United International Journal for Research & Technology

Volume 06, Issue 05, 2025 | Open Access | ISSN: 2582-6832

Improving Electrical Energy Performance in Soekarno-Hatta Airport Apron Management Using Analytical Hierarchy Process (AHP)

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***Abstract*—** Apron is an area or region where aircraft park, maneuver before and after parking, load and unload passengers and goods, refuel and perform minor repairs. This study discusses efforts to improve electrical energy performance in the management of the terminal apron at Soekarno-Hatta Airport using the Analytical Hierarchy Process (AHP) method. In its implementation, the questionnaire was then given to experts in the Electrical Utility and Visual Aid Services Division who carry out maintenance and care of electrical energy in the area. The alternative sequence for improving energy performance at the Soekarno-Hatta Airport apron was obtained based on its priority, namely the alternative of Using tools and spare parts that are available on the market (Availability) which is considered the most important alternative with a value of 0.273191608, followed by the alternative of Using tools that can be repaired and reused (Re-Use) which is considered the second most important alternative with a value of 0.202908753. The third important alternative is the Operational Arrangement of Equipment in the Field (Operational) alternative with a value of 0.183862838, then the fourth important alternative is the Use of Energy Saving Tools (Energy Saving) alternative with a result of 0.153735932 and the alternative considered the fifth important is Reducing the use of tools containing hazardous toxic waste (Waste) with a value of 0.123637483.

***Keywords*—** Terminal Apron, Energy Performance, Analytical Hierarchy Process (AHP).

I. INTRODUCTION

Background Problem

The Terminal Apron is an area or area where aircraft park, carry out maneuvers before and after parking, load and unload passengers and goods, refuel and carry out minor repairs. This area is equipped with markings as signs and restrictions for aircraft to move. After the Covid-19 pandemic, the world of Indonesian aviation has not yet fully recovered and has resulted in many limitations in airport management, however, as Indonesia's international gateway, Soekarno-Hatta Airport continues to operate 24 hours even when the pandemic lasts.

These limitations also resulted in a reduction in the operational budget for all divisions within Soekarno-Hatta International Airport, including the Electrical Utility and Visual Aid Services Division which carries out maintenance and care of electrical energy in the apron area of Soekarno-Hatta International Airport.

This was felt to be even more difficult when the government made adjustments to the Basic Electricity Tariff (TDL) in 2022 where there was an increase of IDR 379.23 per kWh from the previous rate, but all operational and technical ranks remained determined to provide the best service. This is in line with the vision of PT. Angkasa Pura II as the manager of Soekarno-Hatta International Airport to become The leading airport in the region.

Then how do we know if the airport services provided are sufficient to become The leading airport in the region? In the world of aviation there is an institution called Skytrax which conducts surveys and reviews to determine the 100 Best Airports in the World, Skytrax itself is a consulting company from Great Britain that conducts research in the field of commercial civil aviation.

This company conducts annual surveys to determine the best airlines, airports, in-flight entertainment, staff and other elements of air travel. In addition to this survey, Skytrax also has an airline forum where air travelers can provide reviews to be seen by other prospective air travelers.

From the list of 100 Best Airports in the World, it is then summarized to see the position of Soekarno-Hatta International Airport in the world and the Southeast Asian region.

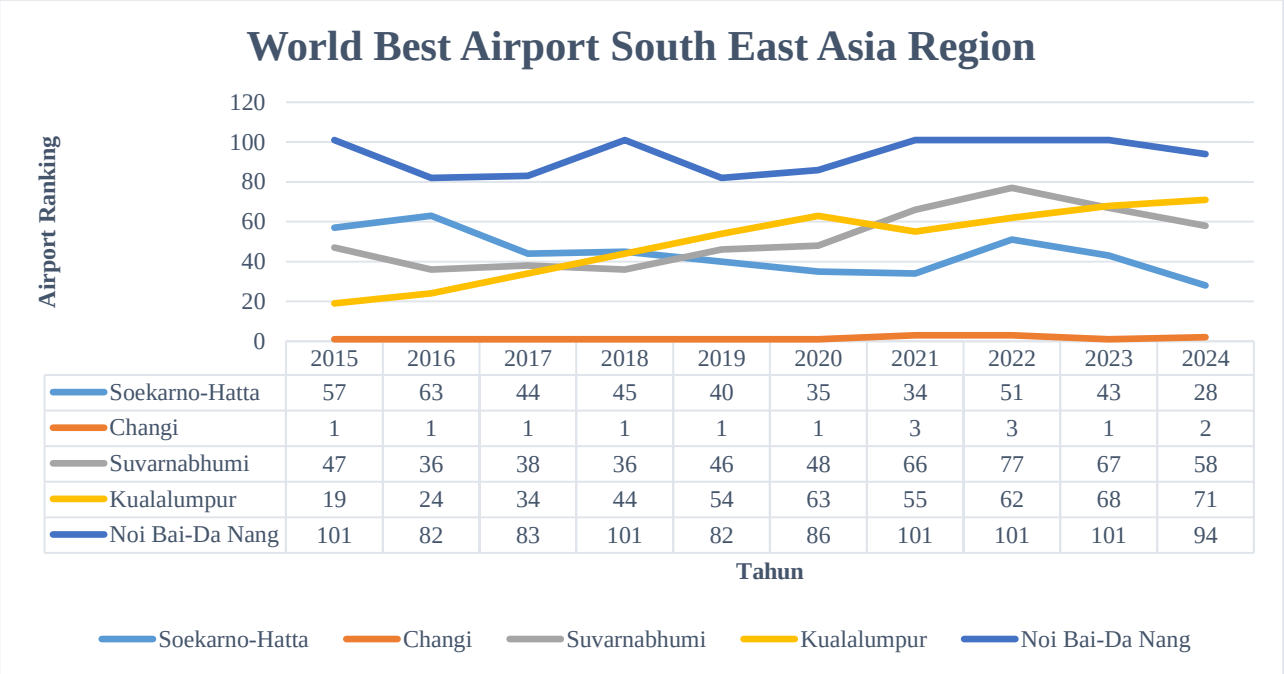

Figure 1. *World's Best Airports*

Looking at the results of the Skytrax survey, out of a total of 11 countries in Southeast Asia, only 5 countries have airports included in the 100 best airports in the world, namely Indonesia, Singapore, Thailand, Malaysia and Vietnam. From Figure 1, it can also be seen that in the last 10 years, Changi Airport - Singapore is the best airport in Southeast Asia and even in the world, while the other 4 airports are not even included in the top 10 best airports.

Therefore, each business unit in Soekarno-Hatta International Airport needs to improve its reputation, performance & service quality according to each business unit in order to improve the ranking of Soekarno-Hatta Airport in the eyes of air travelers, both airlines and airplane passengers.

This affects the desire of air travelers to want to use Soekarno-Hatta Airport for transit or as a destination for their air travel, which of course is directly proportional to the increase in airport management income.

In carrying out its duties, the Electrical Utility and Visual Aid Services Division also provides points from the Soekarno-Hatta Airport terminal apron service through a survey and review conducted by Skytrax. For this reason, the Electrical Utility and Visual Aid Services Division needs to make improvements to improve energy performance on the Soekarno-Hatta Airport terminal apron to help boost the position of Soekarno-Hatta Airport in the eyes of international airport service users.

In order to improve energy performance on the Soekarno-Hatta Airport terminal apron, it must be known how to determine the importance weight value for each criterion and the order of alternative energy performance improvements starting from the most important based on its weight in improving energy performance on the Soekarno-Hatta Airport terminal apron? and how to make improvements in efforts to improve energy performance for the future on the Soekarno-Hatta Airport terminal apron?

Research Formulation

From the management problems that have been expressed, the objectives of this study are:

1. To determine the importance weight value for each criterion in improving energy performance at the Soekarno-Hatta Airport terminal apron.
2. To determine the order of alternatives for improving energy performance at the Soekarno-Hatta Airport terminal apron from the most important based on their weight.
3. To make improvements in efforts to improve energy performance for the future at the Soekarno-Hatta Airport terminal apron.

II. RESEARCH METHOD

Problem Formulation

In a study, in order to obtain a mature concept to explain each problem in a study, it is necessary to create a framework of thought that is combined with the research method used. The framework of thought is a conceptual model of how theory relates to various factors that have been identified as important problems [5]. Then the management problems expressed in the introduction will then be broken down into separate elements and modeled in a general hierarchical manner which includes objectives, criteria and alternatives as follows:

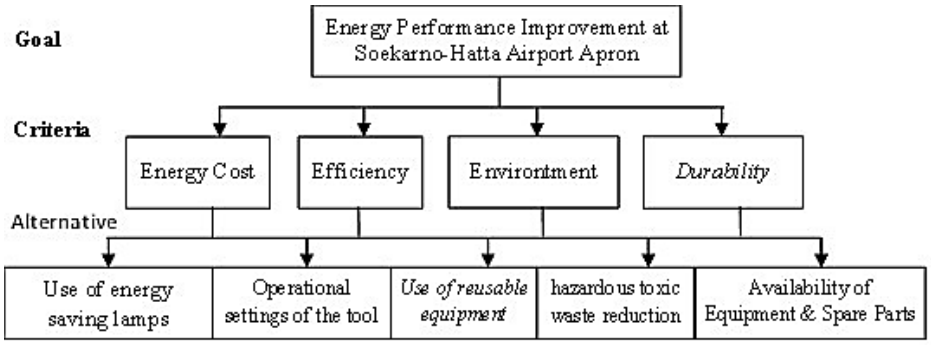

Figure 2. *Research Framework*

According to [2] that the energy performance indicator or EnPI is a quantitative unit or performance indicator set by an organization or a measure of energy intensity used to measure the effectiveness of energy management efforts.

Method

The management problems in this study will be solved using the Analytic Hierarchy Process (AHP) method. Analytic Hierarchy Process (AHP) is a method that details a complex or unstructured situation into components and then organizes the parts or variables of the components into a hierarchical arrangement, assigning numerical values to these considerations to determine which variables have the highest priority [4].

Analytical Hierarchy Process is an analysis method through paired comparisons that relies on expert judgment to determine the priority scale [3], for that the questionnaire was then given to experts in the Electrical Utility and Visual Aid Services Division who carry out maintenance and care of electrical energy in the area.

Population and Research Sample

Population is a generalization area consisting of objects or subjects that have certain qualities and characteristics determined by researchers to be studied and then conclusions drawn [5]. While the sample is part or representative of the population being studied. Sampling for this study used nonprobability sampling with purposive sampling technique. Purposive sampling is a sampling technique with certain considerations [5].

The population in this study were Division Leaders, Departments, Technical and Administrative Implementers of Electrical Utility and Visual Aid Services starting from Manager, Assistant Manager, Supervisor, Senior Engineer, Junior Engineer and Technician. With samples of Assistant Manager, Supervisor, Senior Engineer, and Junior Engineer.

Table 1. *Research Sample Population*

No	Position	Population
1	Assistant Manager	3
2	Supervisor	10
3	Senior Engineer	1
4	Junior Engineer	1
Total	15	

Data Collection

Data collection techniques are the methods used by researchers to obtain data in a study. In this study, the researcher chose a quantitative research type so that the data taken must be accurate and precise because the results can affect the quality of the study. The data collection technique needed in this study was carried out by distributing questionnaires which were then given to

experts in the Electrical Utility and Visual Aid Services Division who carried out maintenance and care of electrical energy in the area.

III. RESULT

Determination of Criteria and Alternative Weights

The determination of criteria and alternative weights is measured against each other starting sequentially from between criteria, then each alternative against other alternatives from the perspective of each criterion.

This aims to determine the level of importance of each comparison, both between one criterion and another and between one alternative and another with a comparison format such as table 2 below:

Table 2. *Criteria Comparison Matrix*

Criterion	Cost	Efficiency	Environtment	Durability
Cost	1	1/A	1/B	1/C
Efficiency	A	1	1/D	1/E
Environtment	B	D	1	1/F
Durability	C	E	F	1
Total	∑ Cost	∑ Efficiency	∑ Environtment	∑ Durability

The pairwise comparison above is distributed to all sources with a total of 15 sources, from the table above, a comparison of the importance of the criteria will be obtained which is then processed into the weight of each criterion. After that, it will be continued with a pairwise comparison between alternatives seen from each criterion, so that a pairwise comparison of alternatives will be obtained as many as 4 times the pairwise comparison as seen in table 3. Seen from criterion 1 (continued until the 4th criterion).

Table 3. *Matrix of Comparison of Alternatives against Criteria*

Alternatif	Energy saving	Operasional	Re-Use	Waste	Availability
Energy saving	1	1/A	1/B	1/C	1/D
Operational	A	1	1/E	1/F	1/G
Re-Use	B	E	1	1/H	1/I
Waste	C	F	H	1	1/J
Ketersediaan	D	G	I	J	1
Total	∑ Energy saving	∑ Operational	∑ Re-Use	∑ Waste	∑ Ketersediaan

As in the pairwise comparison of criteria from the table above, a comparison of alternative interests will be obtained which is then processed into the weight of each alternative.

Each weight produced, be it the weight of the criteria or the weight of the alternative, must first be tested for consistency.

Because the numerical values given come from individual subjective preferences, it is impossible to avoid some inconsistencies in the final assessment matrix, so the amount of inconsistency that can be accepted must be calculated.

For this reason, AHP calculates the Consistency Ratio (CR) which compares the Consistency Index (CI) of the matrix in question with the Consistency Index of the Random Index (RI).

The results obtained from each source provide different variations of interests, resulting in different weights on the criteria and alternatives.

The results of the criteria and alternative weights from each source will be tested for consistency and inconsistent test results from each source, both criteria and alternatives, will not be included in the next process.

AHP Criteria Results

The results of the interest assessment survey from the paired criteria matrix from each source which then produces the criteria weight value are shown in Figure 3.

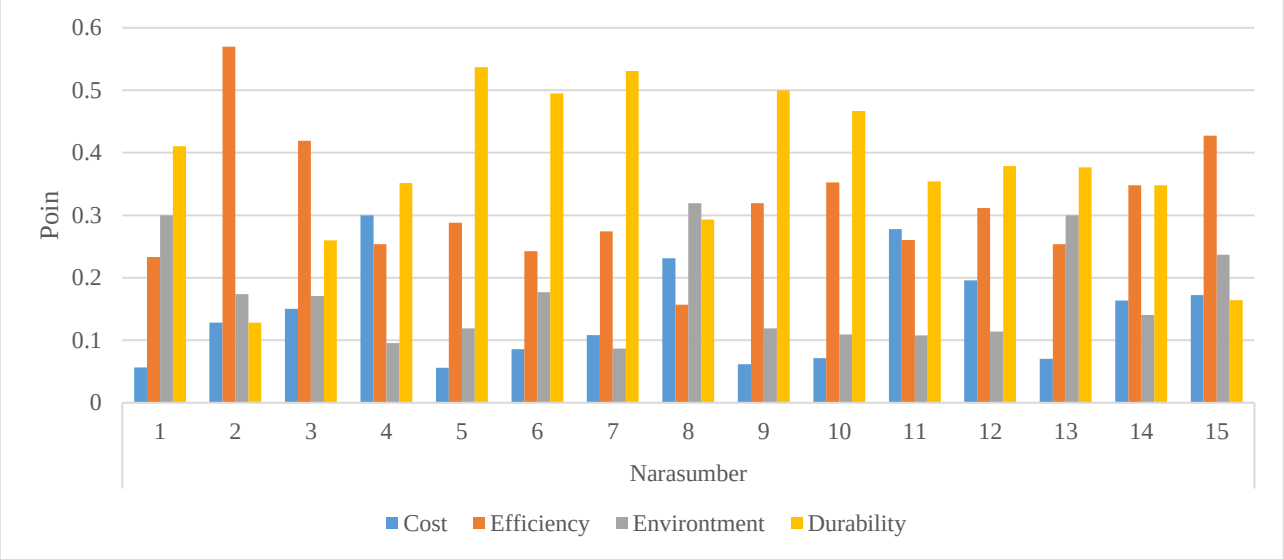

Figure 3. *Criteria Weight Values*

From the results of all the sources, a consistency level test (Consistency Ratio) will be carried out first before determining the priority order of each criterion with a tolerance of 0.10 so that it will be declared consistent if the Consistency Ratio is not more than 0.10. The test results will be shown in table 4:

Table 4. *Criteria Weight Consistency Test*
n: 4, Random Index: 0,9

Source person	Consistency Index	Consistency Ratio	Result
(CI)	(CR)		
1	0,053324692	0,059249658	Consistent
2	0,074074074	0,082304527	Consistent
3	0,060185185	0,066872428	Consistent
4	0,065642009	0,072935566	Consistent
5	0,088847448	0,098719387	Consistent
6	0,061320167	0,068133519	Consistent
7	0,076878934	0,085421038	Consistent
8	0,128575263	0,142861403	Inconsistent
9	0,063077732	0,070086369	Consistent
10	0,061226927	0,068029919	Consistent
11	0,070628038	0,078475597	Consistent
12	0,069749025	0,077498917	Consistent
13	0,017427398	0,019363776	Consistent
14	0,060877684	0,067641872	Consistent
15	0,077132937	0,085703263	Consistent

From the test results, it was found that resource person 8 had a Consistency Ratio above 0.10, which was 0.142861403 and was declared inconsistent, so the criteria weight value of resource person 8 would not be included in the next data processing, namely to find the priority order of the criteria.

The comparison results were expressed in the form of values from 14 resource persons, which were then taken as the geometric average, the following geometric average of the criteria from 14 resource persons is shown in table 5:

Tabel 5. Priority Results Criteria

Criteria	Geomean	Priority
Cost	0,116076046	4
Effficiency	0,314614659	2
Environtment	0,148148994	3
Durability	0,352465057	1

From table 5, it is found that the Durability criterion is considered to have the most important priority from other criteria with a value of 0.352465057.

Then the criterion that is considered the second most important priority is Efficiency with a value of 0.314614659 and followed by the Environmental criterion which is considered the third most important priority with a value of 0.148148994 and the Cost Criteria in the last order with a value of 0.116076046.

Alternative AHP Results Against Cost Criteria

The results of the importance assessment survey from the paired Alternative matrix against the Cost Criteria from each resource person (except resource person 8) which then produces a weight value are shown in Figure 4:

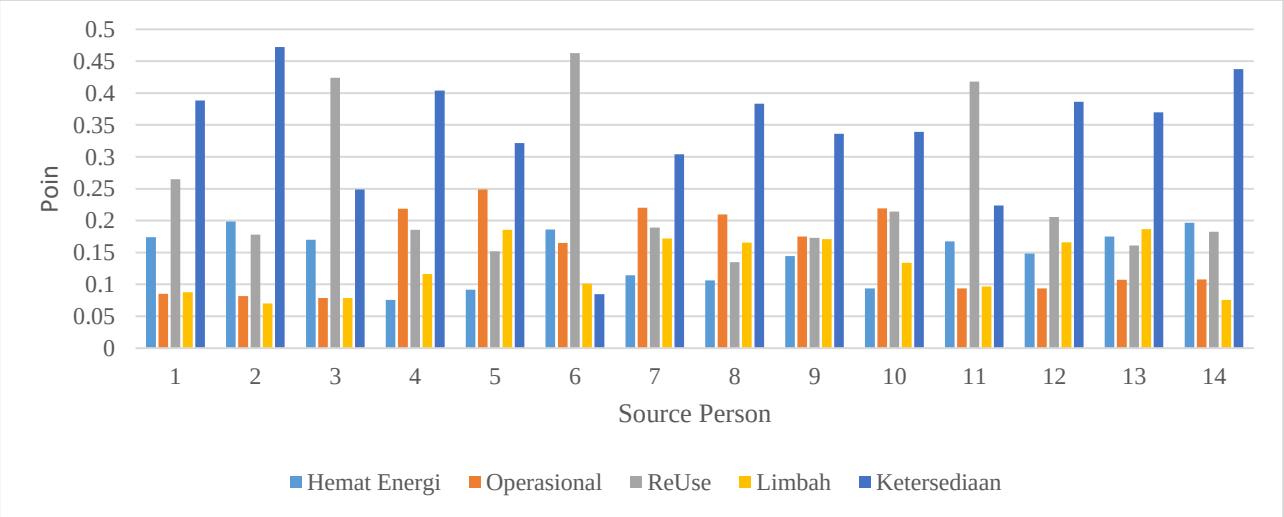

***Figure 4.** Alternative Weight Value Against Cost Criteria*

Again without the results of resource person 8, the results above will be tested for consistency level (Consistency Ratio) first before determining the priority order of the alternatives to the cost criteria with a tolerance of 0.10 so that it will be declared consistent if the Consistency Ratio is not more than 0.10. The test results will be shown in table 6 :

***Table 6.** Consistency Test of Alternative Weights to Cost Criteria*
n: 5, Random Index: 1,12

Source Person	Consistency Index	Consistency Ratio	Result
(CI)	(CR)		
1	0,088573433	0,079083422	Consistent
2	0,086999376	0,077678014	Consistent
3	0,087733185	0,078333201	Consistent
4	0,083296016	0,074371443	Consistent
5	0,105843557	0,094503176	Consistent
6	0,105578602	0,094266609	Consistent
7	0,099348291	0,088703831	Consistent
9	0,241782324	0,215877075	Inconsistent

10	0,091616863	0,08180077	Consistent
11	0,108202098	0,096609016	Consistent
12	0,088325166	0,078861755	Consistent
13	0,108725702	0,09707652	Consistent
14	0,104001415	0,092858406	Consistent
15	0,094396113	0,084282244	Consistent

From the test results, it was again found that the resource person had a Consistency Ratio above 0.10, namely resource person 9 of 0.215877075 so that it was declared inconsistent, so that the weight value of resource person 9 will also not be included in the next data processing, namely to find the priority order of Alternatives to Cost Criteria. The comparison results are expressed in the form of values from 13 resource persons which are then taken as the geometric average, the following is the geometric average of Alternatives to Cost Criteria from 13 resource persons shown in table 7:

Table 7. *Alternative Priority Results Against Cost Criteria*

Criteria	Geomean	Priority
Energy Saving	0,139627002	3
Operational	0,137743458	4
ReUse	0,220062153	2
Waste	0,121650275	5
Availability	0,314714731	1

The results of the Alternative Priorities against the cost criteria obtained that the Availability of tools and spare parts alternative is considered to have the most important priority from other alternatives with a value of 0.314714731. Then the alternative that is considered the second most important priority is Re-use or equipment that can be repaired and reused if damaged with a value of 0.220062153 and followed by the alternative of using energy-saving tools which is considered the third most important priority with a value of 0.139627002 then the operational alternative as the fourth most important alternative with a value of 0.137743458 and the alternative of reducing B3 waste in the last order with a value of 0.121650275.

AHP Alternative Results Against Efficiency Criteria

The results of the interest assessment survey from the paired Alternative matrix against the Efficiency Criteria from each resource person (except resource persons 8 & 9) which then produced a weight value are shown in Figure 5.

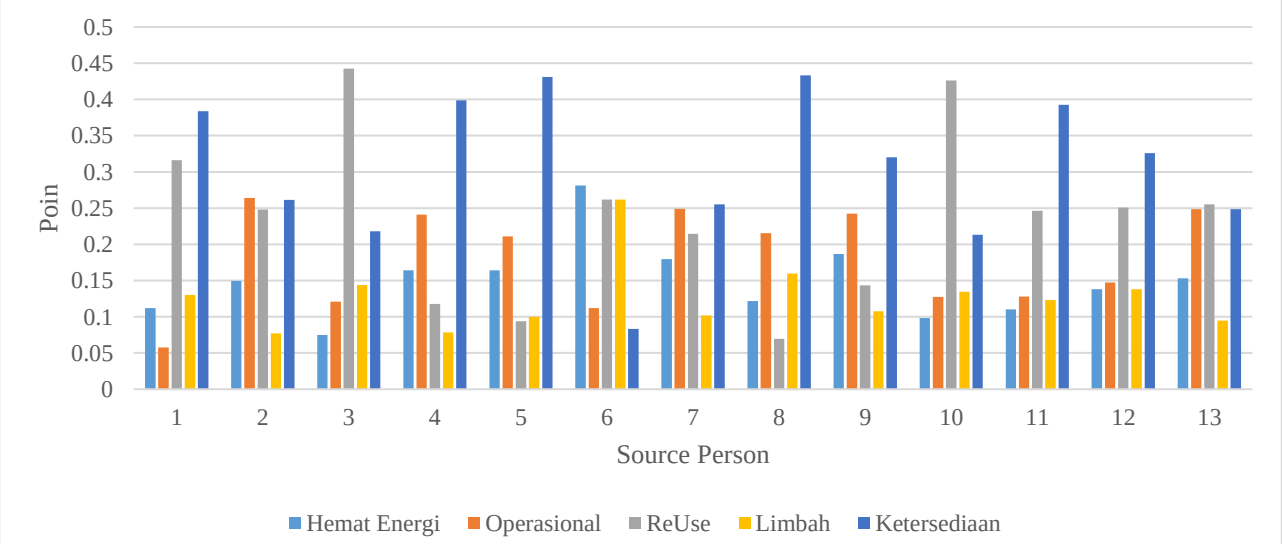

Figure 5. *Alternative Weight Values Against Efficiency Criteria*

This time without the results from sources 8 & 9, the results above will be tested for consistency (Consistency Ratio) first before determining the priority order of the alternatives to the cost criteria with a tolerance of 0.10 so that it will be declared consistent if the Consistency Ratio is not more than 0.10. The test results will be shown in table 8:

Table 8. *Consistency Test of Alternative Weights Against Efficiency Criteria*
n: 5, Random Index: 1,12

Source Person	Consistency Index	Consistency Ratio	Result
(CI)	(CR)		
1	0,104766857	0,093541837	Consistent
2	0,087092889	0,077761508	Consistent
3	0,094254731	0,084156009	Consistent
4	0,100323537	0,089574587	Consistent
5	0,094410979	0,084295517	Consistent
6	0,104746289	0,093523472	Konsisten
7	0,11002345	0,098235223	Konsisten
10	0,107948654	0,096382727	Konsisten
11	0,05375	0,047991071	Konsisten
12	0,105722087	0,094394721	Konsisten
13	0,068017265	0,060729701	Konsisten
14	0,043303571	0,038663903	Konsisten
15	0,099864418	0,089164659	Konsisten

The results of this test did not find any informants who had a Consistency Ratio above 0.10 so that all the informants tested were declared consistent, and the results of all the informants tested will be included in the next data processing, namely to find the priority order of Alternatives to the Efficiency Criteria. The comparison results are expressed in the form of values from 13 informants which are then taken as the geometric average, the following is the geometric average of the Alternatives to the Efficiency Criteria from 13 informants shown in table 9.

Table 9. *Alternative Priority Results Against Efficiency Criteria*

Alternatif	Geomean	Prioritas
Saving Energy	0,14124429	4
Operational	0,167371782	3
ReUse	0,208883412	2
Waste	0,120505224	5
Availability	0,283109255	1

The results of the alternative priorities for the efficiency criteria obtained that the Availability of tools and spare parts alternative is considered to have the most important priority from other alternatives with a value of 0.283109255.

Then the alternative that is considered the second most important priority is Re-use or equipment that can be repaired and reused if damaged with a value of 0.208883412 and followed by the operational alternative which is considered the third most important priority with a value of 0.167371782 then the Energy Saving alternative as the fourth most important alternative with a value of 0.14124429 and the Waste alternative in the last order with a value of 0.120505224.

AHP Alternative Results for Environmental Criteria

The results of the interest assessment survey from the paired Alternative matrix for Environmental Criteria from each resource person (except resource persons 8 & 9) which then produced a weight value are shown in Figure 6:

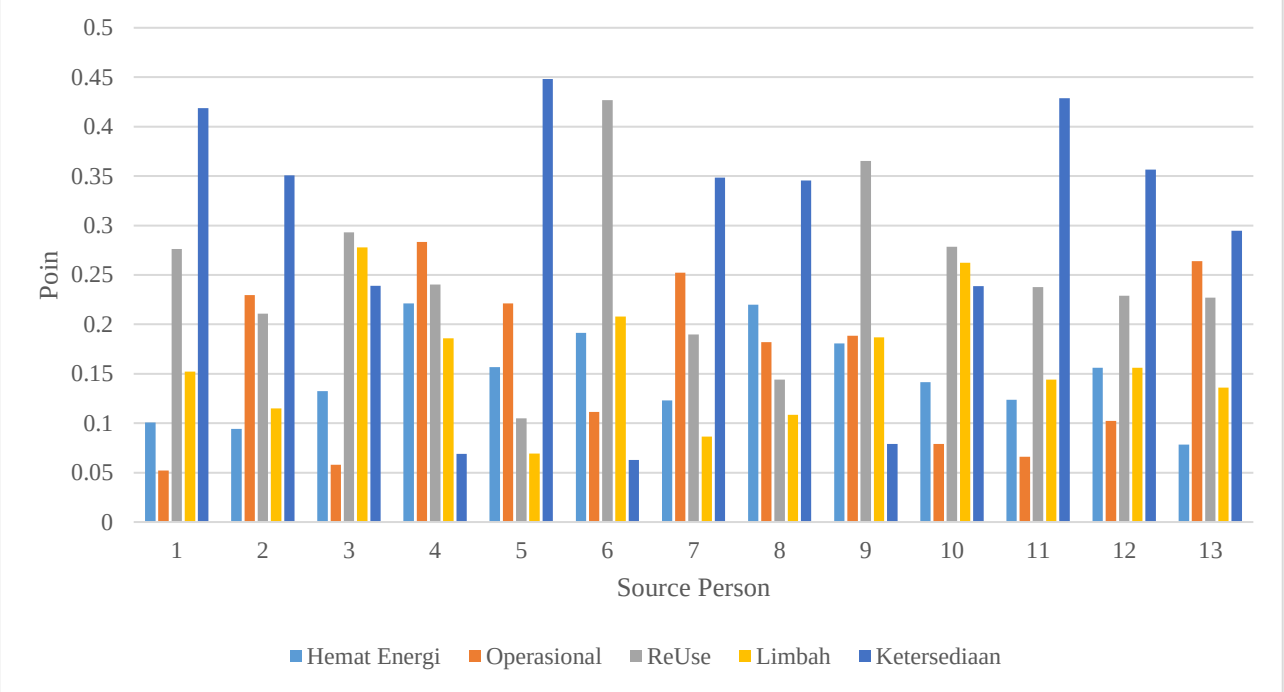

Figure 6. *Alternative Weight Values Against Environmental Criteria*

Still without results from sources 8 & 9, the results above will be tested for consistency level (Consistency Ratio) first before determining the priority order of alternatives to cost criteria with a tolerance of 0.10 so that it will be declared consistent if the Consistency Ratio is not more than 0.10. The test results will be shown in table 10:

Table 10. *Consistency Test of Alternative Weights Against Environmental Criteria*
n: 5, Random Index: 1,12

Source Person	Consistency Index	Consistency Ratio	Result
(CI)	(CR)		
1	0,106993395	0,095529817	Consistent
2	0,082039086	0,073249184	Consistent
3	0,093370841	0,083366822	Consistent
4	0,102764839	0,091754321	Consistent
5	0,105116764	0,093854254	Consistent
6	0,09659077	0,086241759	Consistent
7	0,102372278	0,091403819	Consistent
10	0,093995726	0,083924756	Consistent
11	0,095955722	0,085674751	Consistent
12	0,067699849	0,060446294	Consistent
13	0,09116441	0,081396795	Consistent
14	0,090360483	0,080679002	Consistent
15	0,109237125	0,097533147	Consistent

The results of this test also did not find any informants who had a Consistency Ratio above 0.10 so that all the informants tested were declared consistent, and the results of all the informants tested will be continued in the next data processing, namely to find the priority order of Alternatives to the Efficiency Criteria. The comparison results are expressed in the form of values from 13 informants which are then taken as geometric averages, the following geometric averages of Alternatives to Environmental Criteria are shown in table 11 below:

Table 11. Results of Alternative Priorities to Environmental Criteria

Alternative	Geomean	Priority
Energy Saving	0,140994433	4
Operational	0,136832463	5
ReUse	0,233955945	2
Waste	0,149260183	3
Avaiaility	0,235902442	1

The results of the alternative priorities for the Environmental criteria obtained that the Availability of tools and spare parts alternative is considered to have the most important priority from other alternatives with a value of 0.235902442. Then the alternative with the second important priority is Re-use or equipment that can be repaired and reused if damaged with a value of 0.233955945 and followed by the Waste alternative which is considered the third important priority with a value of 0.149260183 then the Energy Saving alternative as the fourth important alternative with a value of 0.140994433 and the Operational alternative in the last order with a value of 0.136832463.

AHP Alternative Results for Durability Criteria

The results of the importance assessment survey from the paired Alternative matrix for the Durability Criteria from each resource person (except resource persons 8 & 9) which then produced a weight value are shown in Figure 7.

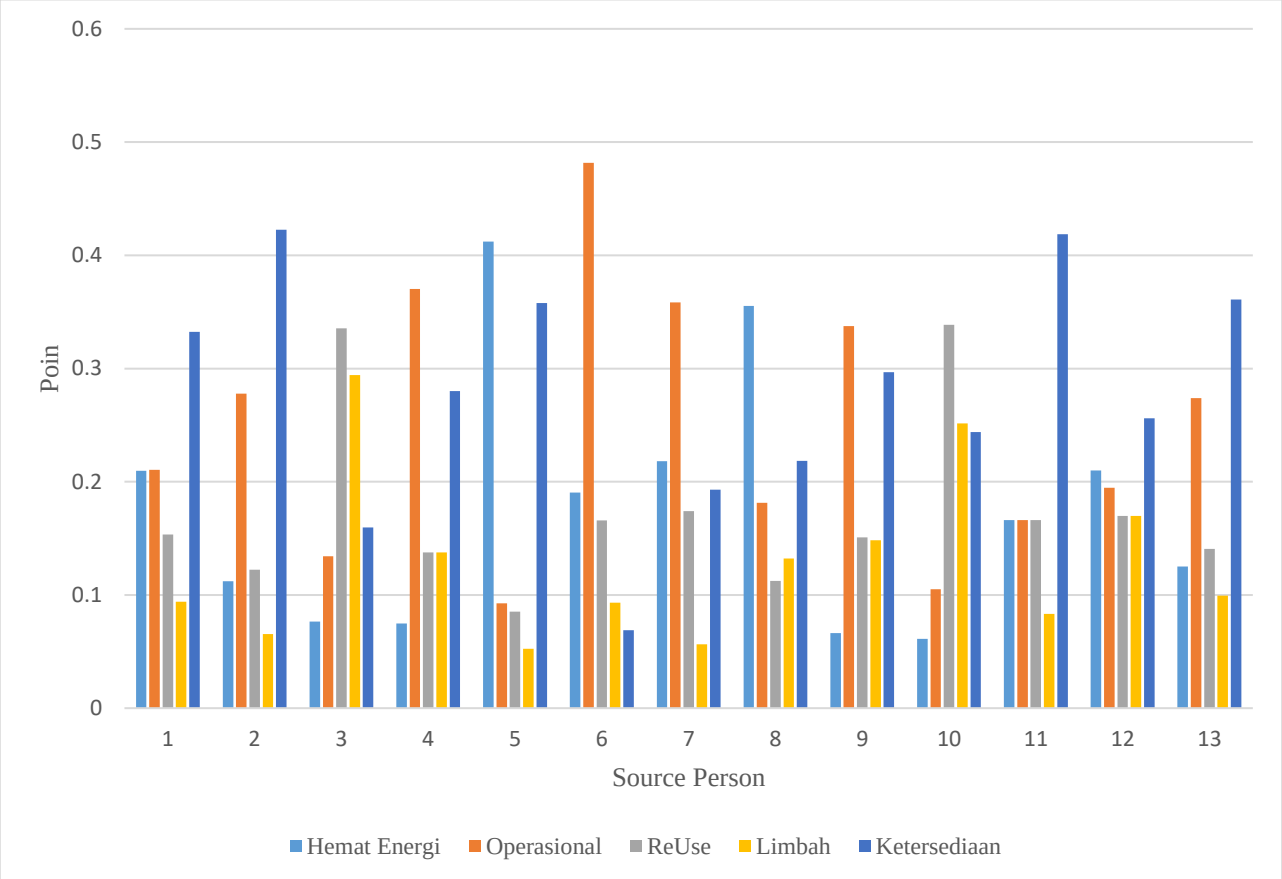

Figure 7. *Alternative Weight Values Against Durability Criteria*

Still without results from sources 8 & 9, the results above will be tested for consistency level (Consistency Ratio) first before determining the priority order of alternatives to the cost criteria with a tolerance of 0.10 so that it will be declared consistent if the Consistency Ratio is not more than 0.10. The test results will be shown in table 12:

Table 12. Consistency Test of Alternative Weights Against Durability Criteria
n: 5, Random Index: 1,12

Source Person	Consistency Index	Consistency Ratio	Result
(CI)	(CR)		
1	0,076937442	0,068694144	Consistent
2	0,094859912	0,08469635	Consistent
3	0,096763285	0,08639579	Consistent
4	0,077196581	0,068925519	Consistent
5	0,089971312	0,080331529	Consistent
6	0,095962419	0,085680731	Consistent
7	0,10843016	0,096812643	Consistent
10	0,100076923	0,089354396	Consistent
11	0,013753191	0,012279635	Consistent
12	0,11006185	0,098269509	Consistent
13	0,085984848	0,076772186	Consistent
14	0,097632576	0,087171943	Consistent
15	0,038326389	0,03421999	Consistent

The test results this time also did not get a resource person with a Consistency Ratio above 0.10 so that all the resource persons tested were declared consistent, and the test results of all the resource persons will be continued in the next data processing to find the priority order of the Alternatives to the Efficiency Criteria. The comparison results are expressed in the form of values from 13 resource persons which are then taken as the geometric average, the following geometric average of the Alternative Priorities to the Durability Criteria from 13 resource persons is shown in table 13:

Table 13. Results of Alternative Priorities to the Durability Criteria

Alternative	Geomean	Priority
Energy Saving	0,146586498	4
Operational	0,218849359	2
ReUse	0,160892142	3
Waste	0,112715942	5
Availability	0,253991719	1

The results of the alternative priorities for the Durability criteria obtained that the Availability of tools and spare parts alternative is considered to have the most important priority from other alternatives with a value of 0.253991719.

Then the alternative that is considered the second most important priority is Operational with a value of 0.218849359 and followed by the Re-use alternative which is considered the third most important priority with a value of 0.160892142 then the Energy Saving alternative as the fourth most important alternative with a value of 0.146586498 and the Waste alternative in the last order with a value of 0.112715942.

Alternative AHP Results for All Criteria

From the data processing carried out, it was found that resource person 8 was considered inconsistent in the criterion weight consistency test. Where the Consistency Ratio value was found above the tolerance of 0.10, which was 0.142861403.

Then in the test of the consistency of the alternative weight value against the cost criteria, it was found that resource person 9 was considered inconsistent with the Consistency Ratio value above the tolerance of 0.215877075.

Because both were considered inconsistent, the assessments of resource persons 8 and 9 were not included in the next weighting process so that there were only 13 assessment data from the resource persons who were considered consistent.

The data on the weight values of the criteria and alternatives that had been considered consistent were

then added up for each resource person's data, so that the final conclusion was obtained from each resource person's alternative priority according to each resource person's assessment as shown in Figure 8.

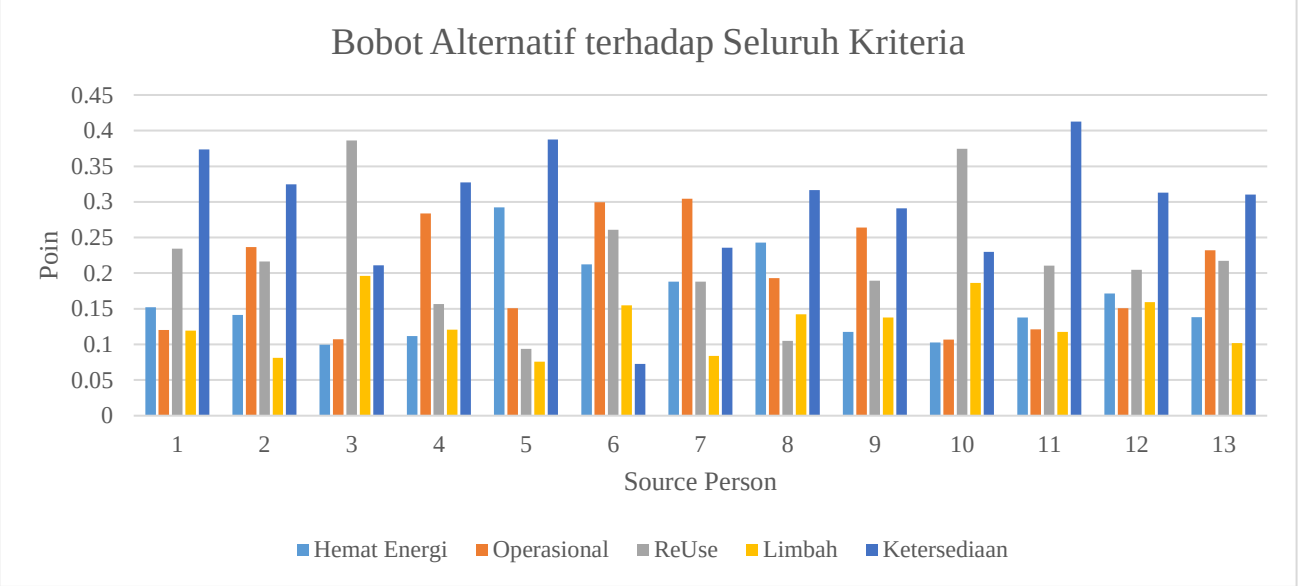

Figure 8. *Alternative Weight Values Against All Criteria*

The comparison results are expressed in the form of values from 13 sources, the geometric average of which is then taken, the following geometric average of the criteria from 13 sources is shown in table 14 :

Table 14. *Results of Alternative Priorities Against All Criteria*

Alternative	Geomean	Priority
Energy Saving	0,153735932	4
Operational	0,183862838	3
ReUse	0,202908753	2
Waste	0,123637483	5
Availability	0,273191608	1

From table 14 we can see that the Availability alternative is considered the most important alternative with a value of 0.273191608, followed by the Re-Use alternative which is considered the second most important alternative with a value of 0.202908753. The third most important alternative is the Operational alternative with a value of 0.183862838, then the fourth most important alternative is the Energy Saving alternative with a result of 0.153735932 while the alternative considered the fifth most important is Waste with a value of 0.123637483

IV. CONCLUSION AND SUGGESTION

Conclusion

With the data of the source's weight value which is considered consistent, the alternative sequence for improving energy performance at the Soekarno-Hatta Airport apron is obtained based on its priority, namely the alternative of Using tools and spare parts that are available on the market (Availability) which is considered the most important alternative with a value of 0.273191608, followed by the alternative of Using tools that can be repaired and reused (Re-Use) which is considered the second important alternative with a value of 0.202908753. The third important alternative is the alternative of Operational Arrangement of Equipment in the Field (Operational) with a value of 0.183862838, then the fourth important alternative is the alternative of Using Energy Saving Tools (Energy Saving) with a result of 0.153735932 and the alternative considered the fifth important is Reducing the use of tools containing hazardous toxic waste Waste (Waste) with a value of 0.123637483.

Suggestion

The following are suggestions that can be given to get better results for further research or the company, namely:

1. The company can improve the flood light operation by modifying the equipment's operational control system and coordinating with related units in the process.
2. Implementing alternative energy performance improvement on the Soekarno-Hatta Airport terminal apron from the most important based on its weight.
3. The company can measure data before and after implementing the suggestions given in order to evaluate the results and make continuous improvements.
4. Similar research can be conducted at the Warehouse Department of PT. Angkasa Pura II, so that the Warehouse Department can provide input to other departments to choose alternative equipment that is more environmentally friendly.

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