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Energy Efficiency on Fatmawati Soekarno Bengkulu Airport

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Abstract: ***The efficiency of energy utilization at the airport should be increased, it is expected that the budget savings from the airport management of this energy savings, so that the budget saved can be used for other purposes such as welfare of employees, reforestation and improvement of other facilities, the airport management should think about how To save energy usage, by saving this energy also besides save cost also can keep environment. Regulation of the Minister of Energy and Mineral Resources (ESDM) number 13 of 2012 on Electricity Energy Saving Measures clearly states that all government office buildings either at the central or regional levels must implement the Energy Saving program. In general, in almost all public services in Indonesia, energy consumption is quite wasteful. The room is often left in a state of light, the AC is on, not to mention the habit of using electrical and electronic equipment. Energy used in airport environments such as electricity consumption, air conditioning (AC) and others should be saved in short-term, medium-term usage especially for the long term. In addition, alternative energy must be sought for sustainable airport management. It is expected that energy consumption can be reduced in airport operation in order to prevent greenhouse gas emissions. Energy usage is seen from the efficiency of energy usage in the airport area. Whether in accordance with the utilization or the waste that resulted in the magnitude of the impact of excessive energy use. There are several rules made by the Government in energy conservation efforts, such as Presidential Instruction No. 13 of 2011 on Energy and Water Saving. These instructions mandate the Government institutions to undertake measures and innovations in energy and water savings, and form a Task Team for Energy and Water Saving Tasks To oversee the implementation of such energy savings. Regulation of the Minister of Energy and Mineral Resources No. 13 of 2012 on Electricity Saving Conservation This regulation provides more detailed guidance on how to implement the energy savings referred to in Presidential Instruction 13/2011. Regulation of the Minister of Energy and Mineral Resources No. 14/2012 on Energy Management In an effort to provide more integrated energy saving directives, this Regulation is issued to regulate the implementation of Energy Management, which is specifically required for users of energy sources that use energy greater than or equal to 6,000 toes per year. While energy users under 6,000 toe (Ton Oil Equivalent), it is still recommended to implement Energy Management (or energy savings).***

Keywords: efficiency, electrical energy, energy saving

1. Introduction

The efficiency of energy utilization at the airport should also be improved, it is expected that the budget savings from the airport management from this energy savings, so that the budget saved can be used for other purposes such as welfare of employees, greening and other facilities improvement, the airport management must think how Ways to save energy usage, by saving this energy as well as saving costs can also keep the environment. Regulation of the Minister of Energy and Mineral Resources (ESDM) number 13 of 2012 on Electricity Energy Saving Measures clearly states that all government office buildings either at the central or regional levels must implement the Energy Saving program.

The building sector absorbs 40% of the world's energy resources, evenIn Indonesia, this sector is responsible for 50% of the total Energy expenditure, and more than 70% of overall electricity consumption(EECCHI, 2012). Of the enormous use of such energy, sectorBuildings contributes to 30% of Greenhouse Gas (GHG) emissions atIndonesia.

Energy saving program conducted at Government HouseIs an early form of energy management that can helpThe achievement of the decrease of energy cost in Building as a whole.Its success can be a good motivation for Government HouseOther or private buildings within a governmental area, orAs a driver of the emergence of similar initiatives in other regions.Therefore, it is important to plan the programOrganized and systematic energy savings.

Energy management is an integrated activity to control consumptionEnergy in order to achieve effective and efficient energy utilization forProduce maximum output. This is done through actionTechnical in a structured and economical way to minimize utilizationEnergy including energy for the production process and material minimizationRaw materials and supporting materials.

Fatmawati Soekarno Airport is an airport located at Bengkulu City, Bengkulu Province, precisely at Jl. Raya Padang Kemiling - Slebar Kota Bengkulu. Formerly the airport was named Padang Kemiling Airport, then inaugurated as Fatmawati Soekarno Airport by President Megawati Soekarnoputri on November 14, 2001. Fatmawati Soekarno Airport has a runway length of 2,470 mx 150 m with an asphalt surface being a class I airport run by a Unit Pelayanan Teknis (UPT) Direktorat Jenderal Perhubungan Udara. The largest type of aircraft that can operate in this air badar is Boeing-737. The distance from the nearest city to this airport is 14 Kilometers.

In general, in almost all public services in Indonesia, energy consumption is quite wasteful. The room is often left in a state of life lights, the air conditioning is on. Not to mention the habits of using electrical equipment and other electronics that tend to be redundant. Energy used in airport environments such as electricity consumption, air conditioning (AC) and others and surrounding areas must be saved in short, medium term usage especially for the long term. In addition, alternative energy must be sought for sustainable airport management. It is expected that energy

consumption can be reduced in airport operation in order to prevent greenhouse gas emissions. Energy use is seen from energy efficiency efficiency in the airport area. Whether in accordance with the utilization or the waste that resulted in the magnitude of the impact of excessive energy use. Based on the problems mentioned above then the need for efficient use of energy at airport fatmawatisoekarno Bengkulu.

2. Methodology

The main energy saving indicators in a building generally use the Energy Consumption Intensity (IKE). IKE shows the amount of energy consumption (kWh) per square meter (m2) every month. The IKE number (kWh / m2 / month) is obtained by dividing the number of kWh electricity usage for a month with the building area used. For the calculation of the recommended IKE through the Ministerial Regulation ESDM No.13 of 2012 with the formula:

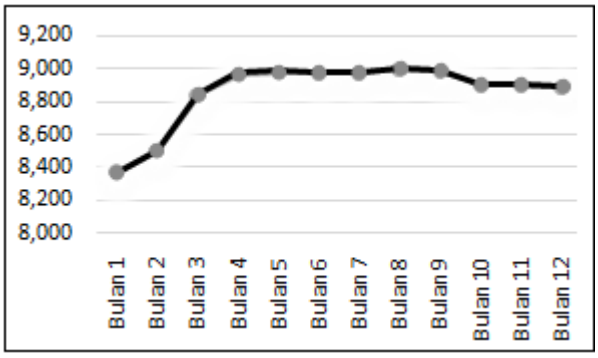
$$\text{IKE} = \frac{\text{kWh electricity usage for a month (kwh / month)}}{\text{Building area used (m2)}}$$

Furthermore, the resulting IKE value will determine whether a building is very efficient, efficient, efficient and wasteful, such as the table below:

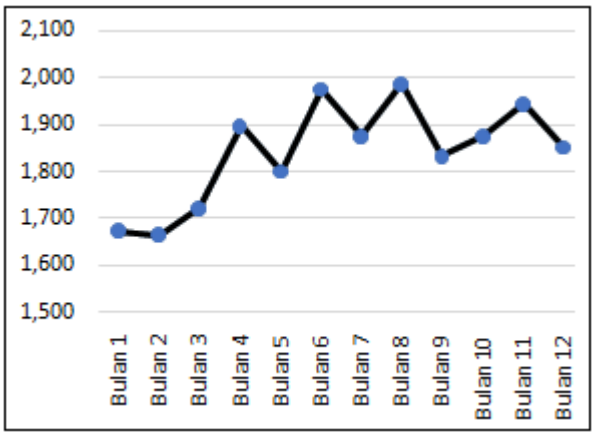
Criteria	Use of Electricity Energy Office Building kWh / m2 / month
Very Efficient	<8,5
Efficient	8,5 - 14
Fairly Efficient	14 - 18,5
Wasteful	>18,5

3. Results and Discussion

From the data of electrical energy consumption at the airport obtained the data described in the graph as follows:
Grafik Pemakaian Listrik Pada Ruang Tunggu Bandara



Grafik Pemakaian Listrik Pada Ruang Administrasi Bandara



From the graphic picture shows the increasing trend of electric energy consumption at the airport, in the first month of use 8.370 KWh recorded up to the end of year use of electric energy used is 8.890 KWh.Increased use of electric energy is seen in the holiday season between the 6th month to the 8th of IdulFitri and school and on the 12th month is the New Year holiday. If observed, there is a relationship between the increasing number of passengerswith the increasing of electric energy consumption caused by the number of passenger candidates who carry electronic equipment such as laptops or mobile phones that are packed in the waiting room of passengers. In addition, many potential passengers who go to the toilet cause a lot of water usage, because according to airport managers with the number of water usage will also increase the use of electricity because the water is flowed by water pumps.The use of electrical energy in the airport administration room shows a steady trend, indicating that the use of electrical energy in the administrative room is not influenced by the arrival of consumers.

To determine the efficiency level of electricity consumption in Airport waiting room can be calculated by using the formula recommended through the Minister of Energy and Mineral Resources No.13 Year 2012 with the formula:

$$\text{IKE} = \frac{\text{kWh electricity usage for a month (kwh / month)}}{\text{Building area used (m2)}}$$

$$\text{IKE for Administration Room} = \frac{1.841}{130} = 14{,}1$$

$$\text{IKE for the Waiting Room} = \frac{8.842}{417} = 21{,}2$$

With reference to the standard intensity of electricity consumption where the value of IKE for administrative space of 14.1 including the category is quite efficient as well as for the value of IKE waiting room of 21.2 including extravagant category. The general consumption of electrical energy at Fatmawati airport is generally not efficient enough, which of course causes high operational costs at the airport.

The increasing number of current electrical energy usage will directly affect the environment of the potential availability of natural resources on earth such as coal used as fuel in Steam Power Plant (PLTU) or oil, especially diesel

fuel in Diesel Power Plant (PLTD) , Not to mention the pollution caused by the operation of the power plant such as increased air pollution due to increased CO2 from coal combustion and diesel engines. The availability of electronic devices at the airport also tends to be less environmentally friendly, such as air conditioning (Air Conditioner) and refrigerators that produce CFC (Chlor Fluor Carbon), which is one of the dangerous gases that if in the atmosphere too much will damage the ozone layer.

Electricity energy savings is a must for the airport because by saving electricity consumption is also friendly to the environment can also save operational costs Airport. These operational cost savings can only be used to find other environmentally friendly alternatives such as solar energy as a source of electrical energy or by reducing the use of daylight lighting by applying bright sunlight.

4. Conclusions

With reference to the standard intensity of electricity consumption where the value of IKE for administrative space of 14.1 including the category is quite efficient as well as for the value of IKE waiting room of 21.2 including extravagant category. The general consumption of electrical energy at Fatmawati airport is generally not efficient enough, which of course causes high operational costs at the airport.

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The Energy Saving Plan can be determined based on the results of potential identification Energy savings in energy audits. The Energy Saving PlanOf course consider the factors that include the level of feasibilityTechnical and economic aspects of the implementation of the plan, the availability of funds and time, And commitment from management and / or local officials. Furthermore, ifThe Energy Saving Plan can be determined then the Energy Saving TargetCan be calculated and the achievement can be planned gradually. AchievementThe Energy Saving Target is strongly influenced by the activities of Supervision, Monitoring,Evaluation and Reporting of Results.

The amount of actual energy savings can be determined by calculatingThe difference in average energy consumption in a period from the building before andAfter the implementation of energy saving. However, in the early stages,General potential / tag energy savings can be calculated by looking at the differenceThe energy intensity with the prevailing standards. By knowing the differenceBoth of these values, the potential savings that can be achieved in 6 months or 1. The year ahead can be calculated.

Referring to the mandate of Presidential Instruction No. 13 Year 2011, energy saving in buildingsThe government is targeted to reach 20% of the baseline of useEnergy. The Local Government can determine the austerity targetsGradually as an effort to maintain the spirit and motivation in the implementationEnergy saving program.For example, an initial target setting of 5% would be better given the potentialA considerable success compared to the initial target of 20%. At the endThe period of the first energy-saving program (eg after 6 months reporting First), the success of achieving those targets will boost morale andMotivation of the Task Force Team and other Government employees to continue the programSuch energy savings.

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