

# Assessment of green public procurement specifications in government institutions: Case study in Central Java, Indonesia

*by* Nia Budi Puspitasari

---

**Submission date:** 19-Apr-2022 11:51AM (UTC+0700)

**Submission ID:** 1814230239

**File name:** public\_procurement\_specifications\_in\_government\_institutions.pdf (400.98K)

**Word count:** 5525

**Character count:** 27549

PAPER • OPEN ACCESS


7  
**Assessment of green public procurement specifications in government institutions: Case study in Central Java, Indonesia**

To cite this article: Nia Budi Puspitasari and Paskalis Glennardo 2021 *IOP Conf. Ser.: Earth Environ. Sci.* **794** 012093

4  
View the [article online](#) for updates and enhancements.

You may also like

- [Preface](#)
- [Mechanical Reliability of All-Solid-State Lithium-Ion Batteries](#) 28  
Giovanna Bucci, Tushar Swamy, Yet-Ming Chiang et al.
- [Development of the system of transboundary protected areas in the Asian part of Russia](#)  
T P Kalikhman




The Electrochemical Society  
Advancing solid state & electrochemical science & technology


**242nd ECS Meeting**  
Oct 9 – 13, 2022 • Atlanta, GA, US

**Extended abstract submission deadline: April 22, 2022**

Connect. Engage. Champion. Empower. Accelerate.

**MOVE SCIENCE FORWARD**





7

## Assessment of green public procurement specifications in government institutions: Case study in Central Java, Indonesia

Nia Budi Puspitasari, Paskalis Glennardo

Department of Industrial Engineering, Diponegoro University, Semarang, Indonesia

Corresponding author: [niabudipuspitasari@lecturer.undip.ac.id](mailto:niabudipuspitasari@lecturer.undip.ac.id);  
[paskalisglennardo@gmail.com](mailto:paskalisglennardo@gmail.com)

**Abstract.** The construction industry has always been the biggest contributor to environmental damage. With the emergence of Leadership in Energy and Environmental Design (LEED) certification and Mayor Regulation Number 24 of 2019 concerning green buildings and Presidential Regulation in Indonesia concerning the importance of green industry products in the procurement process led to the emergence of urgency for the construction sector to create a focus on green. One focus that needs to be considered because contributing a large role in the construction process from beginning to end is the procurement process. The problem that occurs is that there is no awareness from Project Manager in Central Java is regarding environmental aspects in making procurement specifications. This is evident because the consideration of certification of Environmental Impact Assessment, and Occupational Health and Safety Regulation has not yet been taken into consideration in the specification of Project Manager considerations. As a result, government buildings have 46% lower energy efficiency compared to private buildings. With the DEMATEL method, it was found that the criteria "lowest bid value", "Reducing the use of hazardous materials", "Minimizing energy consumption", "Minimizing energy loss", "Clarifying environmentally friendly fuels", "Impact on the environment during and after construction", "Work procedures", "Supervision", and "Frequency of failure" is a criterion that is considered to influence other criteria is greater and can be an urgency for the government of Central Java.

**Keywords:** green public procurement, construction, DEMATEL, ANP

### 1. Introduction

The continued decline of the environment is the main focus of international forums. Where actions have been raised to improve this, ranging from energy conservation and minimization of environmental impacts [1] In major developing countries, construction is still going on a massive scale to create supporting facilities (buildings and infrastructure) for local communities. This is the biggest contributor to environmental damage ([2], [3]).

In this case, focused on public construction. The public construction sector has an effect of 10.49% on GDP and employs more than 5.55% of the workforce in Indonesia [4].

The resulting government buildings are also considered to waste energy up to 46.67% [5] with 35% gas emissions and waste reaching 20-30% of the total waste [6]. So it was concluded, the construction sector has the potential to reduce its impact on the environment [7].

Public procurement is carried out for community interests by the competent authority. This process runs formally and regulates cooperation between buyers and suppliers. The legislative basis on the PP is very strong to oppose



Content from this work may be used under the terms of the Creative Commons Attribution 3.0 licence. Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

Published under licence by IOP Publishing Ltd

fraud, corruption, and local defense. But it does not emphasize the important qualifications regarding the environment in its normative references.

Green public procurement (GPP) is driven by policies based on laws and regulations. This requires a solution that regulates GPP from existing criteria [8]. In this paper, research focuses on a case study studying the criteria that are considered as dispatchers and the most influential for the GPP and creating specifications or regulations that must be applied based on the criteria used by establishing a green procurement role model of existing projects. This research uses the integration of the Decision Making Trial and Evaluation Laboratory (DEMATEL) and Analytical Network Process (ANP) methods. DEMATEL is used to determine the relationship between criteria and find the cause-effect model which will then be used to determine the weights between criteria and alternatives through ANP. The result of the weighting will be the ranking used to determine the best alternative from the procurement specifications determined by the Project Manager in construction projects in Central Java.

## 2. Research Method

GPP is defined as the process by which public authorities procure goods and services with lower environmental impact despite having the same function and performance [9]. The use of the term GPP has been running for decades and several developing countries already have their own GPP terms. Indonesia defines GPP as a process of fulfilling the needs of goods or services of the institution so that the entire stages of the procurement process are beneficial not only for the institution but also for the community and the economy by minimizing the impact of environmental damage [10].

The fundamental difference that complicates the implementation of GPP compared to traditional private procurement is derived from legislative requirements. GPP needs to be responsive to its obligations to the environment, starting from the law, regulations, contracts, industry standards, internal regulations, or just social expectations [11]. The existence of regulations and policies is a significant driver in the adaptation of GPP especially in developing countries [12]. In this case, the GPP in several sectors also has different degrees of implementation [8]. One of them is in the construction sector.

"Building procurement" or construction procurement refers to the activities of the amalgam carried out by the client/project owner in managing the construction or renovation of the building [13]. This is included in the stakeholder responsibility and authority structure within the building construction framework [14]. Combined, the two contexts will produce the understanding that building GPP is finding the criteria that have the greatest impact on the environment in the form of regulations or policies. This criterion must be relevant, clear, unambiguous, and considered important by all stakeholders in the procurement of construction.

Some papers have shown that policymaking, regulation, and authorization, combined with feedback from project leaders can create benefits and provide equivalent input to the procurement and implementation process of GPP [15]. The framework in Table 1 is in comparative literature from the previous GPP was created by Braulio-Gozalo [16] and this research.

### 2.1. Study object

Study objects are 9 construction projects that have been finished with a maximum of 3 years ago. Data represents a combination of the planning and construction process in the perception of each Project Manager. The government service in Central Java itself consists of 19 province area offices while those in the city or district area are more than 750 offices in total. Based on this fact, this research uses a purposive sampling, based on past implementation of green public procurement, and had a construction project in the form of a building in the last 3 years.

### 2.2. Method

The research methodology used in this study was divided into 4 stages:

1. Stage 1: Finding criteria. The criteria used to come from Cathy Berry's book "The Sustainable Procurement Guide: Procuring Sustainably Using BS 8903" summarized and some additional criteria regarding LEED or green building certification.

**Table 1.** Research Framework

TABLE 1. RESEARCH FRAMEWORK										
Writer	Country	Method	Scope					Goal		
			Construction in general	Academic buildings	Office buildings	Civil buildings	Material	Construction waste and goal	Stakeholder consideration	Effect of GPP
Sterner (2002) [17]	SE	Interview, survey								
Varnas et al (2009) [18]	SE	Interviews, survey	•						•	•
Tarantini et al (2011) [19]	IT	LCA					•		•	•
Utman and Balfers (2014) [20]	SE, PL, NL, NZ, KR	Qualitative analysis					•		•	•
Utman and Le LamRoos (2015) [21]	SE	Interview, multicriteria analysis, case study				•			•	
Testa et al (2016) [7]	IT	Interviews, qualitative and statistical analysis	•						•	•
Deambrogio et al (2017)	IT	Case study					•		•	•
Fuentes-Barquies et al (2017) [22]	EU, ES	Qualitative and quantitative analysis	•			•			•	•
Fuentes-Barquies et al (2018)	ES	Qualitative and quantitative analysis		•					•	•
Sparrevik et al (2018) [9]	NO	Case study	•						•	•
Montalbán-Domingo et al (2018) [23]	AR, AU, CA, CL, CO, PA, PE, ES, UK, USA	Quantitative and statistical analysis	•			•			•	•
Marta Bratulis-Gonzalo (2020) [16]	ES	Gap analysis			•		•		•	•
Nia Budi Puspitasari, Paskalis Giennardo (2020)	IND	Delphi, DEMATEL, ANP, Depth Interview	•	•	•	•	•	•	•	•

2. Stage 2: Validation of criteria. Criteria validation is done to assess whether the criteria used are relevant to be applied as guidelines/regulations for green public procurement, especially in Central Java.
3. Stage 3: Relationship between criteria. The relationship between the criteria needs to be used because the final goal of this study is green. Where green is an integration of existing criteria. Relationships between criteria also make weight calculations using ANP possible
4. Stage 4: Priority analysis. Weights are calculated using ANP to measure the priority level of the GPP of each Project Manager. The priority level of the weighted result can then be used to make benchmarks based on Project Manager implementation priority
5. Stage 5: Results. Obtained from the following analysis:
  - DEMATEL: analysis is carried out to identify the relationship between criteria and which criteria provide the strongest relationship to other criteria (dispatchers).
  - ANP: weighting can help to find benchmarks based on the priority level of each Project Manager.

### 3. Result

#### Stage I: Criteria findings

Literatures have suggested the definition of green in the scope of the project to ensure stakeholders in the project move in the same goal (Hes, 2005). But there are no clear criteria regarding what scope must be included in a project to achieve GPP. The criteria have just found this in Cathy, Berry's book [24] as summarized can be seen in Table 2.

**Table 2.** Criteria findings

Aspect	Criteria	Code	Sub-criteria	Code
Cost	Bid	A1	Lowest bid	A1.1
			Realistic bid	A1.2
			Material usage capacity	B1.1
Environment	Material specification and usage	B1	Recycle material usage	B1.2
			Andgerous and hazardous material usage	B1.3
			Energy consumption	B2.1
	Energy uses	B2	Energy loss	B2.2
			Environmentally friendly fuel	B3.1
	Water and waste management	B3	Environmental damage	B3.2
			Work compatibility with costing	B4.1
	Quality management	B4	Accuracy of work implementation with contract schedule	B4.2
			Providers consider the life cycle costing approach	B4.3
	Certifications	B5	LEED certification	B5.1
			ISO and other quality and environmental certifications	B5.2
Social	Health and Safety Management	C1	Worker insurance	C1.1
			Work safety procedure	C1.2
			A rule based on Health and Safety	C1.3
	Infrastructure user	C2	Equality	C2.1
			Changes and improvements	C2.2
			Participation	C2.3
			Health coverage	C2.4
	Human resource	C3	Availability of skilled worker	C3.1
			Work procedure	C3.2
			Supervision	C3.3
Economy	Method	D1	Design planning	D1.1
			Use of technology	D1.2
Reputation	Reputation	E1	Failing contract frequency	E1.1
			Blacklist	E1.2

**Stage II: Criteria validation**

Validation is carried out to measure whether the criteria used are relevant to the state of construction work procurement in Central Java. This validation uses the opinions of the 9 study objects in Table 2 by asking the question "Are these criteria relevant to procurement in the province of Central Java". Respondents have a choice of answers agree (A) and disagree (D) that can be seen in Table 3.

**Table 3.** Validation Criteria

	Project 1	Projects 2	Projects 3	Projects 4	Projects 5	Projects 6	Projects 7	Projects 8	Projects 9	Agreed
A1.1	A	A	A	A	A	A	A	A	A	9
A1.2	A	A	A	A	A	A	A	A	A	9
B1.1	A	A	A	A	A	A	A	A	A	9
B1.2	A	A	A	A	D	A	D	A	A	7
B1.3	A	A	A	A	A	A	A	A	A	9
B2.1	A	A	A	A	A	A	A	A	A	9
B2.2	A	A	A	A	A	A	A	A	A	9
B3.1	A	A	A	A	A	A	A	A	A	9
B3.2	A	A	A	A	A	A	A	A	A	9
B4.1	A	A	A	A	A	A	A	A	A	9
B4.2	A	A	A	A	A	A	A	A	A	9
B5.1	A	A	A	A	A	A	A	A	A	9
B5.2	A	A	A	A	A	A	A	A	A	9
C1.1	A	A	A	A	A	A	A	A	A	9
C1.2	A	A	A	A	A	A	A	A	A	9
C1.3	A	A	A	A	A	A	A	A	A	9
C2.1	A	D	A	A	A	A	A	A	A	8
C2.2	A	A	A	A	D	A	A	A	A	8
C2.3	A	A	A	A	A	A	A	A	A	9
C2.4	A	A	A	A	A	A	A	A	A	9
C3.1	A	A	A	A	A	A	A	A	A	9
C3.2	A	A	A	A	A	A	A	A	A	9
C3.3	A	A	A	A	A	A	A	A	A	9
D1.1	A	A	A	A	A	A	A	A	A	9
D2.2	A	A	A	A	A	A	A	A	A	9
E1.1	A	A	A	A	A	A	A	A	A	9
E1.2	A	A	A	A	A	A	A	A	A	9

$$s^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n - 1} = 0,0201$$

Data shows that more than 75% of respondents agreed in Table 3 to the relevance of implementing the criteria with a variance of 0.002. Thus, the relevance of the criteria reaches consensus.

**Stage III: Relationship between criteria**

DEMATEL calculation based on nine experts, namely project manager for construction procurement in Central Java. DAMATEL is done by providing a pairwise comparison questionnaire to 9 study objects with a rating of 0-4 where 0 = no influence and 4 = very influential. This questionnaire is then translated into a total relation matrix. Returns R as the total for each column, and D as the total for each row, which can then be translated into D-R (cause) and D + R (prominence) can be seen in Table 4.

**Table 4.** Relationship between criteria

	D	R	D-R	D+R
A1.1	2.80	3.47	-0.67	6.28
A1.2	2.42	1.641198911	0.78	4.06
B1.1	1.94	2.591348	-0.65	4.53
B1.2	1.74	2.01251373	-0.28	3.75
B1.3	1.88	2.327998664	-0.44	4.21
B2.1	1.88	2.761711616	-0.88	4.64
B2.2	1.82	2.761363977	-0.94	4.58
B3.1	1.82	2.428103189	-0.60	4.25
B3.2	2.18	2.527782967	-0.35	4.71
B4.1	3.28	2.458231939	0.82	5.74
B4.2	2.98	2.45558195	0.52	5.43
B5.1	2.70	2.41942752	0.28	5.12
B5.2	3.34	2.538611565	0.80	5.88
C1.1	2.66	2.829042316	-0.17	5.49
C1.2	2.52	3.04990572	-0.53	5.57
C1.3	2.49	3.095780109	-0.60	5.59
C2.1	2.00	1.890497396	0.11	3.89
C2.2	2.15	1.760970694	0.39	3.91
C2.3	1.50	1.670700811	-0.17	3.17
C2.4	2.27	2.27597667	0.00	4.55
C3.1	3.34	2.46699113	0.87	5.81
C3.2	3.17	3.230856016	-0.06	6.40
C3.3	3.07	3.172710188	-0.10	6.24
D1.1	3.48	3.12844849	0.35	6.60
D2.2	3.42	2.797561005	0.63	6.22
E1.1	2.47	2.286281484	0.18	4.75
E1.2	2.82	2.102612348	0.72	4.92

D + R signifies the strength of each sub-criterion where the greater the value of D + R indicates the stronger a criterion affects other criteria. Whereas D-R indicates a causal relationship between the criteria. The positive value indicates the criterion as the dispatcher and the negative value indicates the criterion as the recipient of the influence (receiver). Table 5 summarizes the results of dispatchers and receivers (dispatchers are defined as influencers while receivers are said to be influencers).

**Table 5.** Dispatcher and receiver

DISPATCHER	RECEIVER
A1.2	A1.1
B4.1	B1.1
B4.2	B1.2
B5.1 9	B1.3
B5.2	B2.1
C2.1	B2.2
C2.2	B3.1
C3.1	B3.2
D1.1	C1.1
D2.2	C1.2
E1.1 6	C1.3
E1.2	C2.3
	C2.4
	C3.2
	C3.3



Final result of DEMATEL as shown in Figure 1.

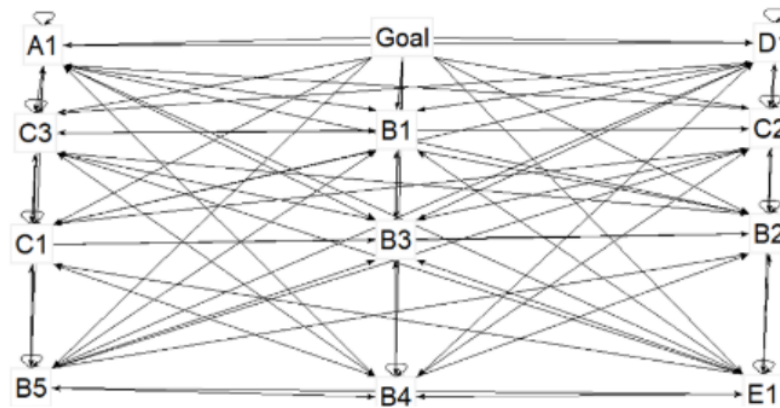


Figure 1. ANP model

The result of the vector  $D + R$  shows that the criteria for "design planning" has the highest value with a value of 6.6. This criterion is considered the most important among other criteria for achieving environmentally friendly procurement. The result of the  $D + R$  vector also provides information that "design planning" is of primary importance and gives great influence to other criteria.

One of the reasons why the "Design planning" criterion is the most important criterion in environmentally friendly public procurement in construction according to the book written by Wulfram I. Ervianto entitled "Save the Earth through Green Construction, Planning, Procurement, Construction & Operations" states that the important aspects that must be implemented to achieve green construction must start from design planning. In the case of public procurement, design planning can be included in technical specifications that have been consulted with structural consultants, architecture, contractors and regulators so that the overall construction work can be based on environmental friendliness.

#### Stage IV: Priority analysis

In Table 6 is the most important priorities of each sub-criterion. Each of these most important priorities is considered a role model for green public procurement in Central Java. Thus, we interview this role-model holder and their opinions are asked to provide recommendations on green public procurement.

**Table 6.** Priority analysis for each project

Sub-criteria	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6	Project 7	Project 8	Project 9
A1.1	0.127	0.122	0.132	0.125	0.129	0.123	0.125	0.125	0.127
A1.2	0.010	0.008	0.009	0.013	0.007	0.008	0.011	0.009	0.011
B1.1	0.044	0.033	0.042	0.036	0.053	0.043	0.051	0.040	0.035
B1.2	0.007	0.014	0.010	0.015	0.006	0.007	0.002	0.009	0.007
B1.3	0.012	0.018	0.008	0.013	0.004	0.017	0.012	0.017	0.022
B2.1	0.038	0.066	0.070	0.043	0.013	0.026	0.076	0.017	0.044
B2.2	0.057	0.038	0.029	0.051	0.081	0.071	0.034	0.076	0.051
B3.1	0.034	0.008	0.051	0.034	0.009	0.011	0.011	0.011	0.034
B3.2	0.045	0.070	0.029	0.045	0.071	0.072	0.068	0.069	0.045
B4.1	0.043	0.020	0.051	0.028	0.020	0.027	0.056	0.024	0.034
B4.2	0.037	0.057	0.028	0.053	0.062	0.051	0.019	0.055	0.044
B5.1	0.024	0.013	0.014	0.024	0.011	0.010	0.010	0.011	0.018
B5.2	0.032	0.042	0.043	0.033	0.045	0.049	0.046	0.046	0.039
C1.1	0.020	0.003	0.028	0.019	0.008	0.004	0.004	0.005	0.019
C1.2	0.022	0.017	0.017	0.021	0.018	0.016	0.024	0.015	0.019
C1.3	0.030	0.051	0.025	0.028	0.050	0.050	0.044	0.053	0.031
C2.1	0.008	0.005	0.018	0.011	0.021	0.025	0.003	0.010	0.007
C2.2	0.009	0.014	0.008	0.010	0.006	0.006	0.007	0.015	0.009
C2.3	0.005	0.004	0.004	0.006	0.003	0.004	0.007	0.003	0.007
C2.4	0.028	0.026	0.023	0.023	0.018	0.019	0.035	0.022	0.028
C3.1	0.022	0.011	0.018	0.021	0.017	0.007	0.042	0.007	0.022
C3.2	0.082	0.067	0.075	0.103	0.055	0.066	0.086	0.069	0.090
C3.3	0.054	0.088	0.053	0.033	0.085	0.092	0.036	0.091	0.053
D1.1	0.086	0.065	0.094	0.117	0.076	0.058	0.105	0.065	0.071
D1.2	0.054	0.070	0.051	0.026	0.059	0.070	0.020	0.069	0.065
E1.1	0.036	0.035	0.023	0.035	0.054	0.014	0.019	0.035	0.027
E1.2	0.034	0.034	0.046	0.033	0.018	0.054	0.047	0.035	0.042

From the result obtained by analyzing each project manager weighting each criterion. By conducting depth interviews with each project manager, a benchmark recommendation can be seen in Table 7.

**Table 7.** Benchmark

Sub-criteria	Recommendation
A1.1	The bid value is chosen if it is still within realistic limits (80% -100% of HPS)
A1.2	Supplier selection priority came from competencies as long as it's still within a realistic range
B1.1	Applying the principle of reuse and recycle for determining technical specifications, especially in the identification of material requirements
B1.2	Applying the principle of reuse and recycle to materials that can still be reused
B1.3	Applying risk assessment for the identification of material needs with material priorities in cost, green, and risk
B2.1	Direction of the principle of green building in the design of technical specifications, especially in the efficiency of water and light
B2.2	Determination of SOPs and heavy equipment required in detailed technical specifications
B3.1	Determination of fuels that have low CO <sub>2</sub> in technical specifications as a consideration for the selection of providers
B3.2	Consultation and coordination with residents and surrounding government related to land selection
B4.1	Regular monitoring of the field in the construction process Technical specifications relating to energy-efficient buildings
B4.2	Calculation of HPS by considering market prices; official unit cost information by BPS; distribution rates; contract costs; inflation; and comparison of similar contracts
B5.1	Job validation based on references from contract documents, mutual check 0, time schedule, and Budget Plan (RAB) Documentation of activities with supervision and CBO Regular reports on the progress of activities and time schedule Energy efficiency and conservation in lighting and electricity systems

Sub-criteria	Recommendation
B5.2	Selection of providers who have ISO 9001, ISO 14001, and SMK3 as mandatory requirements
C1.1	Involve all workers in the labor insurance program
C1.2	Directors in the field are related to health and safety Provision of first aid medicines
C1.3	Work procedures in the technical specifications take into account physical, mental, and physical abilities routinely; regulate wages, hours of work, maternal rights, leave and safety of occupational health; and routine monitoring from the Project Manager
C2.1	Design planning considers access from the elderly, women and vulnerable groups
C2.2	Regularly evaluate site conditions with the environment
C2.3	Opening jobs for the surrounding community CBOs participate in monitoring work
C2.4	Monitoring the impact of the surrounding environment Emergency stairs design, planning and APAR supply
C3.1	Manpower must be SKT certified and supervised by Civil Engineering and Architecture graduates
C3.2	Business Entities have SBU and SKA certificates
C3.3	Establishing SOPs for Contractor Activity Settings in technical specifications Conduct mandatory monitoring by involving Non-Governmental Organizations (CBOs) or requesting progress reports every week
D1.1	Design planning is carried out by identifying the need for construction works until the announcement of procurement planning
D1.2	Identify the needs of heavy equipment used to facilitate the construction process
E1.1	Consideration of the frequency of failures and blacklisting when selecting providers

This benchmark can serve as a standard/regulation for implementing green procurement in future public construction. Based on the results of the weighting of the criteria from the ANP for each project, the weighting of each sub-criterion between projects can be compared with one another. This comparison will produce the highest weight of each sub-criteria for the nine Projects Management assessments in Central Java. From each highest weight, recommendations will be made based on interviews with the Projects Manager of each project.

In the sub-criteria "Realistic bid value" the owner of the highest weight is Projects Manager for project 4. Realistic bidding values range from 80% -100% of the budget. The majority of Projects Manager selects providers that tend to see the lowest bid value, regardless of the competence of the provider. Projects Manager from Project 1 tends to prefer a realistic bid value as long as it meets its competencies within the specified specifications.

In the sub-criteria "Use of recycled products" the owner of the highest weight was Project Manager for Project 3. The reason is the use of the reuse (repurposing) principle by reusing construction materials that can still be used; prefabrication, namely the consideration of using materials efficiently and carefully to plan the construction process in the factory; and planning where planning in the specification has considered more deeply about the use of recycled materials. In the procurement of the project 3, these three principles were carried out, for example, from the boulder which became waste from the material it would be cleaned and reprocessed so that it could be used as the main material in the construction process.

In the sub-criteria "Minimizing energy consumption" the owner of the highest weight was Project Manager for Project 7. Energy consumption is defined as the energy used in the entire construction process from the construction process to the use of buildings. The New Environment Agency building has led to minimizing energy consumption, for example the conservation of natural light in several rooms where the lobby and administration rooms have used natural light for lighting and water efficiency by installing a plumbing system in toilets and taps. Energy savings in construction operations have not been taken into account.

#### 4. Conclusion

Based on the results of data processing and analysis of research data, it can be concluded as follows: The relationship between the sub-criteria was found with the DEMATEL method where the sub-criteria that most influence other criteria are obtained are "Lowest bid value", "Reducing the use of

hazardous materials", "Minimizing energy consumption"; "Minimizing energy loss"; "Clarifying environmentally friendly fuels"; "Impact on the environment during and after construction"; "Work procedures"; "Supervision"; and "Frequency of failure".

An assessment of the weight of each project was obtained using the ANP method to find benchmarks for green public procurement from each criterion. Among these benchmarks, the bid value is selected if it is still within realistic limits and the priority for selecting providers is seen from the competency, not from the low bid value; application of the principle of reuse and recycle in determining technical specifications; guidance on green building principles in the design of technical specifications; determination of fuels which have low CO<sub>2</sub> in technical specifications; consultation and coordination with local residents and government regarding land selection; regular monitoring to the field during the construction process; budget calculations take a consideration from market prices, official unit cost information, distribution rates, contract costs, inflation, and comparisons of similar contracts; job evaluation based on reference to contract documents, mutual check 0; time schedule, and the Budget Plan (RAB); selection of service providers based on ISO 9001, ISO 14001, and HSE certifications; Include a labor insurance program; Directors in the field related to HSE and supply of first aid medicines; Working procedures on technical specifications in detail; design planning considers equality of access; regular evaluation of site conditions with the environment; opening up jobs for the surrounding community; community participates in job monitoring; Consideration of frequency of provider failures and blacklisting when selecting providers.

## References

- [1] Dodds F Strauss M and Strong M F 2012 Only one Earth: The long road via Rio to sustainable development Routledge
- [2] Ding GK 2008 Sustainable construction—The role of environmental assessment tools *Journal of environmental management* **86**(3) 451-64
- [3] Geng Y and Doberstein B 2008 Greening government procurement in developing countries: Building capacity in China *Journal of environmental management* **88**(4) 932-38
- [4] Badan Pusat Statistik 2019 Banyaknya Tenaga Kerja Ahli Konstruksi menurut Provinsi dan Kualifikasi (orang) 2008 - 18
- [5] USAID 2012 Panduan Penghematan Energi di Gedung Pemerintah Panduan Penghematan Energi di Gedung Pemerintah 13 2012
- [6] Hadut AM and Koesmargono K 2018 Kajian Identifikasi Penyebab Construction Waste pada Kontraktor Di Daerah Yogyakarta dan Kupang *Jurnal Teknik Sipil* **25**(3) 237-46
- [7] Testa F, Annunziata E, Iraldo F and Frey M 2016 Drawbacks and opportunities of green public procurement: an effective tool for sustainable production *Journal of Cleaner Production* **112** 1893-900
- [8] Bratt C, Hallstedt S, Robèrt KH, Broman G and Oldmark J 2013 Assessment of criteria development for public procurement from a strategic sustainability perspective *Journal of Cleaner Production* **52** 309-16
- [9] Sparrevik M, Wangen HF, Fet AM and De Boer L 2018 Green public procurement—A case study of an innovative building project in Norway *Journal of Cleaner Production* **188** 79-87
- [10] PERATURAN PRESIDEN NO 16 TAHUN 2018 PENGADAAN BARANG AND JASA PEMERINTAH 2018
- [11] Adham K and Siwar C 2012 Empirical investigation of government green procurement (GGP) practices in Malaysia *OIDA international journal of sustainable development* **4**(4) 77-88
- [12] Qi GY, Shen LY, Zeng SX and Jorge OJ 2010 The drivers for contractors' green innovation: an industry perspective *Journal of cleaner production* **18**(14) 1358-65
- [13] Franks J and Harlow PA 1998 Building procurement systems: A client's guide Longman.
- [14] Love PE Skitmore M and Earl G 1998 Selecting a suitable procurement method for a building project *Construction Management & Economics* **16**(2) 221-33
- [15] Cogburn JD and Rahm D 2005 Environmentally preferable purchasing: who is doing what in the United States? *Journal of Public Procurement* **5**(1)
- [16] Braulio-Gonzalo M and Bovea MD 2020 Relationship between green public procurement criteria and sustainability assessment tools applied to office buildings *Environmental Impact Assessment Review* **81** 106310

- [17] Sterner E 2002 Green procurement of buildings: a study of Swedish clients' considerations *Construction Management & Economics* **20**(1) 21-30
- [18] Varnäs A, Balfors B and Faith-Ell C 2009 Environmental consideration in procurement of construction contracts: current practice problems and opportunities in green procurement in the Swedish construction industry *Journal of Cleaner Production* **17**(13) 1214-22
- [19] Tarantini M, Loprieno AD and Porta PL 2011 A life cycle approach to Green Public Procurement of building materials and elements: A case study on windows *Energy* **36**(5) 2473-82
- [20] Uttam K, Balfors B and Faith-Ell C 2014 Green public procurement (GPP) of construction and building materials In *Eco-Efficient Construction and Building Materials* (166-195) Woodhead Publishing
- [21] Uttam K and Roos CLL 2015 Competitive dialogue procedure for sustainable public procurement *Journal of Cleaner Production* **86** 403-16
- [22] Fuentes-Bargues JL, González-Cruz M and González-Gaya C 2017 Environmental criteria in the Spanish public works procurement process *International journal of environmental research and public health* **14**(2) 204
- [23] Montalbán-Domingo L, García-Segura T, Sanz MA and Pellicer E 2018 Social sustainability criteria in public-work procurement: An international perspective *Journal of Cleaner Production* **198** 1355-71
- [24] Berry C and McCarthy S 2011 Guide to sustainable procurement in construction London: Ciria



# Assessment of green public procurement specifications in government institutions: Case study in Central Java, Indonesia

## ORIGINALITY REPORT

12%

SIMILARITY INDEX

10%

INTERNET SOURCES

9%

PUBLICATIONS

9%

STUDENT PAPERS

## PRIMARY SOURCES

1	Submitted to The University of Manchester Student Paper	1 %
2	gfzpublic.gfz-potsdam.de Internet Source	1 %
3	Submitted to Kingston University Student Paper	1 %
4	linter.untar.ac.id Internet Source	<1 %
5	Asmah Alia Mohamad Bohari, Martin Skitmore, Bo Xia, Melissa Teo, Natasha Khalil. "Key stakeholder values in encouraging green orientation of construction procurement", Journal of Cleaner Production, 2020 Publication	<1 %
6	e378a16a-a07a-4394-9fe1-1cd9a6bc91e2.filesusr.com Internet Source	<1 %
7	www.sciencegate.app Internet Source	<1 %

8	riunet.upv.es Internet Source	<1 %
9	Submitted to Swinburne University of Technology Student Paper	<1 %
10	www.citethisforme.com Internet Source	<1 %
11	www.nrcresearchpress.com Internet Source	<1 %
12	Wilson, D. C., D. Parker, J. Cox, K. Strange, P. Willis, N. Blakey, and L. Raw. "Business waste prevention: a review of the evidence", Waste Management & Research, 2012. Publication	<1 %
13	www.slideshare.net Internet Source	<1 %
14	tavana.us Internet Source	<1 %
15	myassignmenthelp.com Internet Source	<1 %
16	www.freepatentsonline.com Internet Source	<1 %
17	Ram Narasimhan, Tobias Schoenherr. "The effects of integrated supply management practices and environmental management	<1 %

practices on relative competitive quality  
advantage", International Journal of  
Production Research, 2012

Publication

18

[moosebitchin.freesevers.com](http://moosebitchin.freesevers.com)

Internet Source

<1 %

19

[dilbert.engr.ucdavis.edu](http://dilbert.engr.ucdavis.edu)

Internet Source

<1 %

20

[theses.lib.polyu.edu.hk](http://theses.lib.polyu.edu.hk)

Internet Source

<1 %

21

[journals.sagepub.com](http://journals.sagepub.com)

Internet Source

<1 %

22

[docplayer.net](http://docplayer.net)

Internet Source

<1 %

23

"Operations Management and Sustainability",  
Springer Science and Business Media LLC,  
2019

Publication

<1 %

24

[www.journalofgreenbuilding.com](http://www.journalofgreenbuilding.com)

Internet Source

<1 %

25

Submitted to Gitam University

Student Paper

<1 %

26

Submitted to University of Central Lancashire

Student Paper

<1 %

27

Submitted to University of Dundee

Student Paper



<1 %

28

[www.proceedings.com](http://www.proceedings.com)

Internet Source

<1 %

29

[www.e3s-conferences.org](http://www.e3s-conferences.org)

Internet Source

<1 %

30

[sciencedocbox.com](http://sciencedocbox.com)

Internet Source

<1 %

31

Magnus Sparrevik, Helene Førsund Wangen, Annik Magerholm Fet, Luitzen De Boer.

"Green public procurement – A case study of an innovative building project in Norway",  
Journal of Cleaner Production, 2018

Publication

<1 %

32

Nia Budi Puspitasari, Susatyo Nugroho Widyo Pramono, Afrizal Eka Rahmadhika. "Factors that affect intention to revisit of tourists in Semarang", AIP Publishing, 2018

Publication

<1 %

33

[Usir.salford.ac.uk](http://Usir.salford.ac.uk)

Internet Source

<1 %

34

[cibworld.xs4all.nl](http://cibworld.xs4all.nl)

Internet Source

<1 %

Exclude quotes Off

Exclude matches Off

Exclude bibliography Off

# Assessment of green public procurement specifications in government institutions: Case study in Central Java, Indonesia

## GRADEMARK REPORT

FINAL GRADE

/0

GENERAL COMMENTS

Instructor

PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8

PAGE 9

PAGE 10

PAGE 11

PAGE 12