, including opening up opportunities for State-Owned Enterprises (SOEs) to act as the Person in Charge of Cooperation Projects (PJPK) in certain sectors and enable the establishment of Joint PPP. However, analysis of regulations shows that Indonesia's PPP framework is still oriented towards a *modified Build-Operate-Transfer* (BOT) model so that it is more suitable for projects that have a direct source of revenue (*user charge*). On the other hand, most of the regional infrastructure in the form of basic public services does not generate adequate commercial income, requiring a different financing approach (Prabowo & Yudhistira, 2022; Kurniawan et al., 2023).

In international practice, one of the widely applied models for the provision of social infrastructure is *Build-to-Lease* (BTL). South Korea, for example, has been developing this scheme since 2005 for the construction of schools, hospitals, and other public facilities. In the model, business entities build facilities, hand over ownership to the government after construction is completed, and then earn periodic payments through a lease mechanism during the concession period (Kim & Kim, 2020; Ministry of Economy and Finance of Korea, 2021). These characteristics are considered more suitable for projects that do not generate direct income but have high social benefits.

However, the implementation of the BTL model in Indonesia still faces a number of regulatory constraints. First, PPP regulations do not explicitly recognize the BTL scheme. Second, the Joint PPP mechanism still depends on horizontal coordination between local governments so that it has not solved the root of institutional problems. Third, the *Availability Payment mechanism* only regulates payments from PJPK to the Implementing Business Entity, so it has not opened up space for more flexible financing relationship

arrangements. Thus, there is still a gap between the need for regional infrastructure financing and the capacity of the applicable PPP regulatory framework.

In contrast to previous research that generally focused on the effectiveness of PPP or the implementation of inter-regional cooperation, this study offers two main contributions. First, this study examines the feasibility of implementing *the Build-to-Lease* model within the framework of Indonesian PPP regulations, especially after the enactment of the Minister of VAT Regulation Number 9 of 2025. Second, this study develops the concept of vertical aggregation through SOEs as an institutional alternative to integrate small-scale regional infrastructure projects into a more economically viable investment portfolio. In contrast to the horizontal cooperation approach, this model places SOEs as integrators so that dependence on coordination between local governments can be reduced.

Based on this description, this study aims to analyze the feasibility of the *Build-to-Lease model* within the framework of Indonesia's PPP and formulate principles for regulatory reform if the model cannot be applied based on applicable regulations. In particular, this study aims to: (1) map the dimensions of the implementation gap in regional infrastructure financing through the Implementation Gap Index (IGI); (2) analyze the manifestation of horizontal coordination obstacles in the case of Tuk Jambe Regional SPAM; (3) evaluating the level of conformity of PPP regulations, especially the Minister of VAT Regulation Number 7 of 2023 and the Minister of VAT Number 9 of 2025, to the implementation of *the Build-to-Lease model*; and (4) formulating the principles of alternative regulatory framework design as a direction for regional infrastructure financing policy reform.

METHODS

Research Design

This study uses a descriptive-comparative quantitative approach with financial simulation as the main analysis instrument. This approach was chosen because the research question requires quantitative measurement of structural gaps and comparisons between verifiable and replicable financing scenarios. This study uses secondary data as the primary data source, considering the availability of adequate official data from government agencies to answer all research questions. The unit of analysis is a regional infrastructure project in the Bregasmalang area (Brebes, Tegal, Slawi, Pemalang), with national data as a contextual comparison.

Data Source

This study uses two types of data sources. Secondary data (primary source) was obtained from the Directorate General of Fiscal Balance (DJPK) of the Ministry of Finance (regional fiscal data 2019-2024), Bappenas PPP Book (PPP project data 2020-2024), SPAM Tuk Jambe project documents (DED and regional planning documents), and regulatory texts from the National JDIH. A structured survey (supporting sources) was conducted on 35 PPP experts who were selected by purposive sampling from five groups of institutions: the central government (Bappenas, Ministry of Finance, Ministry of Public Works and Housing), local governments (Bappeda, DPUPR), STATE-OWNED ENTERPRISES (PT SMI, BPI Danantara), PPP consultants/practitioners, and academics. The response rate reached 87.5% of the total 40 invitations sent.

Data Collection Instruments and Techniques

The questionnaire was designed with 20 Likert scale questions (1-5) divided into six sections: respondent profile (A), regulatory clarity (B), coordination capacity (C), financial feasibility (D), ranking of obstacles and success factors (E), and quantitative

estimation (F). Each question has a clear theoretical basis and is directly related to the research question. The distribution of the questionnaire is done online via Google Forms and email with a filling time of 10-15 minutes.

Data Analysis Techniques

Data analysis was carried out through four complementary approaches. First, descriptive statistics are used to characterize the magnitude of structural gaps based on secondary and survey data, including mean, median, and standard deviations for fiscal and financial data and frequency distributions for survey data. Second, the construction of the Implementation Gap Index (IGI) is carried out to quantitatively measure the structural gap between the financing needs of regional infrastructure and the capacity of the existing regulatory framework. IGI is a composite index formulated as:

IGI = Σ (Wi × Gi)
with components:

- G1 (Fiscal Gap): (Needs - APBD Capacity) / Needs
- G2 (Scale Gap): (Min Bankable - Project Average) / Min Bankable
- G3 (Coordination Gap): (Actual Duration - Plan Duration) / Plan Duration
- G4 (Regulatory Gap): (5 - Mean Skor B1:B5) / 4 × 100

The weight (Wi) for each component uses equal weighting (equal weighting = 0.25) referring to the OECD (2008). Third, the Kruskal-Wallis test was conducted to find out whether there was a significant difference in perception between groups of institutions on the three research constructs, with a significance level of $\alpha = 0.05$. Fourth, financial simulations use the Discounted Cash Flow (DCF) method to compare the financial feasibility of standalone scenarios with vertical aggregation scenarios, with WACC parameters calculated using CAPM (Damodaran, 2012). The simulation is built from the audited financial statements of Perumda Tirta Ayu and PT Sarana Multi Infrastruktur (Persero), not theoretical assumptions.

Validity and Reliability

The validity of secondary data is guaranteed through three strategies: (1) the use of official government data sources that have credibility and authority (DJPK, Bappenas, BPS); (2) cross-verification between data sources (cross-check DJPK-BPK); and (3) documentation of all assumptions and data limitations. The validity of the survey instrument was tested through the Cronbach's Alpha reliability test (≥ value of 0.70 is considered acceptable), pilot test on 5-10 respondents, and content validation through supervisor review. Source triangulation was carried out by comparing expert perception survey data with official budget documents and project data from the Bappenas PPP Book. The validity of the financial model was tested through a one-way sensitivity analysis to changes in key variables (discount rate, CAPEX, revenue, duration of delay), benchmark comparison with similar PPP projects, and documentation of all assumptions and sources.

RESULTS AND DISCUSSION

Respondent Profiles and Reliability Tests

The survey involved 35 respondents with a response rate of 87.5% out of a total of 40 invitations sent. The composition of respondents consists of Central Government (9),

Regional Government (9), SOEs (5), Consultants/Practitioners (7), and Academics (5). The majority of respondents (71.5%) have more than 6 years of experience in infrastructure and PPP, with 80% having cross-provincial or national experience. This shows that the data obtained comes from competent and credible respondents.
The reliability test of the instrument using Cronbach's Alpha showed good values for the entire construct: Regulatory Clarity (B) of 0.782, Coordination Capacity (C) of 0.846 (after item C1 was excluded due to a negative correlation of -0.773), and Financial Feasibility (D) of 0.879. These values are above the 0.70 threshold which indicates acceptable internal consistency (Nunnally & Bernstein, 1994; Hair et al., 2019).

Table 1. Results of the Research Construct Reliability Test

Construct	Number of Items	Cronbach's Alpha	Remarks
Regulatory Clarity (B)	5	0,782	Reliabel
Coordination Capacity (C)	4 (C2-C5)	0,846	Reliabel
Financial Eligibility (D)	5	0,879	Reliabel

Source: Primary Data (processed)

Implementation Gap Index (IGI)
The Implementation Gap Index (IGI) in the Bregasmalang region reached **86.6%,** showing a very high structural gap between the need for regional infrastructure financing and the capacity of the existing regulatory framework. IGI consists of four mutually reinforcing dimensions.

Table 2. Implementation Gap Index Components

Components	Value	Remarks
Fiscal Gap	86%	Only 14% of needs are financed by the APBD
Scale Gap	93%	Regional projects = 7% of bankable threshold
Coordination Gap	100%	Actual duration of Tuk Jambe = 3× plan
Regulatory Gap	67,5%	Survey mean B = 2.30 (out of 5)
IGI (Equal Weighting)	**86,6%**	OECD 2008 — Handbook on Constructing Composite Indicators

Source: Secondary data and surveys (processed)

1) The Fiscal Gap (86%) shows that only 14% of regional infrastructure needs can be financed from the APBD, with the average ratio of fiscal independence in the Bregasmalang region only 14.1% and dependence on central transfers reaching 85.9% (DJPK, 2024). These findings confirm the paradox that regions have the authority to provide infrastructure based on Law 23/2014 but do not have adequate financial capacity (Hill, 2012; Prasetyo et al., 2022).
2) The Scale Gap (93%) is the most critical finding: the average value of regional projects is only IDR 35 billion, while the minimum threshold for bankable PPP projects is IDR 500 billion (Bappenas, 2024). This means that regional projects only have a value of about 7% of the minimum threshold that is attractive to private investors. These findings are in line with research by Susanti and Nugroho (2021) who stated that regional infrastructure projects in Indonesia generally have too small a scale to attract private investors, because fixed transaction costs are disproportionate to the value of the project.
3) The Coordination Gap (100%) based on the Tuk Jambe case shows that the project planned to be completed in 1 year (2022-2023) is actually delayed for 3 years (2022-2025). This delay is caused by obstacles to land acquisition in Pemalang Regency. This case proves that the horizontal coordination approach through the KSAD mechanism in

PP 28/2018 is not effective for infrastructure projects that require long-term commitments (Kumorotomo, 2020; Suryanto et al., 2021).

4) The Regulatory Gap (67.5%) based on expert perception surveys (mean construct B = 2.30) shows that the existing PPP regulations are unclear and inadequate to accommodate regional infrastructure projects. Analysis of the content of the regulation reveals three main structural limitations that cannot be overcome by simply operationalizing existing articles (Kurniawan et al., 2023; Dewi & Halim, 2012).

Descriptive Statistical Survey Data Analysis of Likert Score per Construct

Table 3. Descriptive Statistics of Survey Scores per Construct

Construct	Re	Media	Std. Deviation	Interpretasi
B. Regulatory Clarity	2,3	2	0,39	Unclear
C. Coordination Capacity	3,6	4	0,32	Neutral-positive
D. Financial Feasibility	4,0	4	0,42	Agree

Source: Primary Data (processed)

In the Regulation Clarity construct (B), an average score of 2.30 indicates that respondents consider the existing PPP regulations to be unclear to accommodate regional infrastructure projects. Item B3 (Presidential Decree 38/2015 accommodates small-scale projects) obtained the lowest score (mean 1.94), indicating a significant regulatory gap for small-scale projects. These findings are consistent with secondary data analysis which shows that all PPP projects in Indonesia are worth more than Rp 600 billion, while regional projects are only Rp 35 billion on average.

In the Coordination Capacity construct (C), respondents strongly agreed that differences in political priorities (C2, mean 4.11) and insynchronization of budget cycles (C3, mean 3.97) are the main obstacles to horizontal coordination. This is in line with the Tuk Jambe case which was hampered due to differences in priorities between regions. Interestingly, respondents strongly agreed that the role of SOEs as integrators (C5, mean 4.34) can overcome horizontal coordination barriers, indicating optimism towards the vertical aggregation model proposed in this study (Herawati et al., 2025).

On the Financial Feasibility construct (D), respondents strongly agreed that the scale of the project is too small to attract investors (D1, mean 4.37) and that project aggregation can improve financial feasibility (D2, mean 4.11). This confirms the potential of the proposed vertical aggregation model and strengthens the results of secondary data analysis on the Scale Gap which reached 93%.

Kruskal-Wallis Test Results

Table 4. Kruskal-Wallis Test Results

Construct	χ^2 (H)	df	p-value	Signifikan?
B (Regulatory Clarity)	1,43	4	0,838	No
C (Coordination Capacity)	8,45	4	0,076	No
D(Financial Eligibility)	6,16	4	0,187	No

Source: Primary Data (processed)

The Kruskal-Wallis test shows that there is no significant difference in perception between groups of institutions in all three research constructs. The p-values for Constructs B (0.838), C (0.076), and D (0.187) are all above 0.05. This indicates that respondents' perceptions of regulatory clarity, coordination capacity, and financial feasibility are relatively homogeneous across institutional groups. These findings actually strengthen the validity of the research data because they show that structural barriers are assessed consistently by all stakeholders (Kurniawan et al., 2023; Tiawarman & Vic, 2025).

Ranking Obstacles and Success Factors

Table 5. Ranking of Obstacles to Regional PPP Implementation

Peringkat	Barriers	Score
1	The scale of the project is too small	80%
2	High transaction fees	63%
3	Differences in political priorities between regions	57%

Source: Primary Data (processed)

Table 6. Vertical Aggregation Model Success Factor Rating

Peringkat	Success Factors	Score
1	The active role of SOEs as integrators	86%
2	Availability of supporting regulations	71%
3	Flexible financing scheme	63%

Source: Primary Data (processed)

Respondents identified project scale that was too small (80%) as the main barrier, followed by high transaction costs (63%) and differences in political priorities between regions (57%). For the success factor of vertical aggregation, the active role of SOEs as integrators (86%) is the most critical factor, followed by the availability of supporting regulations (71%) and flexible financing schemes (63%). These findings answer research questions about the principles of vertical aggregation-based alternative framework design.

Analysis of the SPAM Case of Tuk Jambe

Table 7. Technical Data of the Tuk Jambe SPAM Project

Variabel	Value	Source
CAPEX	± IDR 195.6 billion (state budget: IDR 170.36 billion)	DED SPAM Tuk Jambe
Raw Water Capacity	150 liters/second	DED SPAM Tuk Jambe
Home Connection Target	6.230 SR	Copyright © 2019 Copyright © 2019 Copyright © 2019
Service Region	Suradadi & Warureja District (Tegal Regency)	DED SPAM Tuk Jambe
Raw Water Source	Tuk Jambe, Kec. Moga, Pemalang Regency	DED SPAM Tuk Jambe
Completion Plan	2023	Copyright © 2019 Copyright

Realization (2025)	Stymied	Observations

Source: DED SPAM Tuk Jambe, Tegal Regency Government, Pemalang Regency Government (processed)

The Tuk Jambe case shows an extreme asymmetry of interests. Tegal Regency as a benefit user has a high urgency, while Pemalang Regency as the owner of the location does not have direct economic incentives. The development of the project is stagnant even though the Central Government provides 87% of the budget through the State Budget. The main problem is not money, but the absence of an aggregator mechanism to bridge cross-border interests vertically (Kumorotomo, 2020; Suryanto et al., 2021).

Table 8. Chronology of Obstacles to the Tuk Jambe SPAM Project

Stages	Year	Status	Barriers
MoU Signing	August 2, 2022	Finish	-
DED Discussion	December 2022	Finish	-
Land Acquisition	2023-2025	Stymied	Unclear land status in Pemalang
Project Completion	2023 (plan)	Not yet realized	Consequences of land acquisition barriers

Source: Tegal Regency Government, Pemalang Regency Government (processed)

The Tuk Jambe project is planned to be completed within 1 year (2022-2023), but the actual delay is until 2025 (3 years). This delay results in a Coordination Gap of 100%. This case reflects three main problems of horizontal coordination: the difference in political priorities between regions, the asynchrony of the budget cycle, and the impact of the change of regional heads on the continuity of the project. The obstacles to land acquisition occur because the current scheme demands consolidation—one mutually agreed land status, a joint PJPK, one integrated project—before anything can move.

Reframing Counterfactual BTL

The Tuk Jambe case is a *counterfactual* illustration of the BTL model. Land acquisition barriers occur because the current scheme demands consolidation of ownership. In the BTL scheme, Pemalang does not need to hand over its land to a joint project, it can lease its land directly to SOEs. Tegal, separately, pays for the water services it receives. Two parallel bilateral relations (BUMN] Pemalang, BUMN Tegal) replace one horizontal agreement between the two regions.

Table 9. Comparison of Current Scheme vs BTL Scheme

Aspects	Current Scheme (KSAD)	BTL scheme
Relationship Structure	One-sided horizontal agreement between regions	Two parallel bilateral relations with SOEs
Land Status	Consolidation of land in one project	Pemalang leases land to SOEs
Coordination Risks	Height	Low SOEs as mediators
Dependency	Relying on inter-regional consensus	Relying on bilateral contracts

Source: Researcher analysis (processed)

An important implication of this reframing is that horizontal coordination is not the root of the real problem what appears to be an institutional pathology (differences in political priorities, budget cycles, change of regional heads) is a derivative consequence of the conditions of consolidation of ownership in the current model, not an independent cause. Once ownership does not need to be consolidated, inter-regional political negotiations become much less urgent.

Analysis of PPP Regulations

The content analysis of the Regulation of the Minister of National Development Planning/Head of Bappenas Number 9 of 2025 produced key findings:

Table 10. Analysis of PPP Regulation Content and Structural Loopholes

Regulation	Key Terms	Identified Structural Gaps
Article 33 of the 1945 Constitution	State control of important branches of production	Not yet operationalized in PPP regulations
Presidential Decree 38/2015	Basic framework for PPP and PJPK	No provisions for small-scale projects
VAT Decree 7/2023	SOEs as PJPK; PPP Coalition	Still requires horizontal coordination between PJPK
VAT Ministerial Regulation 9/2025	Simple PPP	Haven't set up a Build-to-Lease (BTL) model yet
PP 28/2018	Inter-Regional Cooperation	Not overcoming persistent institutional barriers

Source: Regulatory Analysis (processed)

Based on the content analysis, there are five key findings from the Minister of VAT Regulation 9/2025: (1) Article 9 (SOEs as PJPK) has not been amended, so that the requirement "as long as regulated in the sector's laws and regulations" is still valid; (2) the definition of Availability Payment remains as a one-way payment; (3) the provisions of the Joint PJPK still require active horizontal coordination between PJPKs; (4) the form of PPP without asset handover is possible but only for projects without fiscal support and without Availability Payment; and (5) Simple PPP is a matter of simplifying procedures, not a rental payment mechanism (Republic of Indonesia, 2025).

Conclusion of the analysis: There is no category of PPP form that explicitly regulates the transfer of assets at the beginning (immediately after construction) accompanied by periodic rent payments from the government of the South Korean-style BTL core structure either in Ministerial Regulation 7/2023 or in its amendments (Ministerial Regulation 9/2025).

Financial Simulation

Simulation Parameters

Table 11. Financial Simulation Scenario Parameters

Parameter	Standalone Scenario	Aggregation Scenario
WACC	8,90%	7,76%
Structure Modal	100% Equity (Perumda)	Levered (PT SMI)
Basic Rates	IDR 4,784/m^3 (Perbup R1)	IDR 4,784/m^3 (Perbup R1)
Concession Duration	25 years	25 years

Source: Simulation results (processed)

Simulation Results

Table 12. Standalone vs Aggregation Financial Feasibility Comparison

Skenario	IRR	WACC	NPV (Rp)	Status
0. Independent, State Budget Capital Expenditure	-	8,90%	(105.957.299.743)	Not Eligible
1. Independent (R1 Tariff)	7,88%	8,90%	-	Not Eligible
2. Agregasi (R1 Tariff)	7,88%	7,76%	4.208.755.934	Layak Marjinal
3. Aggregation (Maximum Rate)	14,65%	7,76%	16.832.112.990	Worthy

Source: Simulation results (processed)

DCF's simulation shows that with the base rate of Perbup R1 (Rp 4,784/m^3), standalone projects only generate an IRR of 7.88% below the WACC of 8.90%—not feasible. Marginal feasibility (IRR 7.88%, positive NPV) was only achieved through a combination of the injection of state budget capital expenditure as a grant and a reduction in WACC to 7.76% through SOE aggregation. The break-even rate analysis showed a standalone break-even rate of Rp 42,695/m^3 (politically and regulatory impossible) versus an aggregate break-even rate of Rp 3,397/m^3 (below the Perbup R1 tariff, a surplus of Rp 1,387/m^3).

Aggregation Efficiency: IDR 135 billion per project (CAPEX IDR 150 billion), derived from a decrease in WACC (4% or IDR 120 billion) and a reduction in transaction costs (10% CAPEX or IDR 15 billion). This efficiency is the result of aggregation (pooling risk and scaling down WACC), not proof of financial feasibility of BTL the two claims are tested in parallel and separately.

Sensitivity Analysis

Table 13. Sensitivity Analysis Results

Skenario	Changes	NPV	Status
Baseline	NRW 25.38%	-IDR 102,75 Billion	Not Eligible
CAPEX	-20%	-Rp 80,20 billion	Not Eligible
Tariff Escalation	10%/year	-Rp 88,28 billion	Not Eligible
NRW	20% (national standard)	-Rp 104,06 Billion	Not Eligible

Source: Simulation results (processed)

There is no single optimization scenario that makes NPV independently positive. The failure of regional projects is not operational inefficiency but the absence of economic scale and high local capital costs.

DISCUSSION

Structural Gaps and BTL

The structural gaps identified through IGI of 86.6% were very significant. The Scale Gap (93%) is the most critical dimension, indicating that regional infrastructure projects in Indonesia are inherently unbankable within the framework of conventional PPP. The Coordination Gap (100%) based on the Tuk Jambe case proves that the horizontal coordination approach through the KSAD is not effective for cross-regional projects. The regulatory gap (67.5%) shows that existing PPP regulations do not accommodate the needs of regional projects. The content analysis of the Minister of VAT 9/2025 shows that

the BTL model (modified to suit the Indonesian context) cannot be applied under the current PPP regulations. There is no category of PPP that explicitly regulates the transfer of assets at the beginning accompanied by periodic rent payments from the government. These findings answer the main question of the research that existing PPP regulations do not provide categories for BTL and this is a matter of design, not implementation.

Reframing the Tuk Jambe Case

The Tuk Jambe case was reframed as a counterfactual illustration of BTL. Land acquisition barriers occur because the current scheme demands consolidation of ownership. In the BTL scheme, Pemalang and Tegal can have parallel bilateral relations with SOEs, replacing a horizontal agreement between the two regions. This reframing shows that horizontal coordination is not the real root of the problem, but rather a consequence of the conditions of ownership consolidation in the current model (Kumorotomo, 2020; Suryanto et al., 2021).

Vertical Aggregation as a Solution

The study tested vertical aggregation through SOEs as a stand-alone solution, separate from the feasibility of BTL regulation. Empirical DCF simulations prove that vertical aggregation is an absolute prerequisite for financial feasibility. With a pro-people basic rate (Rp 4,784/m^3), the standalone project only generates an IRR of 7.88% below the WACC of 8.90% of the area is not feasible. Marginal feasibility (IRR 7.88%, positive NPV) was only achieved through a combination of the injection of state budget capital expenditure as a grant and a reduction in WACC to 7.76% through SOE aggregation. This efficiency is the result of aggregation (pooling risk and scaling down WACC), **not proof of BTL's financial viability**.

Alternative Framework Design Principles

Based on the findings that BTL cannot be implemented under current regulations, the study formulated three principles of directional reform (Harun & Suwondo, 2020; Mahani et al., 2022): (1) reform of the definition of Availability Payment so that it can flow from more than one government entity (multi-party); (2) explicit arrangements about the timing of asset transfer at the beginning accompanied by periodic rent payments; and (3) easing sectoral requirements for SOEs as PJPK. These reforms are necessary to accommodate the BTL model and address the structural gaps identified.

Research Limitations

This research has several limitations. First, the geographical scope is limited to the Bregasmalang area, so the generalization of the findings needs to be done carefully. Second, the number of survey respondents (35 people) was relatively limited with 5-9 respondents per group of institutions, so that the Kruskal-Wallis test was not significant (Construct C $p=0.076$; $\varepsilon^2=0.249$) inter-group perception inference was limited. Third, this study relies heavily on secondary data that may have bias or methodological limitations from the publishing institution. Fourth, financial simulations use assumptions that may not fully reflect actual conditions on the ground. However, the primary evidentiary strength of this study lies in secondary data and simulations, while surveys play a supporting role as per the research design from the beginning.

CONCLUSIONS

Based on the results of the research, it can be concluded that *the Build-to-Lease* (BTL) model cannot be applied within the framework of Government Cooperation with

Business Entities (PPP) based on the applicable regulations in Indonesia. An analysis of the Minister of VAT Regulation Number 9 of 2025 shows that PPP regulations have not explicitly accommodated the BTL scheme, still require horizontal coordination between PJPKs, and limit *the Availability Payment* mechanism to only one PJPK to business entities. The study also identified a high implementation gap, as shown by the Implementation Gap Index (IGI) of 86.6%, with *the Scale Gap* (93%) as the main obstacle because most regional infrastructure projects have not met the investment scale that is attractive to investors. The case study of the Tuk Jambe Regional SPAM shows that implementation obstacles are more influenced by the requirements for consolidating asset ownership than by weak coordination between regions. On the other hand, the vertical aggregation model through SOEs has the potential as an alternative to financing because it is able to increase efficiency through reducing capital costs and transaction costs. Based on these findings, this study proposes three directions for regulatory reform, namely the expansion of *the Availability Payment mechanism*, the regulation of asset transfers at the beginning of the cooperation period, and the provision of greater flexibility for SOEs to play the role of PJPK. In the future, the government needs to consider improving PPP regulations to better suit the characteristics of regional infrastructure, while further research is expected to test the implementation of the BTL model empirically and compare it with conventional PPP schemes.

REFERENCE

Asshiddiqie, J. (2019). *Konstitusi dan Infrastruktur di Indonesia*. Jakarta: Sinar Grafika.

Damodaran, A. (2012). *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* (3rd ed.). New York: Wiley.

Dewi, P. & Halim, A. (2012). Analisis Regulasi KPBU di Indonesia. *Jurnal Kebijakan Ekonomi*, 7(2), 45-62.

Feiock, R.C. (2013). The Institutional Collective Action Framework. *Policy Studies Journal*, 41(3), 397-425.

Grimsey, D. & Lewis, M. (2017). *Public Private Partnerships: The Worldwide Revolution in Infrastructure Provision*. Cheltenham: Edward Elgar Publishing.

Harun, A. & Suwondo, E. (2020). Reformasi Regulasi Pembiayaan Infrastruktur Daerah. *Jurnal Kebijakan Publik*, 11(1), 78-95.

Herawati, S., dkk. (2025). Studi Kelayakan Finansial Proyek Infrastruktur di Indonesia. *Jurnal Ekonomi dan Bisnis*, 18(1), 112-130.

Hill, H. (2012). *The Indonesian Economy* (2nd ed.). Cambridge: Cambridge University Press.

Kementerian Strategi dan Keuangan Korea Selatan. (2021). *Evaluasi Model Build-to-Lease (BTL) di Korea Selatan*. Seoul: Kementerian Strategi dan Keuangan.

Kim, J. & Kim, S. (2020). Build-to-Lease Model in South Korea: Performance and Implications. *International Journal of Infrastructure*, 15(3), 234-251.

Kumorotomo, W. (2020). Koordinasi Horizontal dalam Pembangunan Daerah. *Jurnal Administrasi Publik*, 18(2), 156-173.

Kurniawan, R., dkk. (2023). Analisis Regulasi KPBU di Indonesia: Hambatan dan Peluang. *Jurnal Hukum Ekonomi*, 14(1), 67-84.

Lee, J. & Kim, H. (2024). Performance Improvement Model for Small-Scale Public Education Facility BTL Projects. *Journal of the Institute of Engineering Technology Research*, 17(1), 41-47.

Martitah, M., dkk. (2021). Ego Sektoral dalam Pembangunan Daerah. *Jurnal Hukum dan Pembangunan*, 51(2), 345-362.

OECD. (2008). *Handbook on Constructing Composite Indicators: Methodology and User Guide*. Paris: OECD Publishing.

Park, S., dkk. (2024). Analyzing the Effectiveness of Sewer Rehabilitation Projects Using the Build-Transfer-Lease (BTL) Method. *Journal of Korean Society of Water and Wastewater*, 27(5), 621-630.

Prabowo, H. & Yudhistira, M. (2022). Free-Rider Problem dalam Proyek KPBU Lintas-Daerah. *Jurnal Ekonomi Publik*, 13(2), 78-95.

Prasetyo, B., dkk. (2022). Ketergantungan Fiskal Daerah Pasca-Desentralisasi di Indonesia. *Jurnal Ekonomi dan Keuangan*, 16(3), 189-206.

Rahayu, S., dkk. (2024). A Comparative Study of Small-Scale Public-Private Partnership Implementation in Indonesia and South Korea. *Journal of Comparative Policy Analysis*, 26(3), 245-262.

Rahayu, S., dkk. (2021). Biaya Transaksi dalam Kerja Sama Antar Daerah. *Jurnal Administrasi Publik*, 19(2), 123-140.

Republik Indonesia. (2015). *Peraturan Presiden Nomor 38 Tahun 2015 tentang Kerja Sama Pemerintah dengan Badan Usaha dalam Penyediaan Infrastruktur*. Jakarta: Sekretariat Negara.

Republik Indonesia. (2023). *Peraturan Menteri PPN/Kepala Bappenas Nomor 7 Tahun 2023 tentang Tata Cara Pelaksanaan KPBU*. Jakarta: Kementerian PPN/Bappenas.

Republik Indonesia. (2025). *Peraturan Menteri PPN/Kepala Bappenas Nomor 9 Tahun 2025 tentang Perubahan atas Permen PPN 7/2023*. Jakarta: Kementerian PPN/Bappenas.

Suryanto, B., dkk. (2021). Evaluasi Kerja Sama Antar Daerah di Indonesia. *Jurnal Administrasi Negara*, 19(1), 89-106.

Susanti, R. & Nugroho, A. (2021). Skala Proyek dan Minat Investasi dalam Skema KPBU. *Jurnal Manajemen Investasi*, 10(2), 134-151.

World Bank. (2017). *Benchmarking Public-Private Partnerships Procurement*. Washington DC: World Bank.