



UNIVERSITAS
INDONESIA

Veritas, Probitas, Iustitia
— EST. 1849 —

Cultivating Green Energy at the Universitas Indonesia Towards Sustainable Campus

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The 3rd International Workshop on UI GreenMetric

Istanbul University, Istanbul, Turkey

April 9-10, 2017



Outline



Introduction

- Welcome to Universitas Indonesia



University Policy on Energy Management

- Energy consumption & savings target
- Renewable energy development
- Results of UI GreenMetric 2016



Future Works & Challenges

- Integrated monitoring system
- Electricity generation of gas power
- Research Center

Welcome to Universitas Indonesia (UI)

- Oldest and best university in Indonesia
- Total area 320 ha (Depok campus)
- 47 thousand students
- 7.5 thousand staff
- 17 Faculties



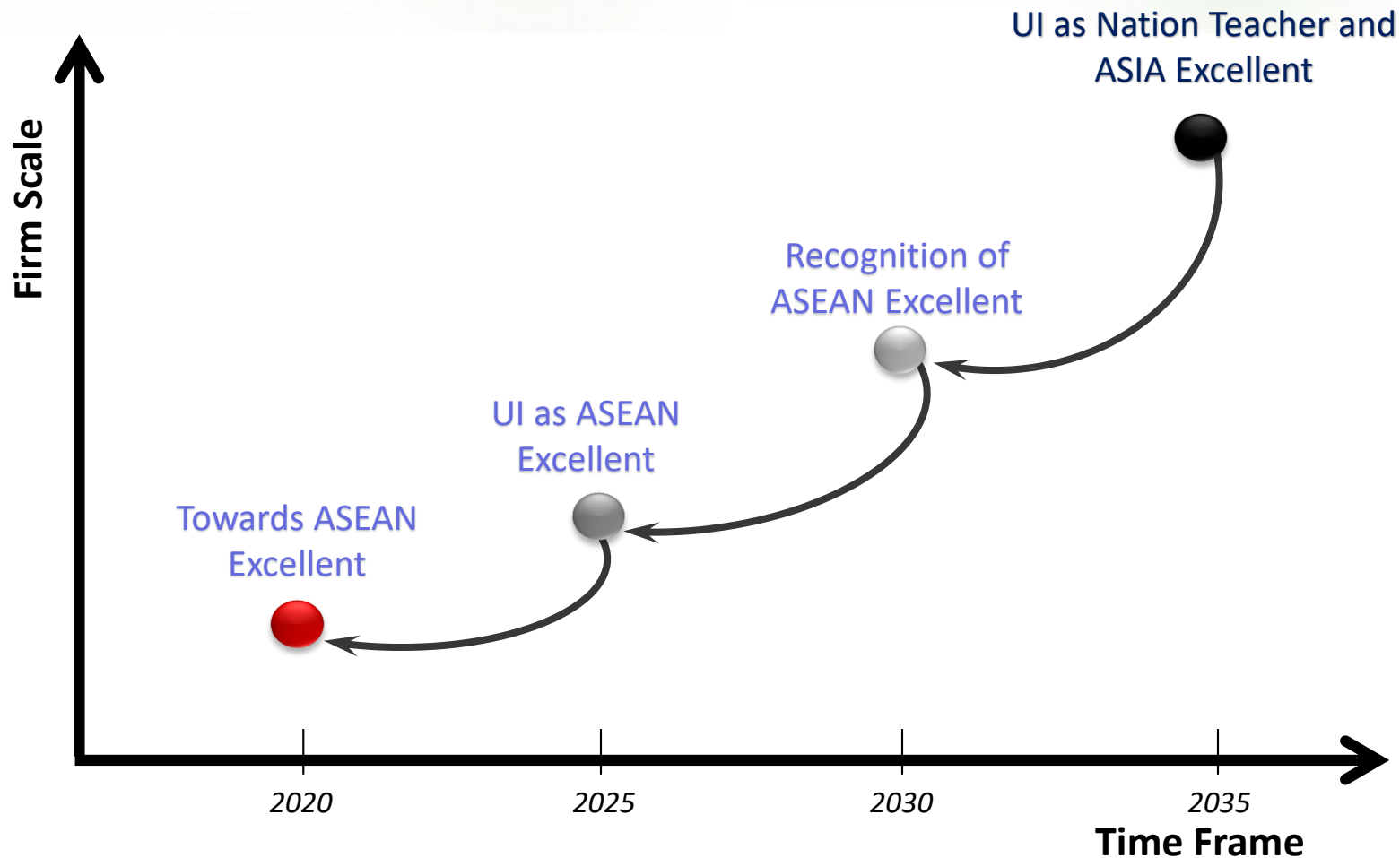
Map of Universitas Indonesia

Campus Depok, 320 ha





Roadmap in realizing Universitas Indonesia as the Asia Excellent

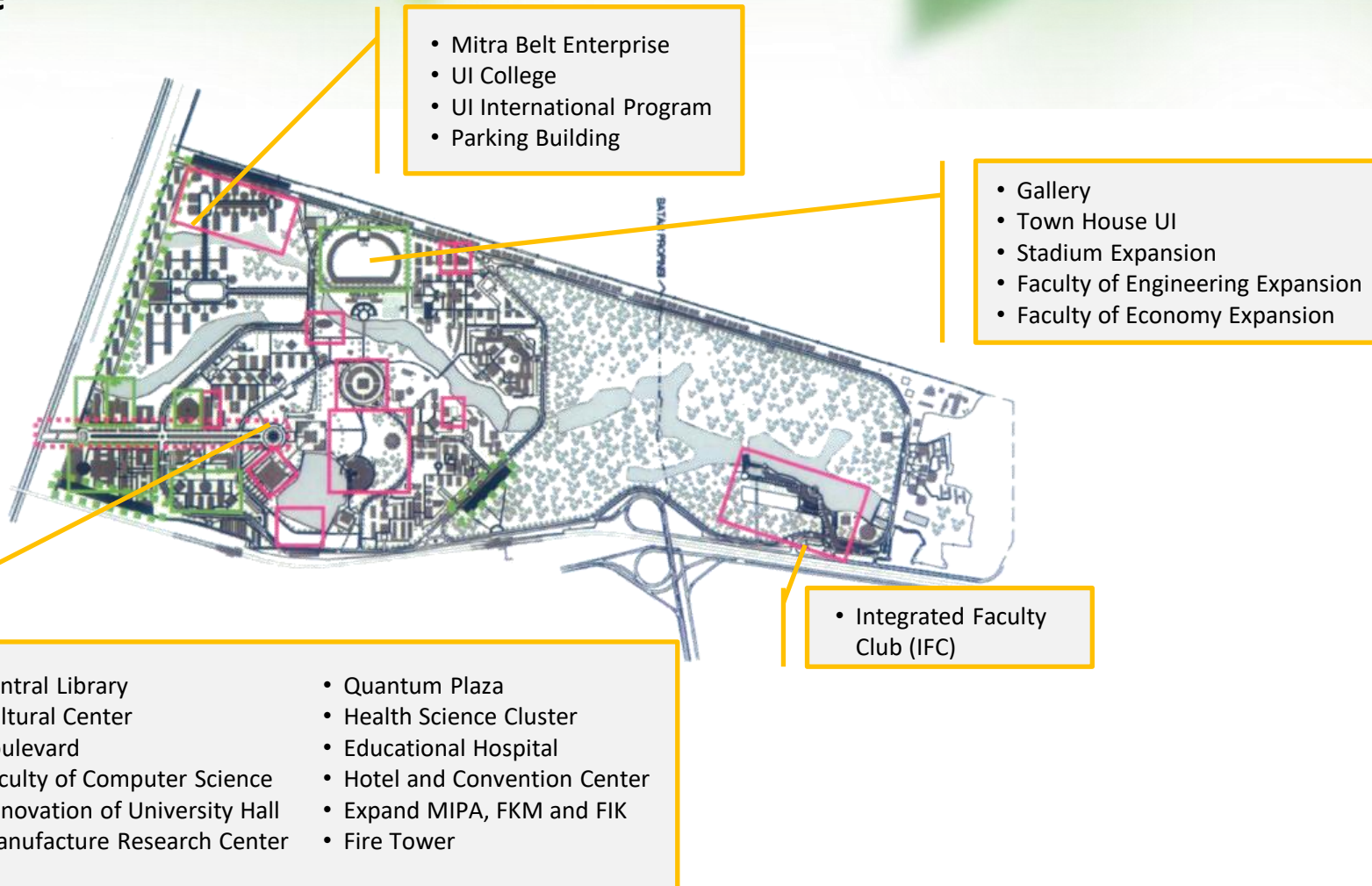




Master Plan UI 2008



❖ Before

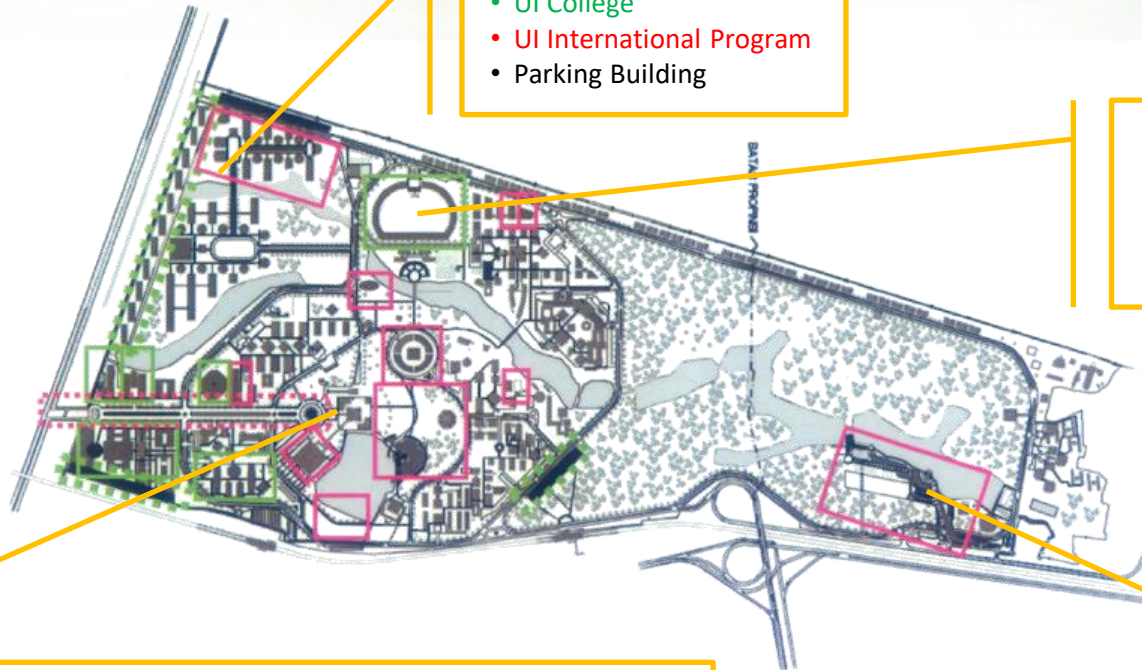




Master Plan UI 2008



❖ After (Existing condition)



- Mitra Belt Enterprise
- UI College
- UI International Program
- Parking Building

- Gallery
- Town House UI
- Stadium Expansion
- Faculty of Engineering Expansion
- Faculty of Economy Expansion

- Integrated Faculty Club (IFC)

- Central Library
- Cultural Center
- Boulevard
- Faculty of Computer Science
- Renovation of University Hall
- Manufacture Research Center
- Quantum Plaza
- Health Science Cluster
- Educational Hospital
- Hotel and Convention Center
- Expand MIPA, FKM and FIK
- Fire Tower

Legend:

- In line with Master Plan 2008
- On-going with notes
- Delay or not available in Master Plan 2008



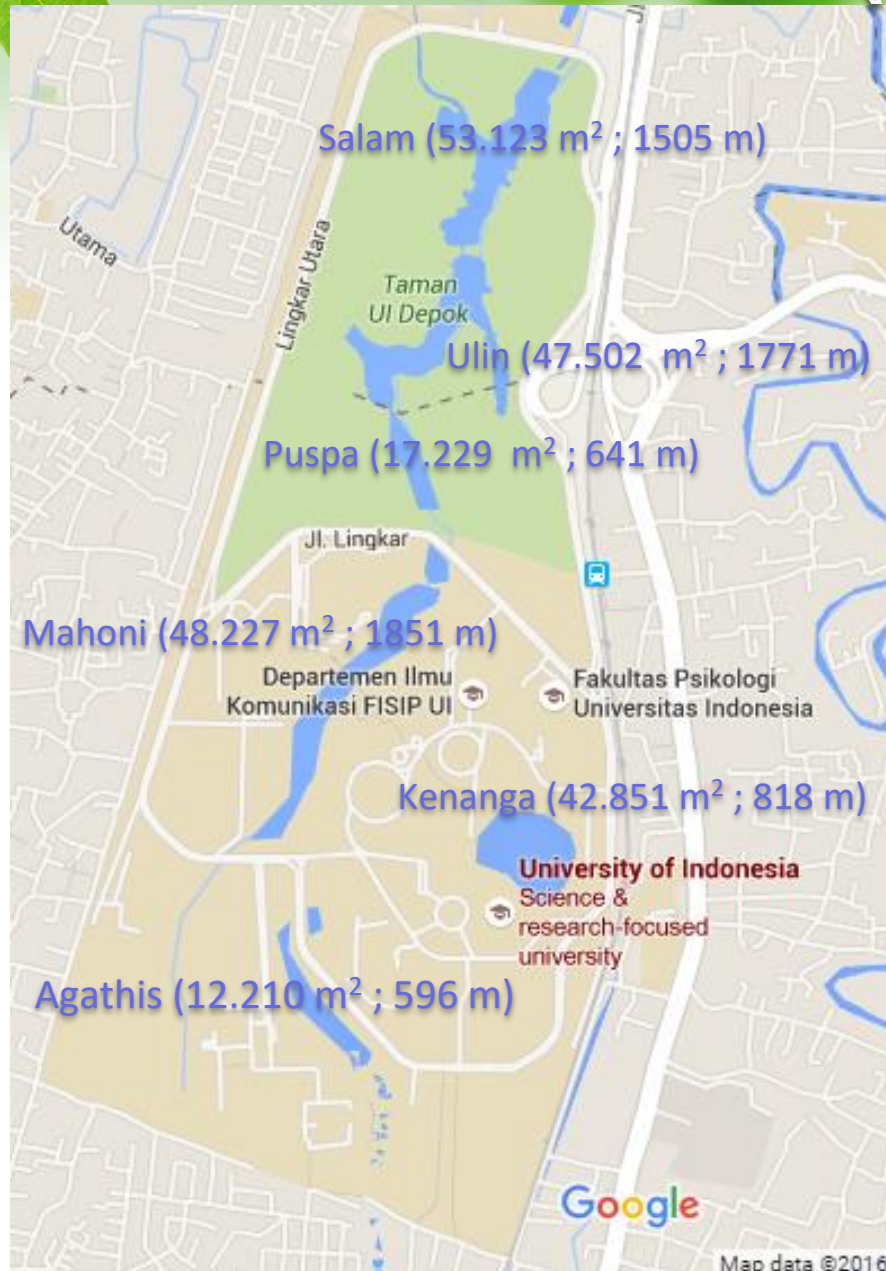
City Forest UI



• Total area 100ha



6 Lakes UI (K-A-M-P-U-S)



Potential of UI Lakes (22 ha)

- Ground water recharge
- Experimental site
- Tourism
- Sports



Central Library – *The Crystal of Knowledge*



Green roof



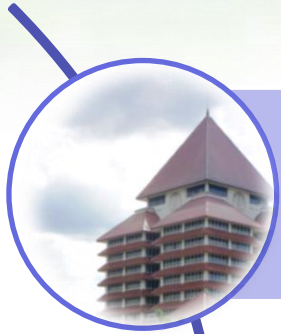
- Integrated system
- Largest library in Southeast Asia

Baobab Tree (*Adansonia Digitata*)



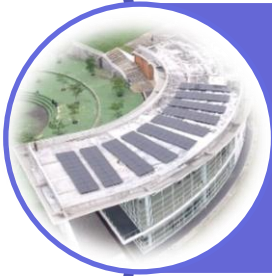
- 9 Baobab trees
- Directly imported from Africa

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Future Works & Challenges

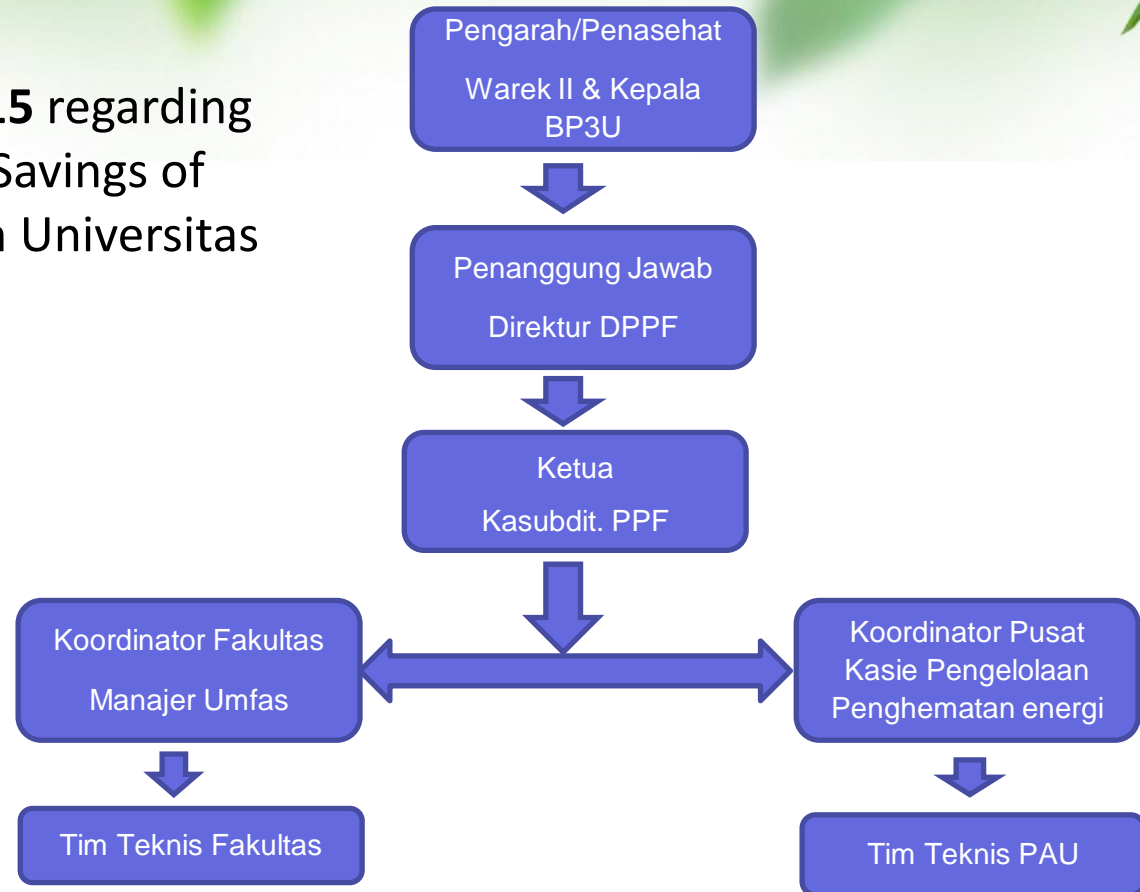
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UI Policy on Energy Management



Rector Decree No.
1327/SK/R/UI/2015 regarding
Management and Savings of
Electricity Power in Universitas
Indonesia



University Team for Electrical Energy Management

Electricity consumption (UI Depok campus)

Annual electricity
consumption :

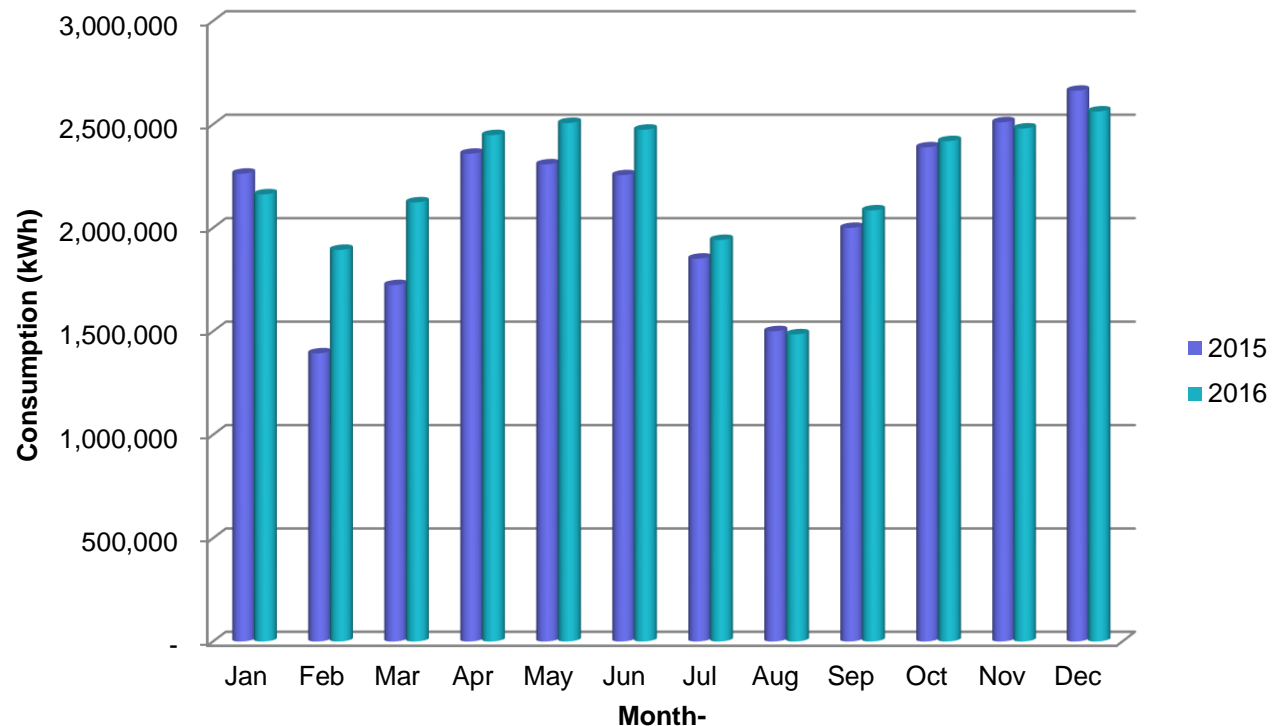
1986 = 6.50 MW

2015 = 25.30 MW

Total in 2016 =
26,583,252 kWh
monthly average =
2,215,271 kWh

increased energy
consumption

2015-2016 = 5%

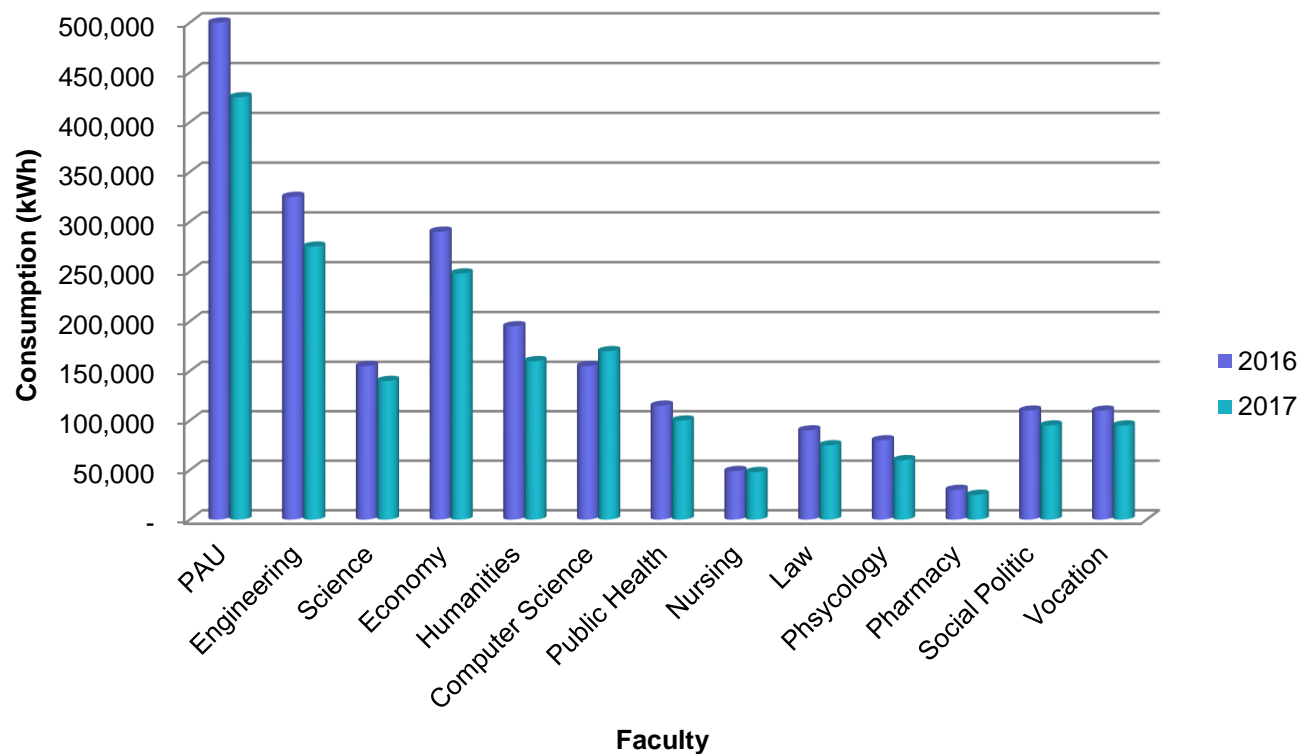


Electricity Consumption 2015-2016

Energy savings target (UI Depok campus)

Energy savings target
= 15% (in 2017)

reducing monthly average =
1,882,981 kWh per month



Saving target of electricity consumption in 2017



Renewable Energy Development



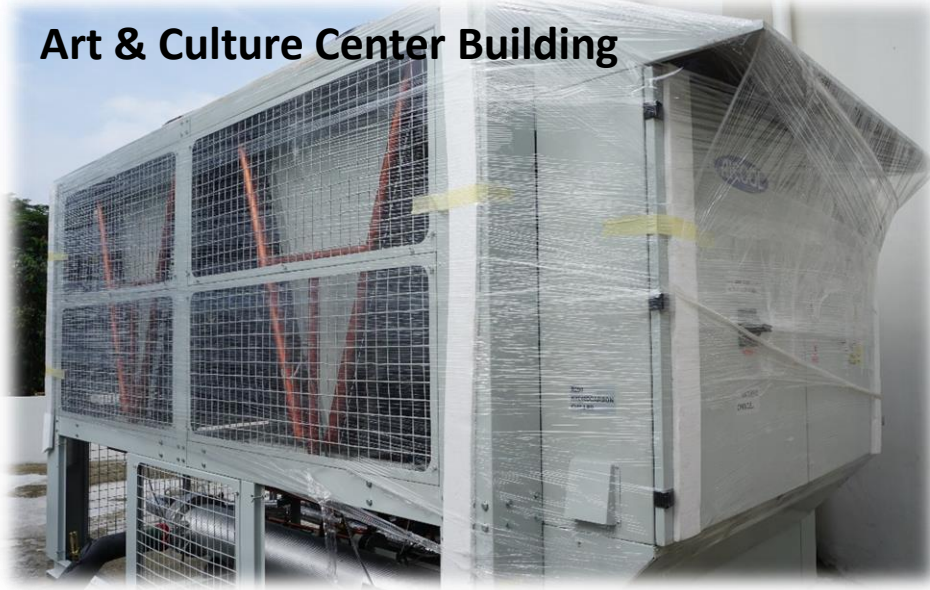
Technology	Location at	Capacity
<i>Green chilling system</i>	Integrated Laboratory and Research Center (ILRC);	VRF
	New library building	VRV
	Art and Culture Center	VRV
<i>Solar photo-voltaic</i>	MRPQ building	2.5 kW peak
	Integrated Faculty Club (IFC) building	25 kW peak
<i>Solar cooling absorption chiller system</i>	Manufacturing Research Center (MRC) Building, Faculty of Engineering UI	240 kW thermal or 68 TR



ILRC Building

Green Chilling System

Art & Culture Center Building



New Library Building



Solar Thermal @ MERC
(240 kW thermal or 68 TR)

Solar PV 2.5 kWp at MRPQ Building
(Polycrystalline type)



Thin Film Solar PV 25kWp at IFC



Results of UI GreenMetric 2016

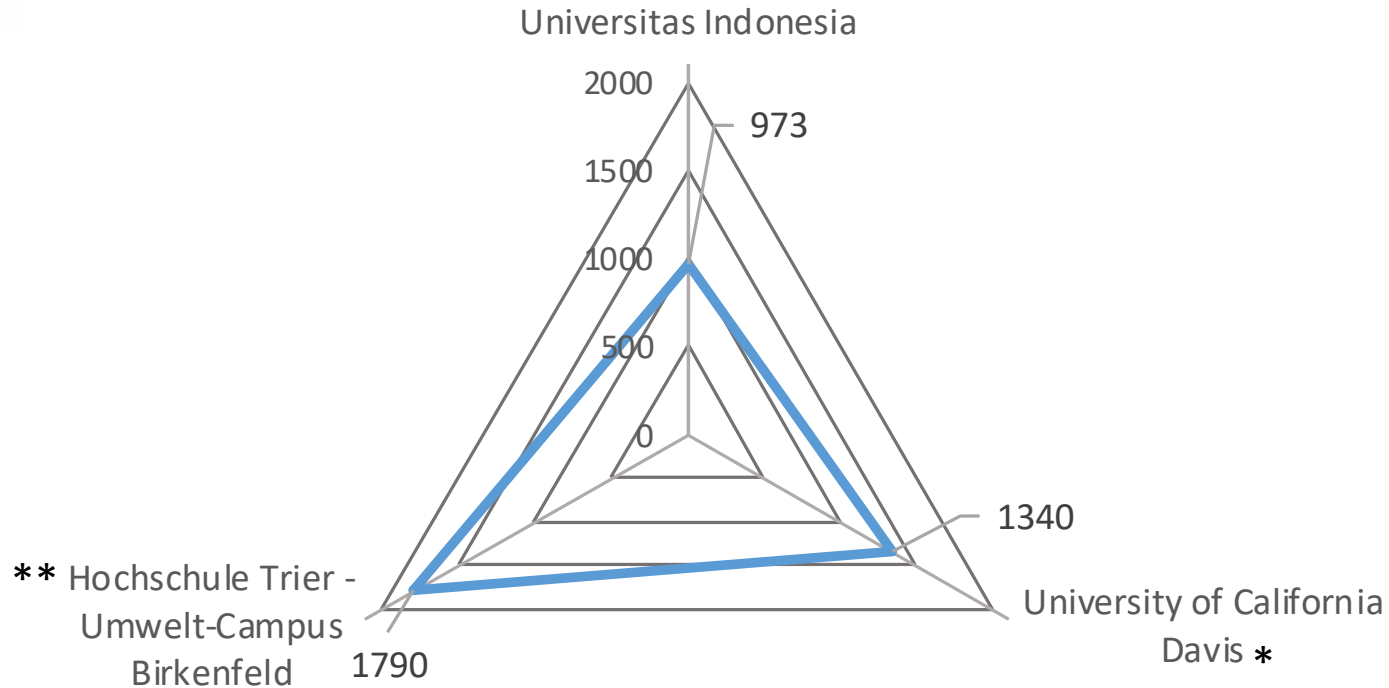
Universitas Indonesia' scores for energy and climate change category

Indicators	2016 Score	Maximum Score
Energy efficient appliances usage are replacing conventional appliances	30	200
Smart Building implementation	150	300
Renewable energy produce inside campus	129	300
Electricity usage per year (in kilo watt hour)	220	300
Ratio of renewable energy produce/production towards total energy usage per year	30	200
Elements of green building implementation as reflected in all construction and renovation policy	225	300
Greenhouse gas emission reductions program	134	200
Total carbon footprint (CO ₂ emission in the last 12 months)	56	300

46%

Energy and Climate Change

UI GreenMetric 2016



* : 1st ranked in “total score” UI GreenMetric 2016

** : 1st ranked in “energy and climate change” category of GreenMetric 2016



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Future Works and Challenges

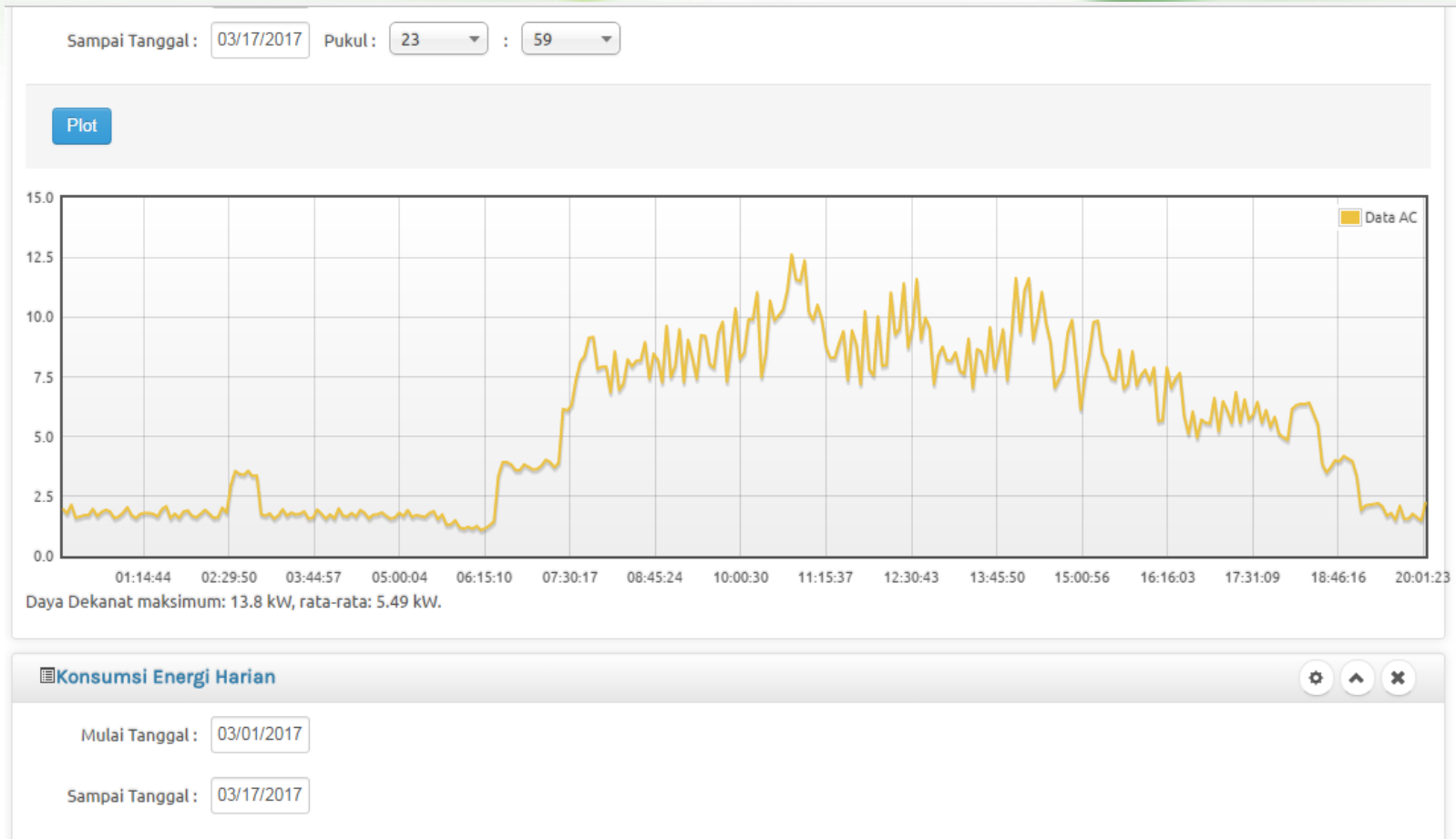
Renewable energy

- Integrated monitoring system
- Solar air-conditioning system
- Solar photo-voltaic
- Electricity generation of gas power

Green Building

- Smart building
- Green building LEED Certificate
- Pedestrian highway
- Central parking area

Integrated monitoring system

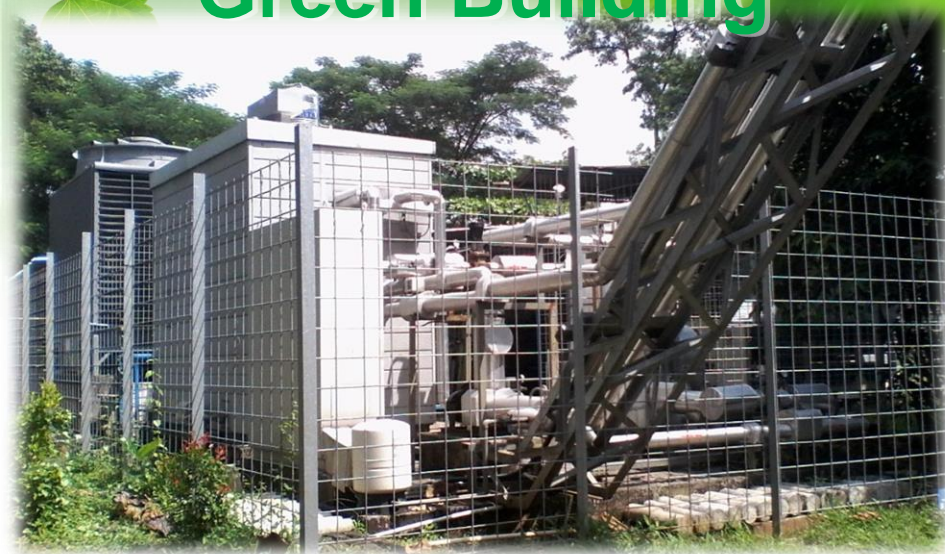


An example of energy consumption real-time monitoring at the Faculty Engineering, Dean building (Source: <http://www.ee.ui.ac.id/power/>)



An example of energy consumption real-time monitoring at the Rectorat building 3rd Fl. (Source: http://sinergi.ui.ac.id/new_rektorat/)

Green Building



△ Solar Air-conditioning System at the Faculty of Engineering, Universitas Indonesia (Produce 239 kW)



△ Solar Panels at the Faculty Club, Universitas Indonesia (Produce 25 kW)



△ Green-roof at the New Central Library, Universitas Indonesia



△ Vertical garden at the Health Sciences Cluster (RIK) building, Universitas Indonesia



△ LEED Building at the Integrated Laboratory and Research Center, Universitas Indonesia



△ Environmental Design at the “Main Zone”, Universitas Indonesia

Campus (Yellow) Bus



- More than 20 buses
- Free for students, staffs, publics

Bikes and lanes




- More than 400 bikes available
- Free for students and staffs



Concluding Remarks



- Though it can be classified into initial stage, green energy development are continuously being promoted and extended as much as possible
- UI will keep the energy management policy on the track so that improving UI rank in UI GreenMetric, especially for energy and climate change category
- Expectation to achieve sustainable campus as an eco-friendly based education infrastructure in the form of eco-science-park can be realized in very near future



Thank you - Terima kasih



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