

FIG
2018
ISTANBUL



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XVI FIG Congress 2018
6-11 May 2018
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FIG Congress 2018



**EMBRACING OUR SMART WORLD WHERE THE CONTINENTS CONNECT:
ENHANCING THE GEOSPATIAL MATURITY OF SOCIETIES**

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APPLICATION OF MULTIPURPOSE CADASTRE TO EVALUATE ENERGY SECURITY OF LAND PARCEL (CASE STUDY: BUILDING A AND BUILDING B, OF INSTITUT TEKNOLOGI SUMATRA CAMPUS)

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OUTLINE

- Introduction
 - Multipurpose Cadastre
 - Objective
- Method
- Results and Discussion
- Conclusion

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INTRODUCTION

- Multipurpose Cadastre
- Objective

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MULTIPURPOSE CADASTRE

- Multipurpose cadaster is an integrated land information system containing legal (e.g. property ownership or cadaster), physical (e.g. topography, man-made features), and cultural (e.g. land use, demographics), is used to evaluate energy (electrical energy) security of land parcel.



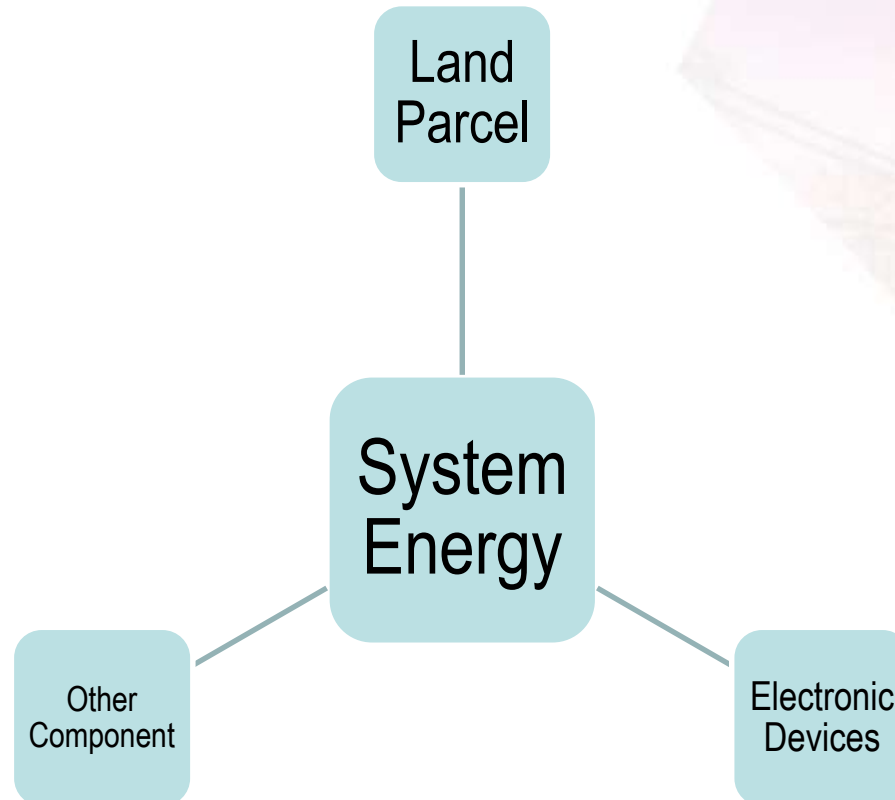
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MULTIPURPOSE CADASTRE ENERGY SYSTEM



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MULTIPURPOSE CADASTRE in ITERA Campus



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OBJECTIVE

- Show the method to evaluate excess energy consumption of room based on productivity and the use of the electronic devices.

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METHOD

- Spatial reference frame is collected from 13 bench marks located in Institut Teknologi Sumatera Campus, referred to geospatial reference frame SRGI2013, reference ellipsoid WGS84 and reference frame ITRF2008 epoch 2012.0.
- Current base map is obtained from UAV photogrammetry measurement with scale 1:1000 acquired on February 2017

METHOD

- Cadastre map was obtained from the delineation of fixed boundary parcel land of Institut Teknologi Sumatra parcel Campus (Cadastre document of ITERA Campus) . The principal boundary of this research is delineation of boundaries of Building A and Building B which is obtained from Institut Teknologi Sumatera Campus building floor plan.
- Attributes data which is facility, occupant, and electronic devices are obtained by doing 'facility counting n rating' activities.



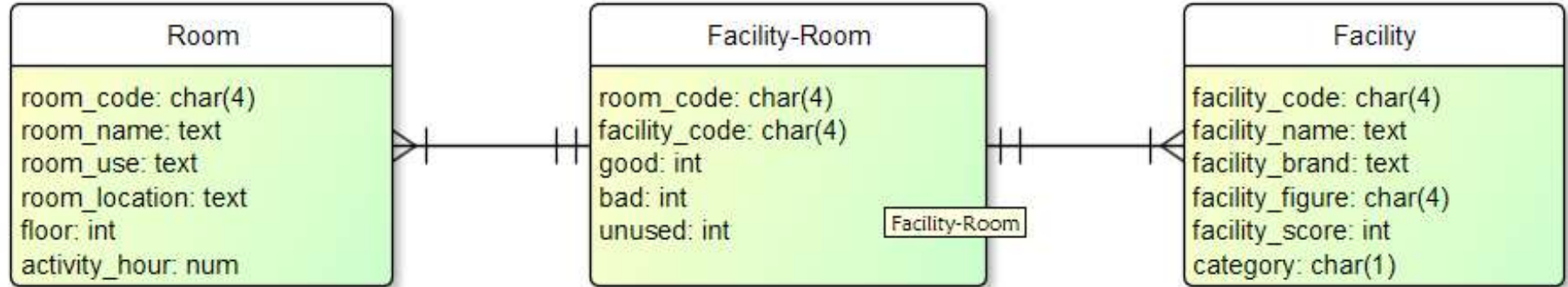
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METHOD



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METHOD

- Exceed of energy consumption of every room are analysed by firstly calculate room value based on facilities uses of electronic devices and the types the electronic devices itself.
- Productivity of room can also be used to valuate a room function.
- Facility both uses of electronic devices and general facilities were valuated by rating method based on its functionality.

METHOD

- The valuation method used by comparing one facility to other facilities.
- General facilities included in room valuation are relatively static items (such as chair, desk, and cabinet) and uses of lamps and other electronic devices.
- Electronic devices included in room valuation are the air conditioner, CCTV, computer, dispenser, fan, lamps speaker, and other machines.



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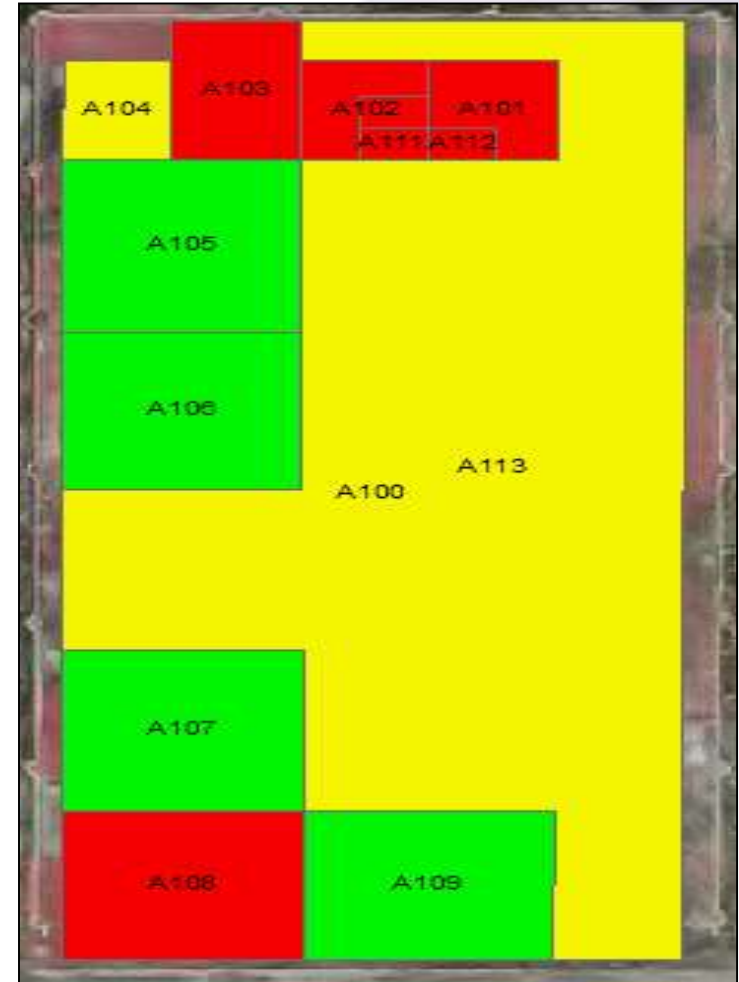
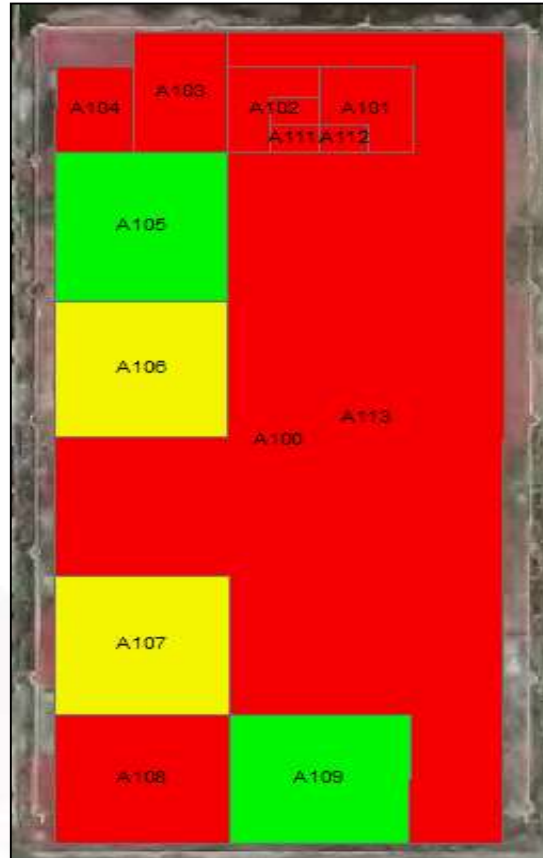
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RESULTS AND DISCUSSION

- 0.000000 - 70.000000
- 70.000001 - 250.000000
- 250.000001 - 1000.000000



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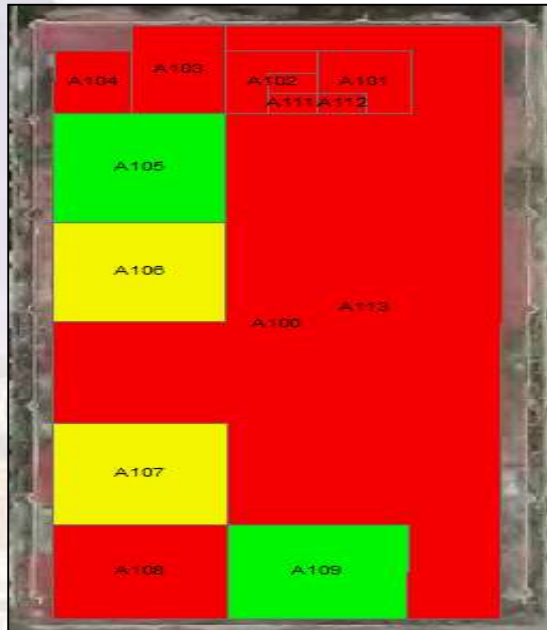
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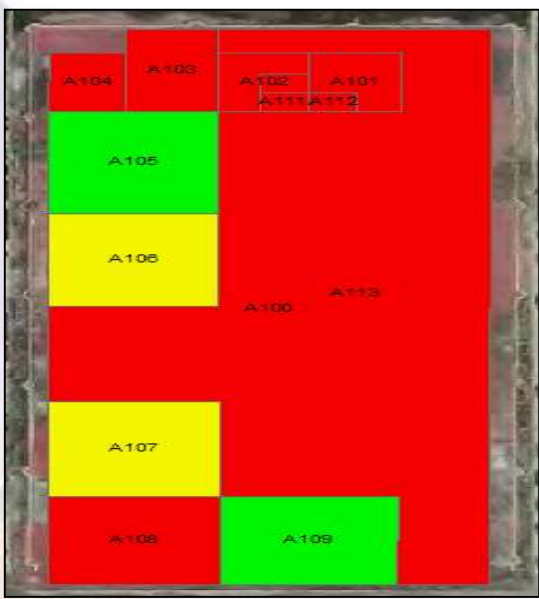




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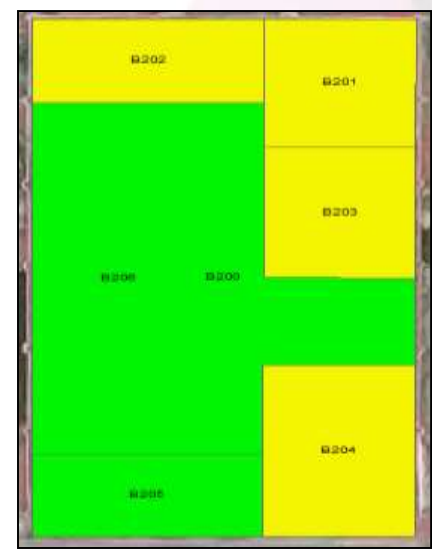
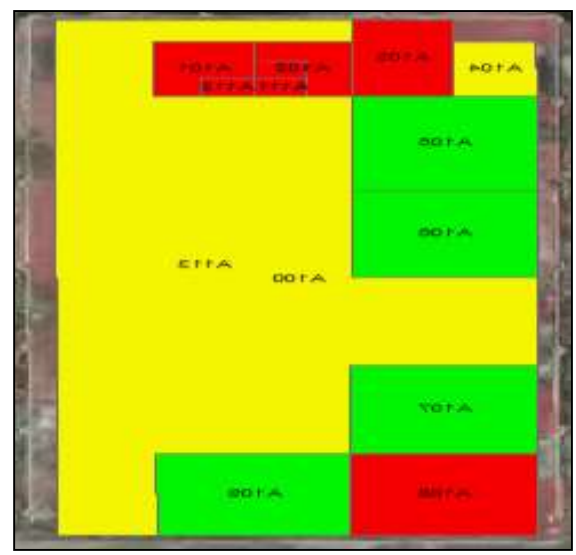
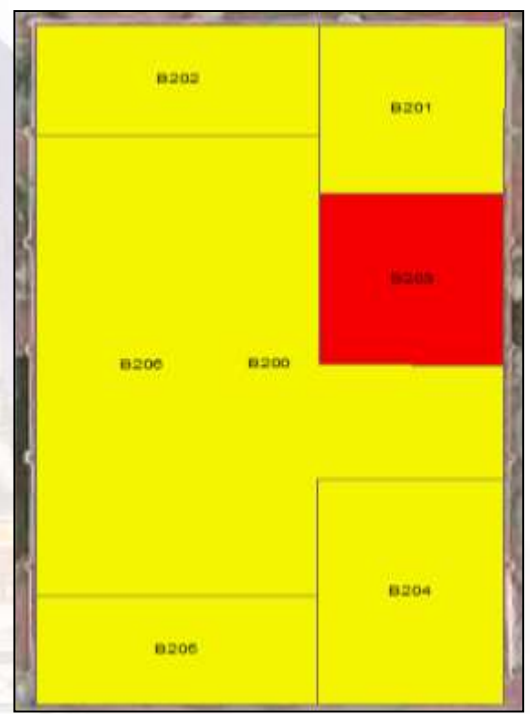




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RESULTS AND DISCUSSION



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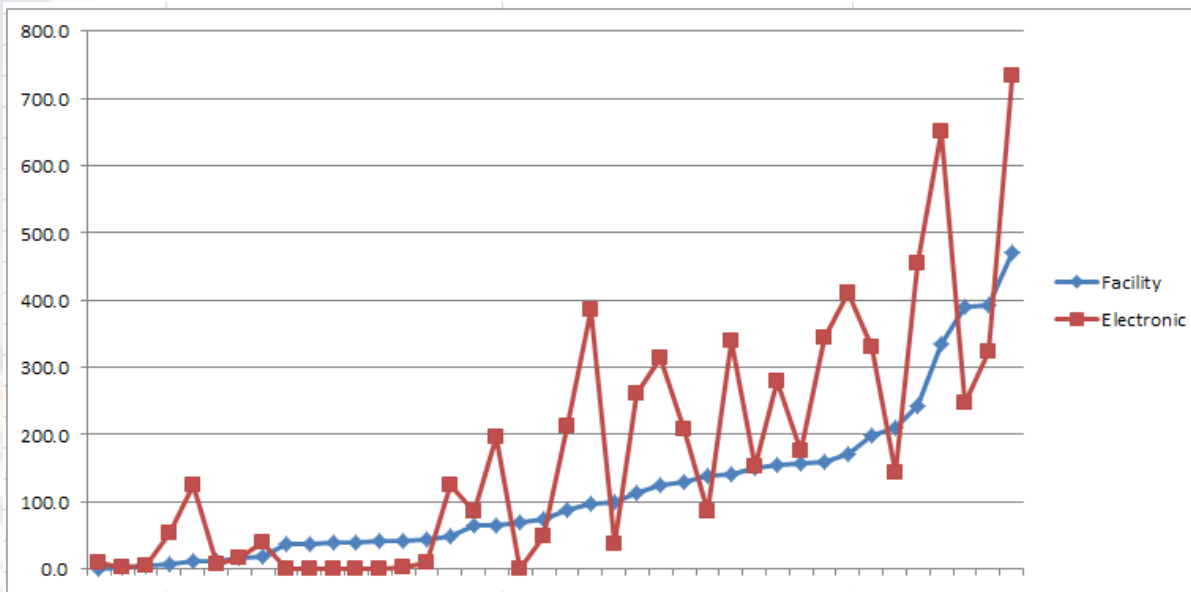
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QUALITY RATING AND DISCUSSION



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RESULTS N DISCUSSION

Room Code	Value Difference	Category
A109	260.6	Critical
B104	232.7	Critical
A204	209.0	Critical
B206	187.6	High Need
A203	158.4	High Need
B108	143.1	High Need
B107	136.2	High Need
A107	128.7	High Need
B205	94.6	High Need
A207	79.1	Low Need
B203	76.2	Low Need
B204	69.2	Low Need
A106	68.6	Low Need
A209	58.3	Low Need
B202	22.8	Low Need
A104	21.7	Low Need

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RESULTS AND DISCUSSION

- Consumption of electrical energy of electronic devices in the room with average value remains constant while consumption in other room needs to be evaluated to save the energy.
- Facility based average value is 116.0
- Electronic devices based value is 170.3.

RESULTS AND DISCUSSION

- Room with facility based value below 116.0 should have electronic devices based value below 170.3 to save energy.
- Excess of energy is calculated by subtracting difference of each room electronic based value and average electronic based value with difference of each room facility value and average facility value.

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RESULTS AND DISCUSSION

- Minimize energy consumption in the room.
- Move electronic devices to other broader room.
- Increase general facility in the room.

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CONCLUSION

- The method to evaluate excess energy consumption of room based on productivity and electronic devices produce classification of room with excess energy.
- The classification could lead to policy and strategies of energy security.
- In this case study, there are 3 rooms with critical excess energy, 6 rooms with high excess energy, 7 rooms with low excess energy, and 24 rooms with secure energy.



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THANK YOU

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