

# ICT AND ECO CAMPUS, STRATEGY FOR REDUCING ENERGY CONSUMPTION IN THE NAROTAMA UNIVERSITY

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**Abstract.** Narotama University is committed to continuously improve the customer satisfaction through the implementation of QMS (Quality Management System) ISO 9001: 2008 based on IWA 2: 2007. Narotama University provides the adequate facilities for the customers, lecturers, and employees in order to carry out the process learning well as well as to produce the quality graduates who qualify: (1) Go Green for Eco Campus and (2) Strengthen for utilization of ICT (Information and Communication Technology). Narotama University applied the certification of Environmental Management System (ISO 14001) for Eco Campus. It became the main strategy to reduce electricity consumption in the Narotama University. Narotama University got second place for Eco Campus in 2012. Then, BLH of Surabaya City Government gave award in 2013, related to the implementation of environmentally sensitive campus and paperless activity. Meanwhile, the ICT implications could support the quality of Narotama services especially e-learning and e-library. The use of e-Learning Narotama (e-Lina) supported the online classes. It was conducted in the second semester 2012 - 2013 for all faculties. E-Lina had been designed to ODL (Distance Learning) or online classes. E-library provided e-Books (<http://ebooks.narotama.ac.id>), e-Journal (<http://ojs.narotama.ac.id>), e-Thesis (<http://skripsi.narotama.ac.id>) and e-Article. The use of e-lina and e-library made the students easier to access the materials outside the campus so it automatically reduced the energy consumption.

**Keywords:** Reducing Energy Consumption, Eco Campus, Online Classroom, Online Library

## I. INTRODUCTION

The energy resource intensities of the ICT sector are lower than industrial economies. They emit less  $CO_2$ . They are only a small portion of the total value. The fossil fuel combustion is still the dominant activity in the modern industrial economies. Fast and cheap global communications could reduce the need for travel so pollution levels would fall. Moreover, the information can go virtually at high speed and almost no cost.

It will allow companies to locate away from established economic hubs and free workers to work from anywhere. It will reduce the environmental impact from people who move from place to another place (Fuchs, 2008). Energy consumption increases with intensity of human activities. People consume energy for movement. Two major sources of energy consumption are identified, namely: electricity and transport. Electricity energy is the largest component in the University. The study in UTM's also observed

that teaching and learning activities consumed 43% and hostel accommodations consumed 30% of the total electricity energy of the university. While Central Administration and Support Services consumed about 14% and the ICT consumed 13% of the total electricity supply. The reason for relatively low consumption of electricity for the administrative and support activity was caused by the operational use for maximum periods of 9-10 hours per working day. The ICT facilities included the computer center; the library and also the Information Technology (IT) support services for the teaching and learning as well as central administrative activities. Carbon emission for ICT sector could be as a result of the electricity consumption for the population served. For instance, the library accommodated about 1,083,677 visitors annually. Similarly, the computer center (CIC) served the entire university population, supports all university activities and continuously used for 24 hours of 7 days, hence, the high emission intensity (Abdul-Azeez, I.A. and Ho, C.S, 2015).

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## II. METHODOLOGY

The authors used the method as follows:

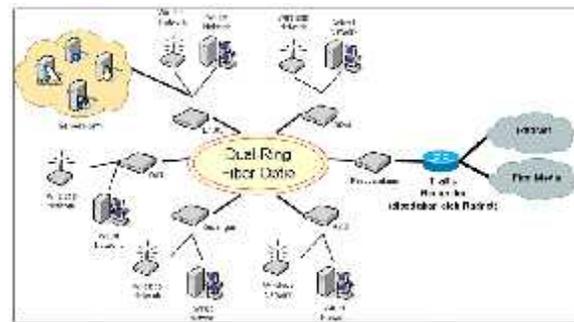
(1) The case study approach referred to a method that emphasized the qualitative analysis (Yin, 2009); (2) Research approach used qualitative research approaches (Denzin and Lincoln in Lexy Moleong, 2005); (3) The research location was in the Narotama University; (4) Primary data obtained from the direct or first hand, especially ICT impact to reduce energy consumption in the Narotama University; (5) Secondary data were online-offline information, reports, results of previous studies and other publications; (6) The interview was conducted in-depth interviews, the method of collecting data through in-depth interviews conducted to the data source (W.Gulo, 2003)

The ICT implications could support the quality of Narotama services especially e-learning and e-library. The use of e-Learning Narotama (e-Lina) supported the online classes. It was conducted in the second semester 2012 - 2013 for all faculties. E-Lina had been designed to ODL (Distance Learning) or online classes. E-library provided e-Books (<http://ebooks.narotama.ac.id>), e-Journal (<http://ojs.narotama.ac.id>), e-Thesis (<http://skripsi.narotama.ac.id>) and e-Article. The use of e-lina and e-library made the students easier to access the lectures and library materials outside the campus so it automatically reduced the energy consumption.

The impacts of the **e-learning narotama (e-lina)** implementation were: (1) lecturers could conduct the teaching and learning flexible for the time and place; (2) lecturers could conduct the training and

practice of technology-based learning process information; (3) Lecturers could afford to develop technology-based materials information; (4) lecturers could organize the learning materials easy to learn; (5) lecturers could organize a discussion forum to students without limited time and space; (6) lecturers could organize the exam with tolerance time working and random questions; (7) Lecturers could evaluate the success of learning one way to dissipate online questionnaire; (8) fellow faculty could perform the sharing learning materials by using a standards-based teaching materials SCROM (Sharable Content Object Reference Models).

While the impacts of e-learning narotama (e-lina) implication were: (1) the students could follow the process of learning virtually anytime and anywhere (time and place flexible); (2) the students could access the materials via internet anytime and anywhere; (3) the students could develop science and technology learning



**Fig.1. Backbone of Network Infrastructure**

**RFID** (Radio Frequency Identification) system. The library used RFID to speed up the management system of library visitors recaps. The students used student identity card (KTM) for the presence that would appear on the computer name; student's number and photo appeared. It cooperated with Higher Education Libraries of East Java (FPPTI). It was useful for the visitors who came from another university visited the library by using **supercard**. It was a card to go to the library, cooperated by the Higher Education Libraries Forum of East Java (FPPTI). It permitted to go to the other libraries. It did not replace the membership fee that was required each member FPPTI. The visitors who wanted to get supercard could directly go to the library. Then, he had to fill out the registration form of supercard members. The requirement was the active student by showing valid student card. Then, he had to pay the registration fee Rp 5,000. It would valid for 6 months. Then, he could visit the other university library. The

list of library could be accessed through <http://fppti-jatim.or.id/public/keanggotaan/daftar-anggota-fppti-jatim/>. He could also access online library materials in the form of a journal, articles and books in the library through search proquest.com, <http://e-resources.perpusnas.go.id/index.php> and also search ebscohost.com. He could get username and password at the library. The officers would assist him who wish to access the library materials online. Online library materials contained in <http://e-resources.perpusnas.go.id/index.php>. The other ones were Sage knowledge, Brill Online, Proquest, Lexis Nexis and so on. In search.ebscohost.com there was an online journal that covered the field Mathematics / Science and engineering sciences.

Information Systems and ICT devices that supported academic and educational activities by providing technical resources and ICT-based academic facilities.

- The development of multimedia technology in all classrooms
- Provision of videoconferencing equipment
- Improvement and Development Web Portal and units / faculty
- Optimization of e-learning system.
- The integration of data and applications Academic Information System
- The integration of data and applications Academic Information System, Information Systems and Information Systems Online Registration
- Development of Library Information System and Digital Library
- Integration of Single Identity-based Student Services.
- Development of Information Systems Research and Community Service at the same time with the integration into related applications.
- Acceleration of the campus-wide wireless network access.
- Development of graduation and Career Information System
- Provision of services banking and Micro-Payment
- Creation of data-warehouse university.

- Development of financial Information System
- Development of Asset Information System-Inventory
- Development of Information Systems Quality Assurance
- Development of Human Resource Management Information System
- Information Systems Development Executive
- The integration of the entire application system Narotama Management Information System (SIMNARO) with Executive Information System

### III. CONCLUSIONS

The ICT implications could support the quality of Narotama services especially e-learning and e-library. The use of e-Learning Narotama (e-Lina) supported the online classes. It was conducted in the second semester 2012 - 2013 for all faculties. E-Lina had been designed to ODL (Distance Learning) or online classes. E-library provided e-Books (<http://ebooks.narotama.ac.id>), e-Journal (<http://ojs.narotama.ac.id>), e-Thesis (<http://skripsi.narotama.ac.id>) and e-Article. The use of e-lina and e-library made the students easier to access the lectures and library materials outside the campus so it automatically reduced the energy consumption.

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