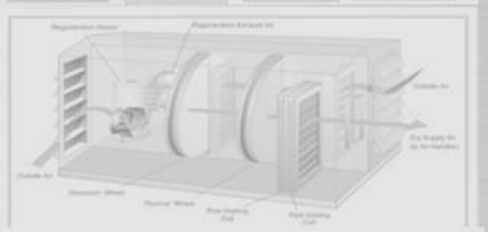
Tropical Green Building Mission in conjunction with Greenright Conference 2014



GREENSHIP CERTIFICATION PROCESS for New & Existing Building from Practitioner Side

Name: Totok Sulistiyanto

Company: PT. Narama Mandiri

Email: totok.sulis@naramamandiri.net

Associations: ASHRAE, GBCI, FKMHE, IAFBI, PII, KNI-WEC.

National Commitment On Reducing GHG

President Commitment in G-20 Pittsburgh and COP15 to reduce greenhouse gasses emission by 2020

Domestic efforts

26%
(767 Mill. Ton)

41%
(1,210 Mill Ton)

Domestic efforts and international support

Forestry, Peat, Agriculture	680 million Ton
Energy Sector	**30 million Ton**
Wastes	48 million Ton
Industry and Transport	9 million Ton

Through new renewable energy development and energy conservation implementation in all sector

Source: DGNREEC – Ministry of Energy and Mineral Resources, 2012

Policy Instrument

A. Legal Instruments:

- Law No. 28 of 2002 concerning Buildings
- Law No. 30 year 2007 on Energy
- Law No. 32 year 2009 on Environmental Protection and Management
- National Action Plan on GHGs Emission Reduction (Draft of Presidential Regulation on RAN-GRK), Nationally Appropriate Mitigation Actions (NAMAs) of Energy Sector

B. Fiscal Instruments:

- Incentive for implementation of energy conservation program (Government Regulation No. 70/2009 on Energy Conservation
- Exemption of import tax, set-up price and subsidy allocation from fossil energy to new renewable energy (based on *"Green Paper"* developed by Ministry of Economy)

C. Institutional Instrument:

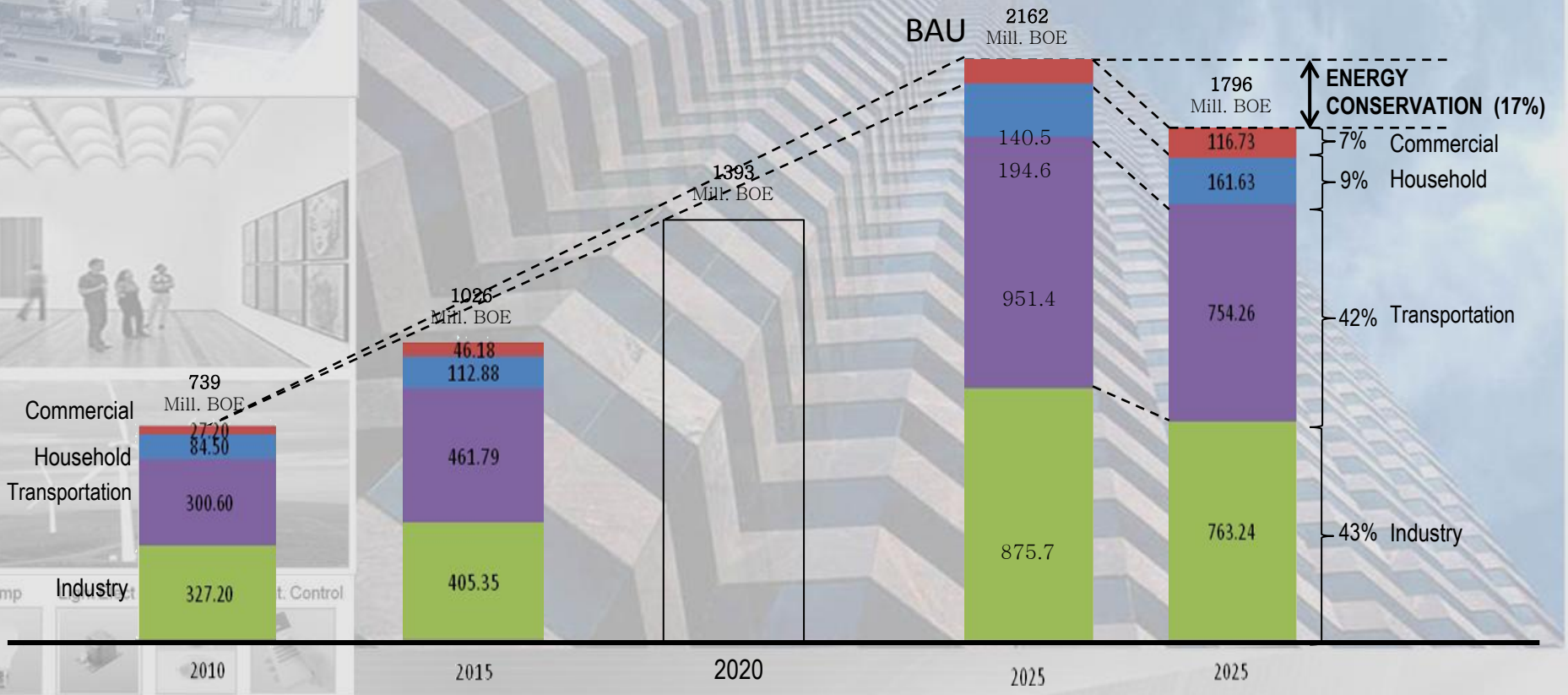
- MEMR as Energy Authority, Permen ESDM No. 12, 13, 14 – 2012
- Ministry of Environment (including climate change mitigation), Permen LH No. 8 - 2010
- Ministry of Public Works
- Related institutions, Inpres No. 013 – 2011, Pergub DKI Jakarta No. 38 - 2012
- Carbon Market Authority

D. Financial Instruments:

- Unilateral (National/regional government budget, Private sector's CSR)
- Donor Countries' support (Bilateral/Multilateral)
- Carbon Market (such as. CDM)
- Green Financing

Source: DGNREEC – Ministry of Energy and Mineral Resources, 2012

Policy Direction for Energy Users



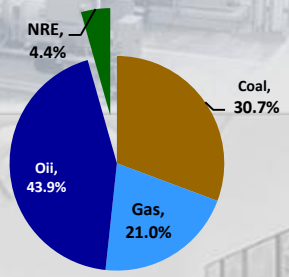
SECTOR	1990	1995	2000	2005	2009	2010	2015	2020	2025
Commercial	6.22	12.06	19.22	24.82	29.09	27.20	46.18	69.64	116.73
Household	46.00	56.39	87.96	89.07	81.50	84.50	112.88	139.27	161.63
Transportation	76.18	105.87	139.18	178.45	226.58	300.60	461.79	598.86	754.26
Industry	119.58	176.63	262.52	302.22	329.68	327.20	405.35	584.93	763.24
TOTAL	247.98	350.95	508.88	594.56	666.85	739.50	1026.20	1392.70	1795.85

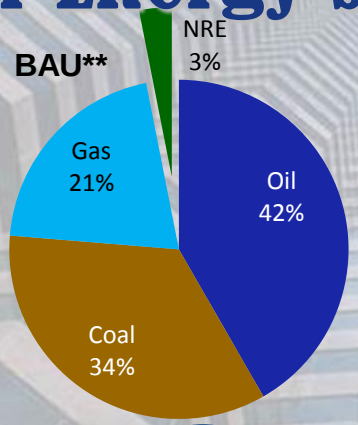
Note: 1 TOE = 7.33 BOE

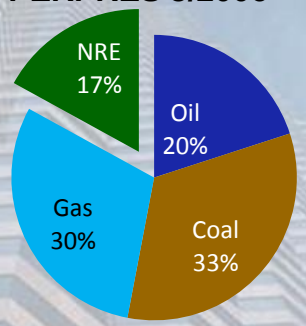
Source: DGNREEC – Ministry of Energy and Mineral Resources, 2012

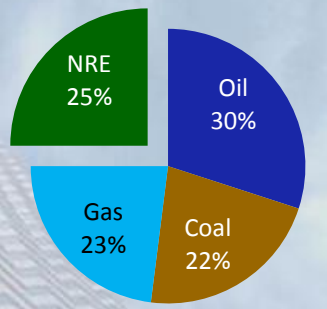
4

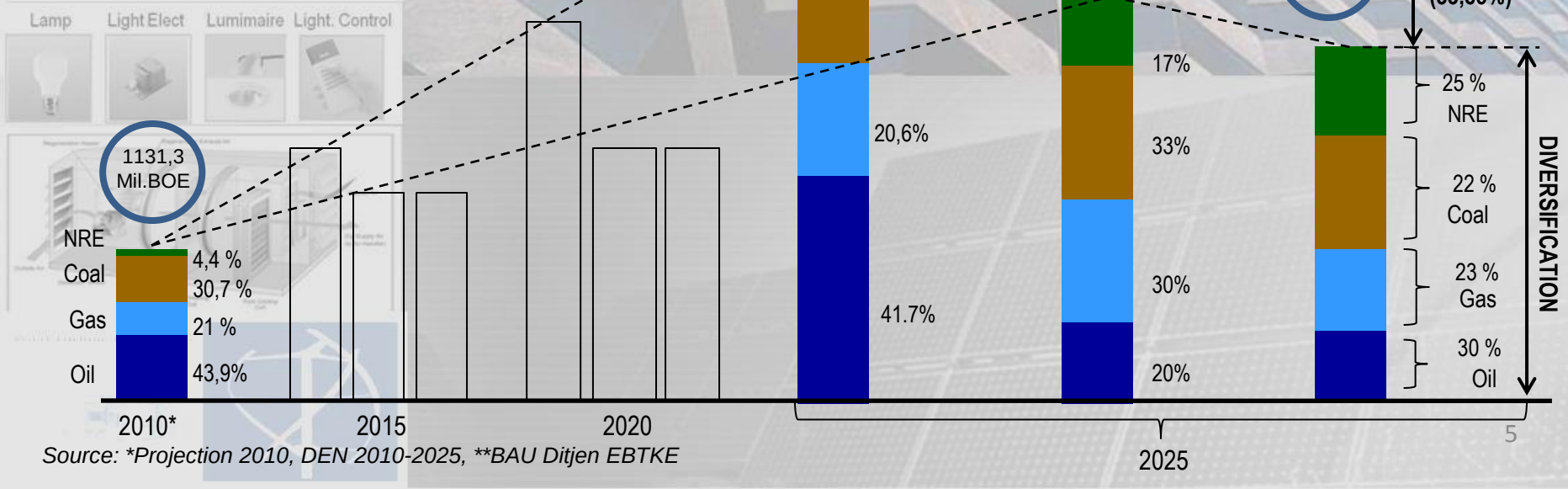
Policy Direction for Energy Supply











*Source: *Projection 2010, DEN 2010-2025, **BAU Ditjen EBTKE*

Jakarta Province Green Buildings Code No 38 2012

- ✓ As a Governor commitment from C-40 programme in Seoul 2008
- ✓ Part of Jakarta regulatory reform to achieve 30% CO_2 reduction in 2030

This regulation will be regularly reviewed to achieve better performance

6

Mandating Green Buildings Code through:
1) Building Permit and
2) Occupancy Permit

design

Recommen-dation from other institution

Building Permit

construction

Recommen dation from other institution

Occupancy Permit 1

operation

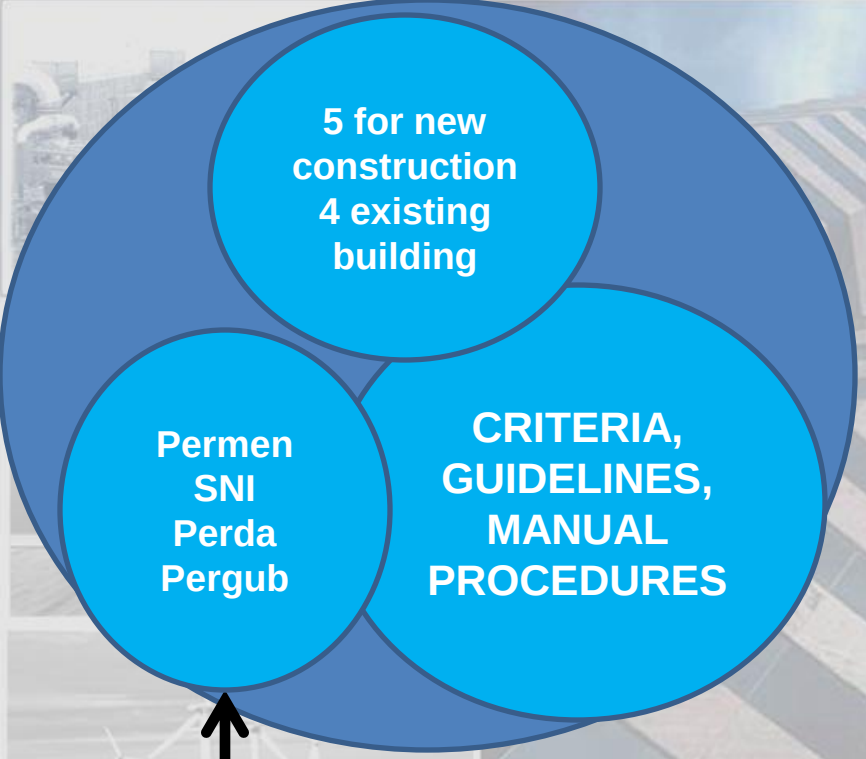
Recommen dation from other institution

Occupancy Permit 2, 3....n

Building Inspector Program

Collaborate with other institutions for domestic and overseas training program

Incorporating green buildings concepts into building inpector training curriculum



CRITERIA	Benchmark	Assessment method	Tools
Development			
Site			
Electrical			
Water			
Indoor Quality			

NEW CONSTRUCTION

CRITERIA	Benchmark	Assessment method	Tools
Operation			
Electrical			
Water			
Indoor Quality			

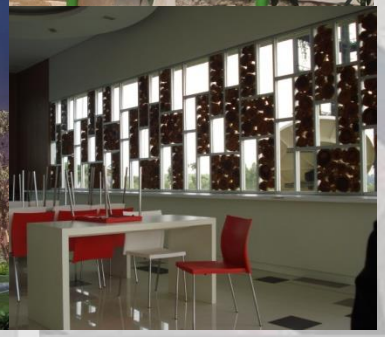
EXISTING BUILDING

International regulation/policy which is aplicable in Jakarta

VARIABLE Review

IMPROVEMENT

DATA BASE FOR ENERGY CONSUMPTION



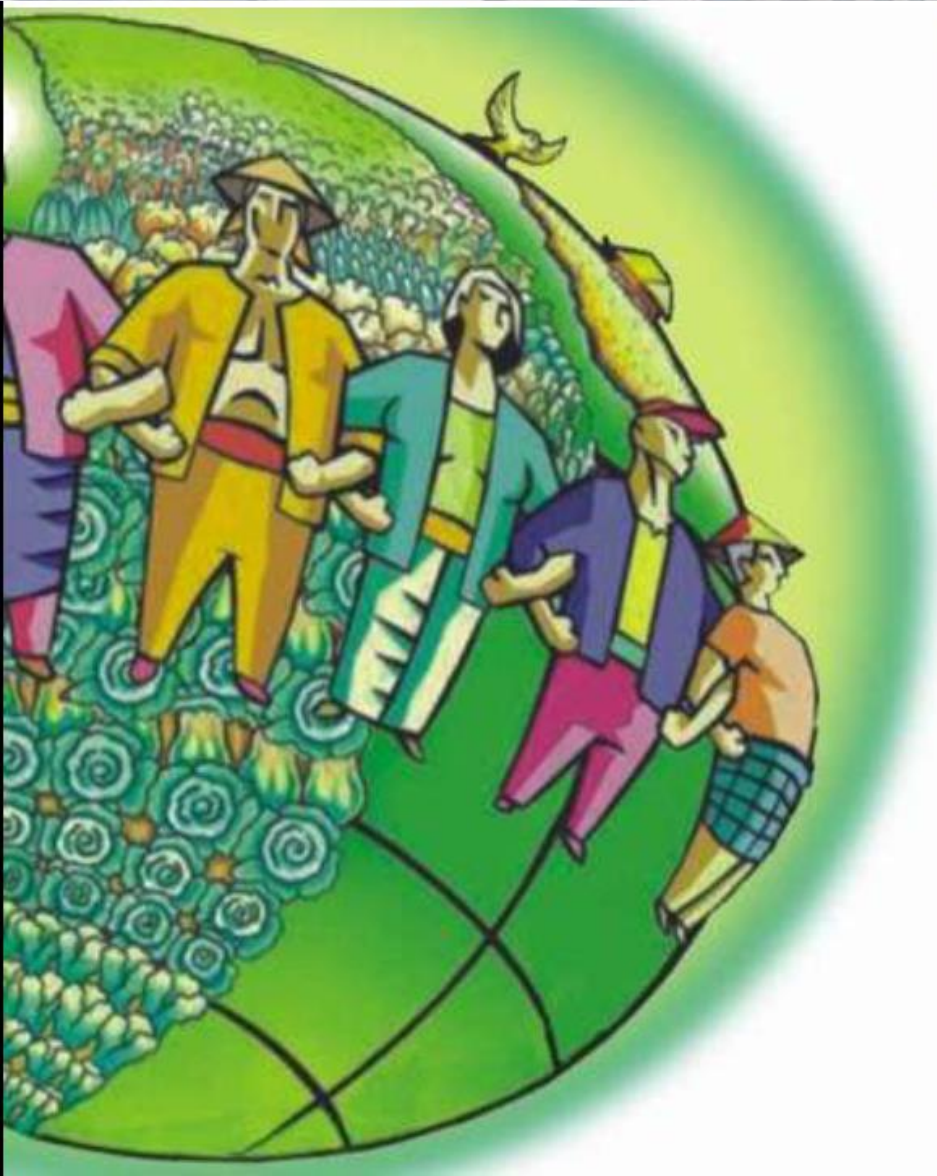
Green Building Council Indonesia

GREEN BUILDING COUNCIL INDONESIA

WORLD GREEN BUILDING COUNCIL

GBCI is Emerging Member and representing World Green Building Council (WGBC) in Indonesia

Green Building Council Indonesia



❑ Not for profit organization

- Starting by 7 initiator
- Established : February 2009 by 50 core founder individu professionals:
  - Developer, designer, architect, building & facility management, contractor, supplier etc with architects, mechanical & electrical engineer, interior desinger, landscape background etc.
- Then 21 company join as "corporate founding member"
- Currently GBCI has 125 corporate member

GBC Indonesia's Mission

Promote & Stewards
market transformation

Educate
the industry & public

Forums
for Industry dialog

Builds Community

Provides
tools & expertise

"Ensuring Indonesia's Sustainable Future"

Greenship New Building Version 1.1

GREENSHIP

NARAMA

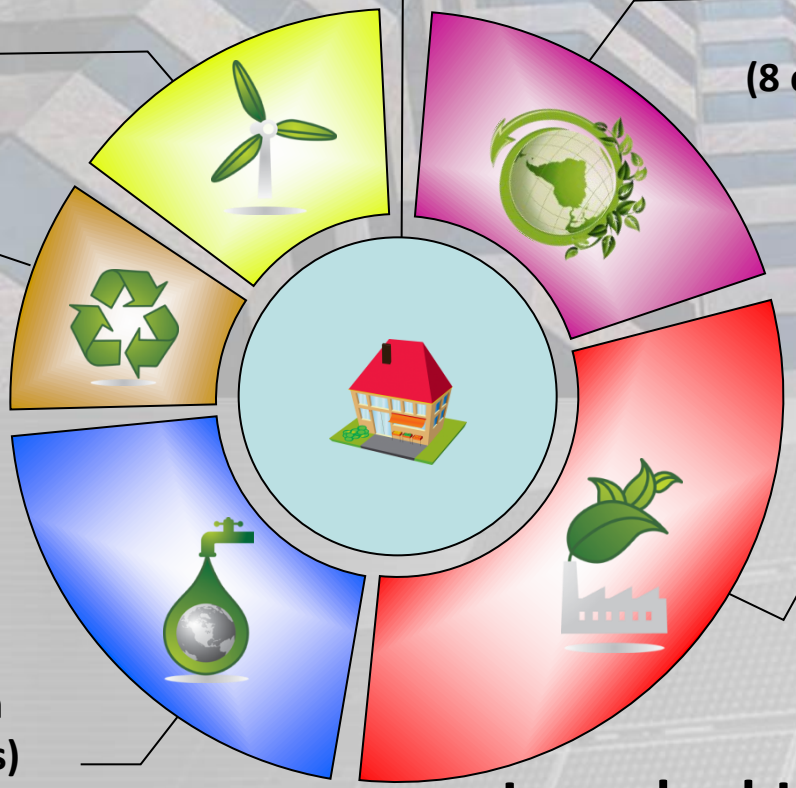
TOTAL : 46 CRITERIAS
101 POINTS

Building Environment Management
(8 criterias, 13 points)
12,87%

Indoor Air Health and Comfort
(8 criterias, 10 points)
9,9%

Material Resources and Cycle
(7 criterias, 14 points)
13,86%

Water Conservation
(7 criterias, 21 points)
20,79%



Appropiate Site Development
(8 criterias, 17 points)
16,83 %

Energy Efficiency and Refrigerant
(7 criterias + 1 bonus, 26 points + 5 bonus points)
25,74%

Launched June, 2010
***Update to 1.1 version: February 2012**

Greenship Existing Building V.1.0

GREENSHIP

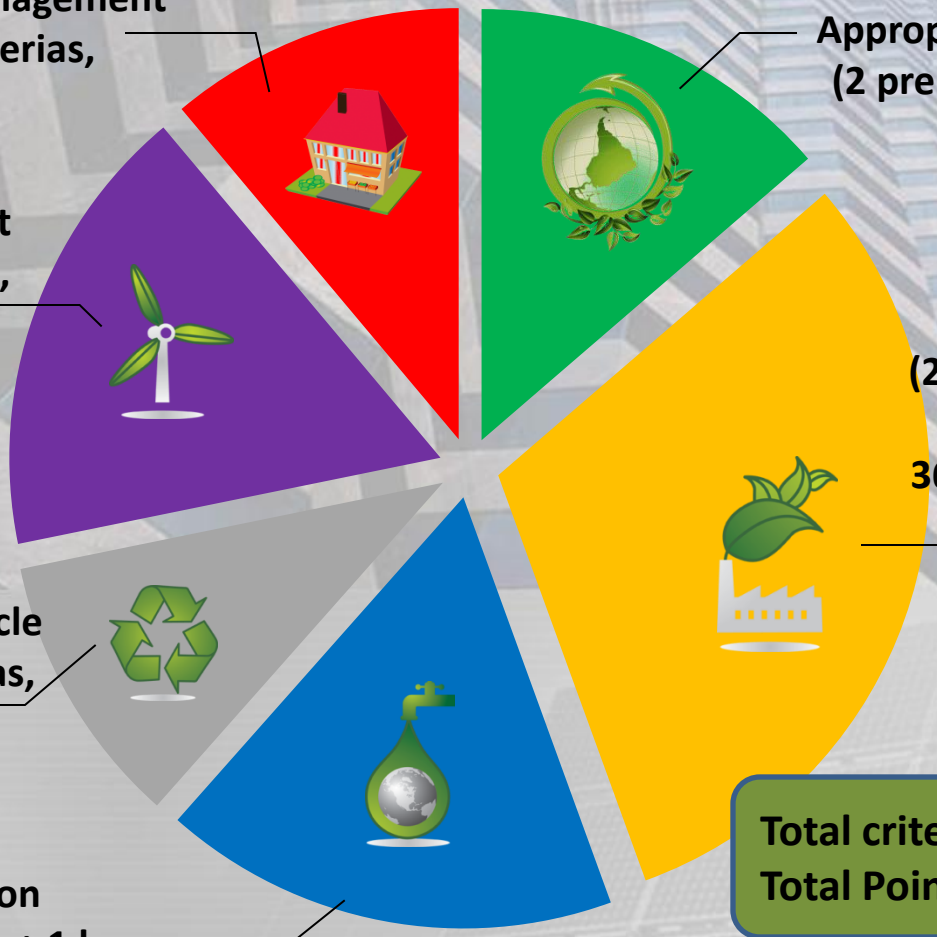
NARAMA

Building Environment Management
(1 prerequisite + 5 criterias, 13 points)
11,11%

Appropiate Site Development
(2 prerequisites +8 criterias, 16 points) **13,67%**

Indoor Health and Comfort
(1 prerequisite + 8 criterias, 20 points)
17,09%

Energy Efficiency and Conservation
(2 prerequisites +5 criterias + 2 bonus, 36 points + 8 bonus points)
30,76%



Material Resources and Cycle
(3 prerequisites + 5 criterias, 12 points)
10.26%

Water Conservation
(1 prerequisite + 7 criterias + 1 bonus, 20 points + 2 bonus points) **17,09%**

Total criteria : (10P + 41K + 3B)
Total Points : (117P + 10B)

Launched January, 2011

Greenship Interior Space V.1.0

GREENSHIP

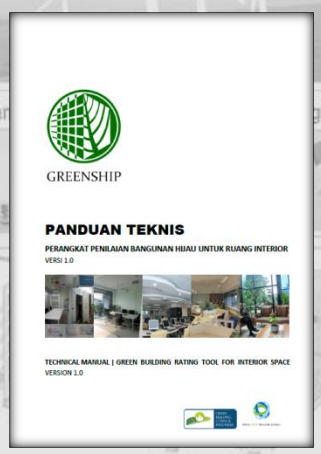
NARAMA

Building Environment Management
11,65% (12 points)

Appropiate Site Development
(12 points) 11,65%

Indoor Health and Comfort
28,16% (29 points)

Energy Efficiency
and Conservation
(14 points) 13,59%



Water Conservation
(8 points) 7,77%

Material Resources and Cycle
(28 points) 27,18%

Total criteria : (43)
Total Points : (103)

Launched April, 2012

Awarding

GREENSHIP

NARAMA

Achievement	Percentage	Minimum Point New Building	Minimum Point Existing Building
Platinum	73 %	74	85
Gold	57 %	58	67
Silver	46 %	47	53
Bronze	35 %	35	41
	Total	101	117

Re-certification: 3 Years

Greenship Certified Buildings

GREENSHIP

NARAMA

Main Building
Ministry of Public Works

PLATINUM
Design Recognition Award
GREENSHIP New Building
Dated:20 September 2011

ITSB Campus

GOLD
Design Recognition Award
GREENSHIP New Building
Dated: 1 Desember 2011

Greenship Certified Buildings

Rasuna Tower Jakarta

GOLD

Design Recognition Award
GREENSHIP New Building
Dated: 4 April 2012

Greenship Certified Buildings

GREENSHIP

NARAMA

Grand Indonesia Office Tower

PLATINUM

GREENSHIP Existing Building

Achieved: 21 Desember 2011

Energetic Material Center PT. Dahana

PLATINUM

GREENSHIP New Building

Achieved: 20 Desember 2011


SERTIFIKAT
GREENSHIP GEDUNG BARU V.1.0
GREENSHIP NB (NEW BUILDING) V.1.0
No. 001/PP/NB/I-2012
KAMPUS PT. DAHANA (PERSERO)
Peringkat / Rating
GREENSHIP
Berlaku sampai dengan 20 Januari 2015
Valid until Januari 20th, 2015
Green Building Council Indonesia

Registered Project by March 2013: 30 Projects

NARAMA

MEMBERSHIP

Dec 2012: 125 Members

Greenship Professional

GREENSHIP

NARAMA

Professional Task:

- Consultant in Green Concept for Building's Owner
- Managing Project Team for Green Building design, construction, and operation management
- Consultant for GREENSHIP certification

- 3 Days GREENSHIP ASSOCIATE Workshop → Basic Green Concept
- 6 Day GREENSHIP PROFESSIONAL Workshop → Advance Technical Green Concept

GREEN BUILDING COUNCIL INDONESIA

WORLD GREEN BUILDING COUNCIL

SERTIFIKAT KELULUSAN

Nomor Ujian : 0043/GBCI/GP/II/2010

NAMA: Burhan Sani Tjakra

Lahir Di Tanjung Karang, 8 Februari 1965

Sebagai Peserta dinyatakan :

LULUS

Pada Pelatihan GREENSHIP PROFESSIONAL Angkatan II yang diselenggarakan oleh KONSIL BANGUNAN HIJAU INDONESIA pada tanggal 19-20 November & 3-4 Desember 2010

Jakarta, 11 Maret 2011

Siti Adiningsih Adiwoso
Chairperson

Rana Yusuf Nasir
Director of Rating & Technology

www.gbcindonesia.org

Further Information Please visit WEBSITE

GREENSHIP

NARAMA

www.gbcindonesia.org

Energy Efficiency Guidelines

NARAMA

Energy Efficiency Guidelines for the Building Sector in Indonesia

PART 1
ENERGY EFFICIENCY FOR DEVELOPERS AND BUILDING OWNERS

PART 2
ENERGY EFFICIENCY TECHNICAL DESIGN GUIDE

PART 3
CASE STUDIES AND ADDITIONAL INFORMATION

Energy Efficiency Guidelines

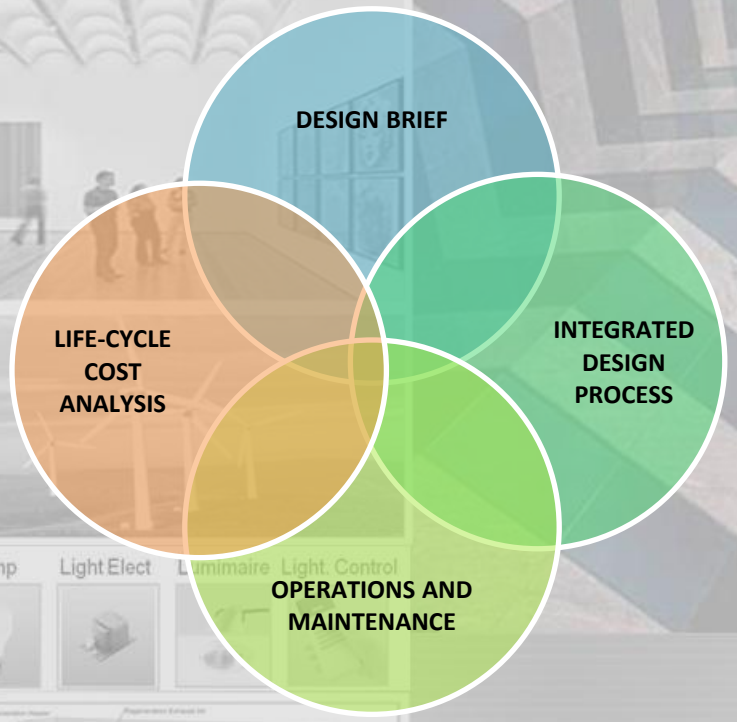


Figure 1. Four major aspects that influence the possibility for energy efficient design that are controlled by the developer.

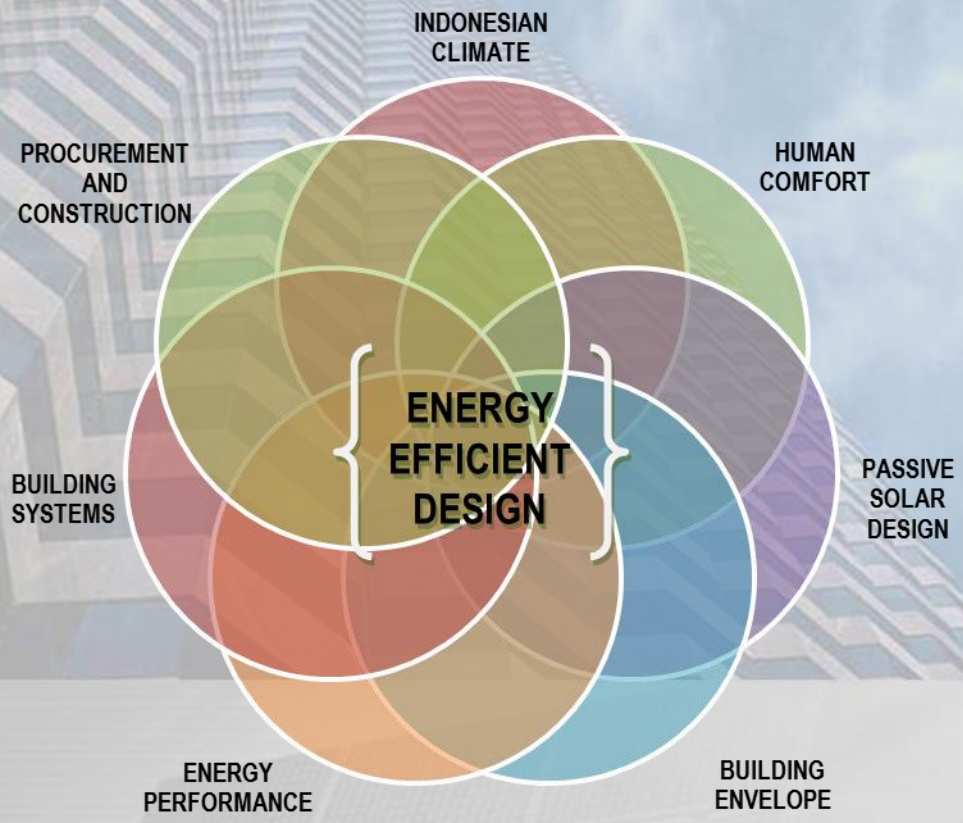
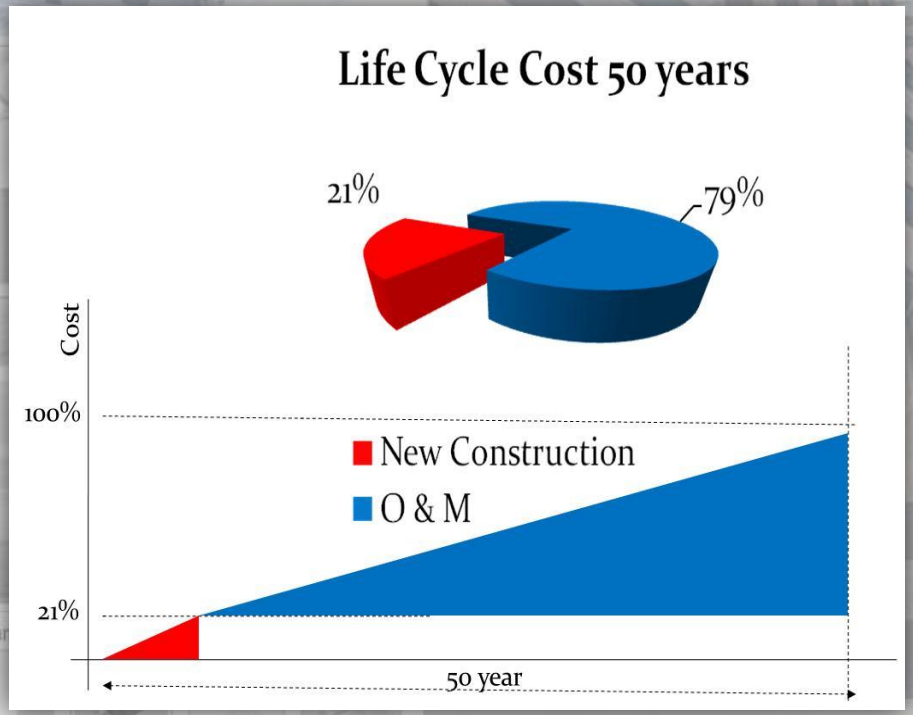
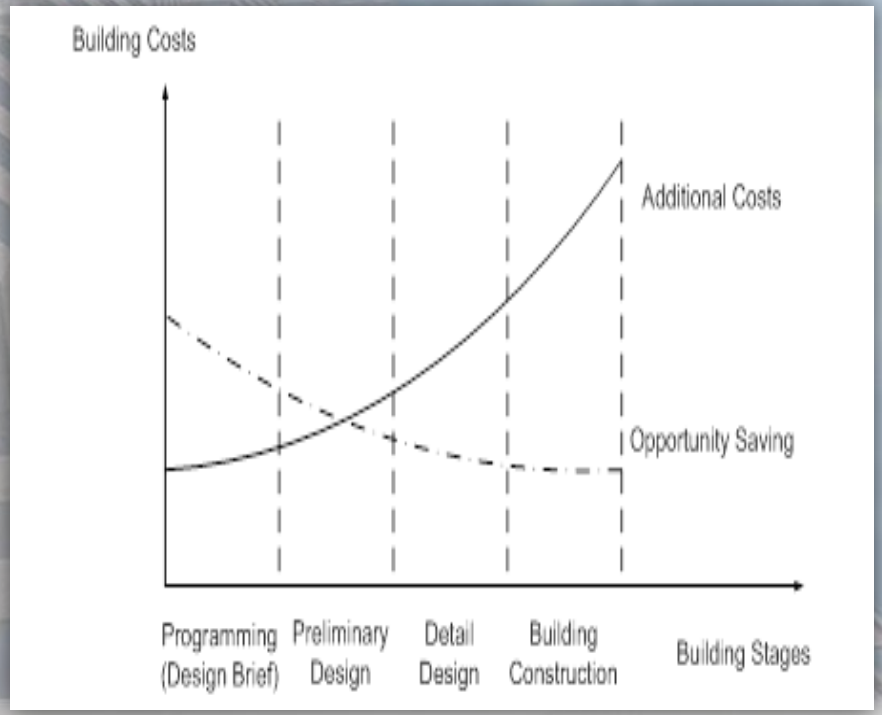


Figure 2. Seven major aspects that influence the possibility for energy efficient design that are controlled by the design team.

Pitfalls



Building Life Cycle Cost

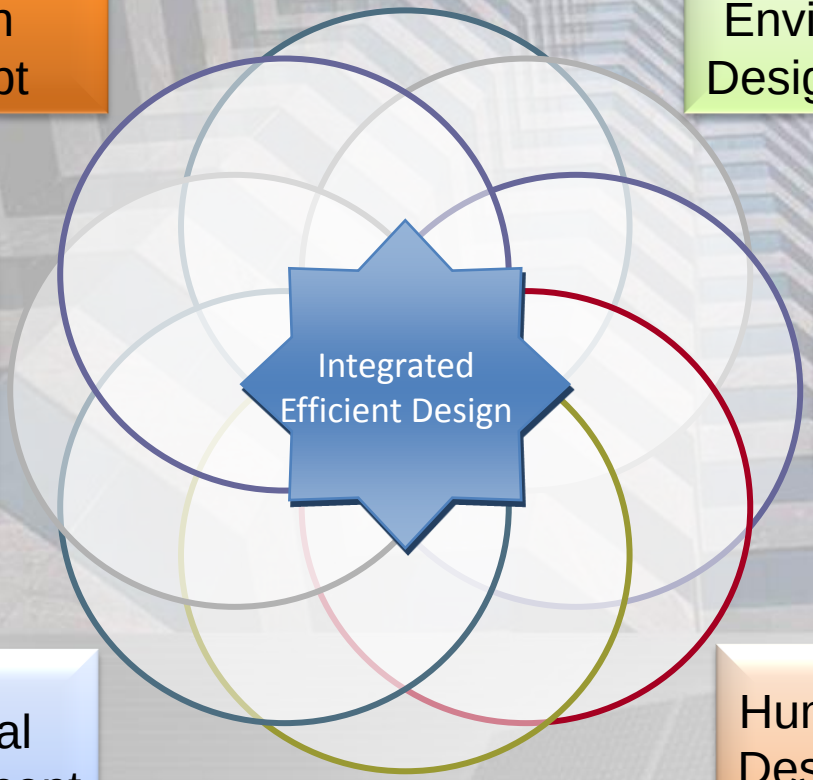


Cost Influence for Different Stage of Buildings

Comparison of Integrated and Conventional Design Processes

Integrated Design Process		Conventional Design Process
Inclusive from the outset	vs	Involves team members only when essential
Front-loaded — time and energy invested early	vs	Less time, energy, and collaboration exhibited in early stages
Decisions influenced by broad team	vs	More decisions made by fewer people
Iterative process	vs	Linear process
Whole-systems thinking	vs	Systems often considered in isolation
Allows for full optimization	vs	Limited to constrained optimization
Seeks synergies	vs	Diminished opportunity for synergies
Life-cycle costing	vs	Emphasis on up-front costs
Process continues through post-occupancy	vs	Typically finished when construction is complete

Integrated Efficient Design



Financing Concept

Structural Design Concept

Landscape and Environmental Design Concept

Operations and Maintenance Principles

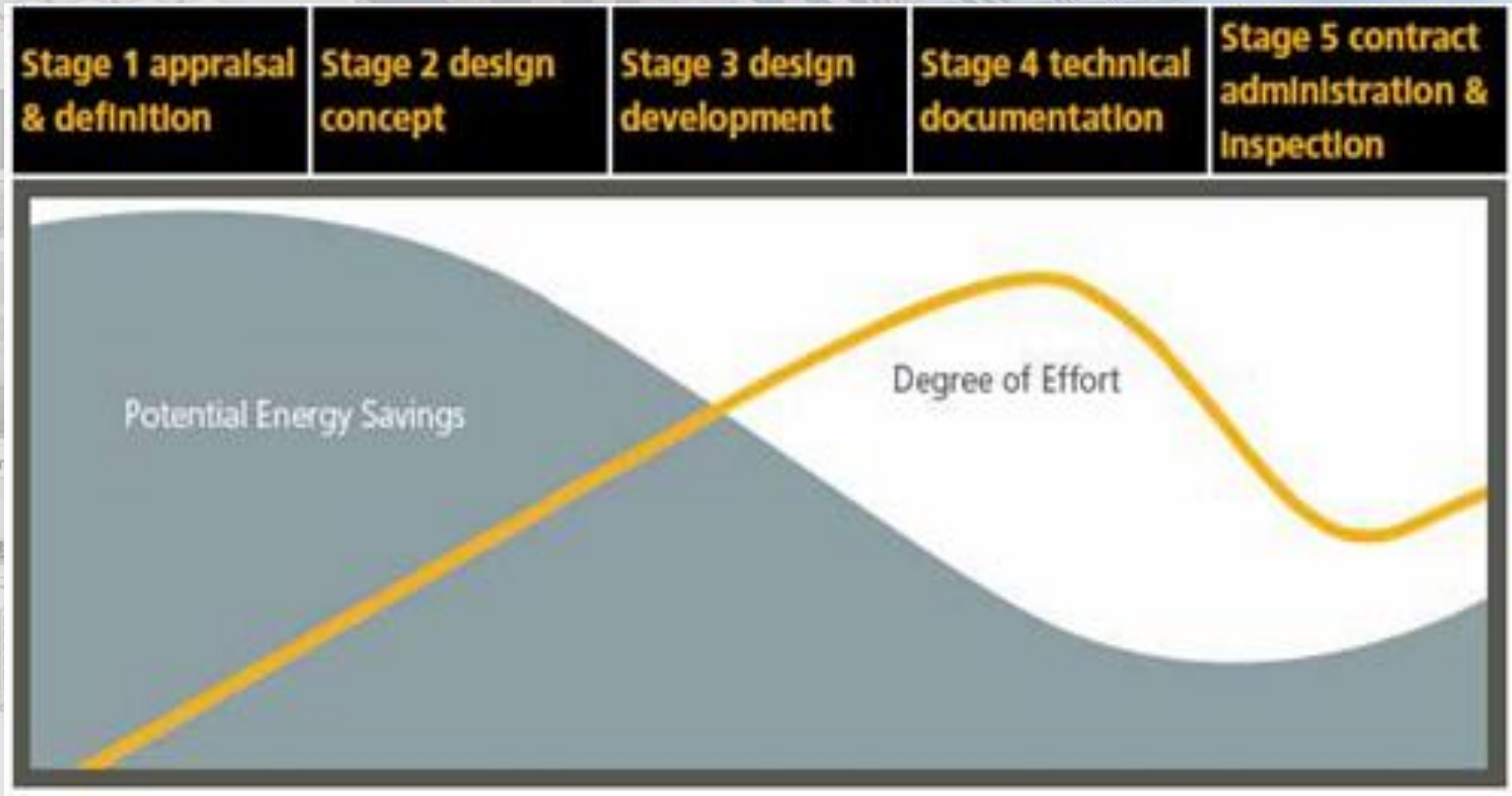
Architectural Design Concept

Mechanical Design Concept

Human Comfort Design Concept

Electrical and Lighting Design Concept

Potential Energy Saving and Degree of Effort in Every Stage



Conception and Design

NARAMA

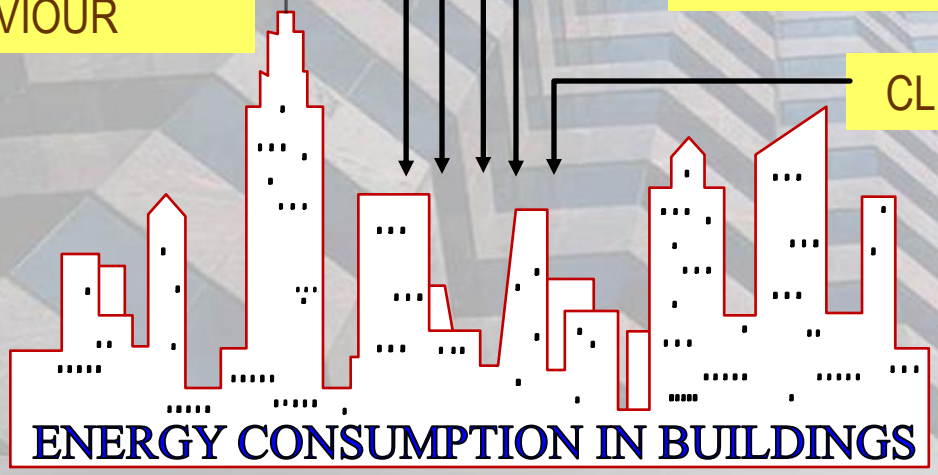
MANAGEMENT / MAINTENANCE

POLICIES, REGULATIONS, STANDARDS, ETC.

OCCUPANCY PATTERN / OCCUPANT BEHAVIOUR

COSTS / PRICES OF ENERGY

CLIMATE / WEATHER



BUILDING DESIGN

CONSTRUCTION MATERIALS

FUNCTION / NATURE OF BUILDINGS

EQUIPMENT, APPLIANCES, ETC

Building Types and Energy Efficiency Index

NARAMA

Mall, Retail & Service = **350 – 500 kWh/m²/y**

Hospital = **320 – 450 kWh/m²/y**

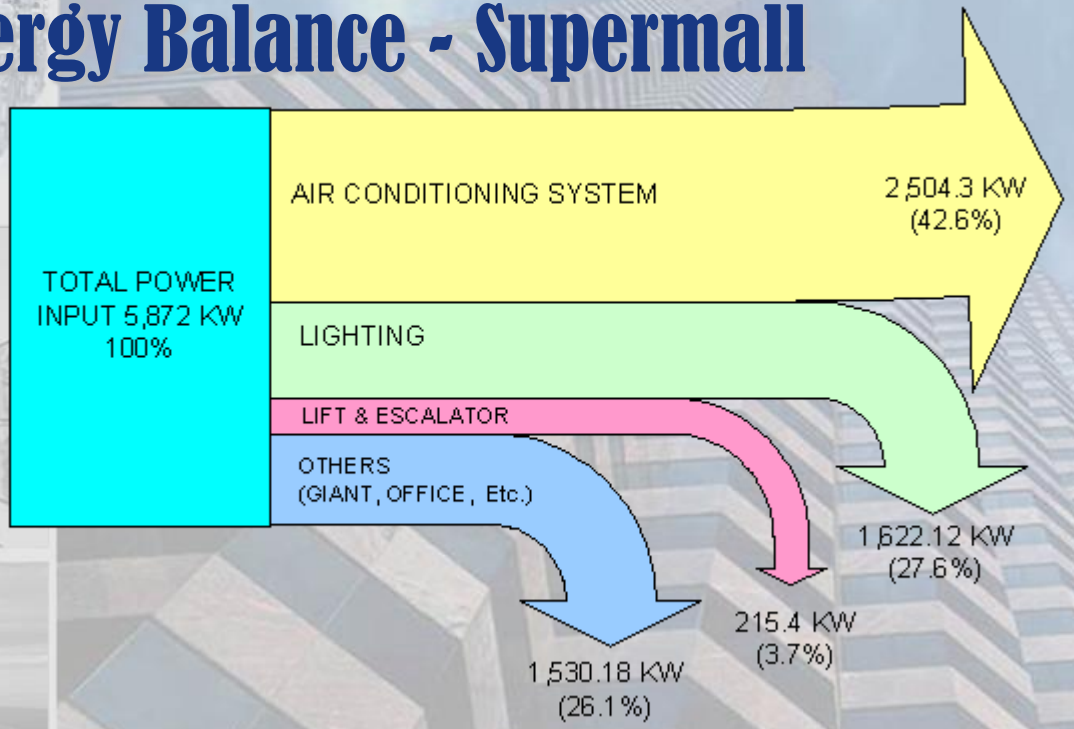
Apartment = **300 – 400 kWh/m²/y**

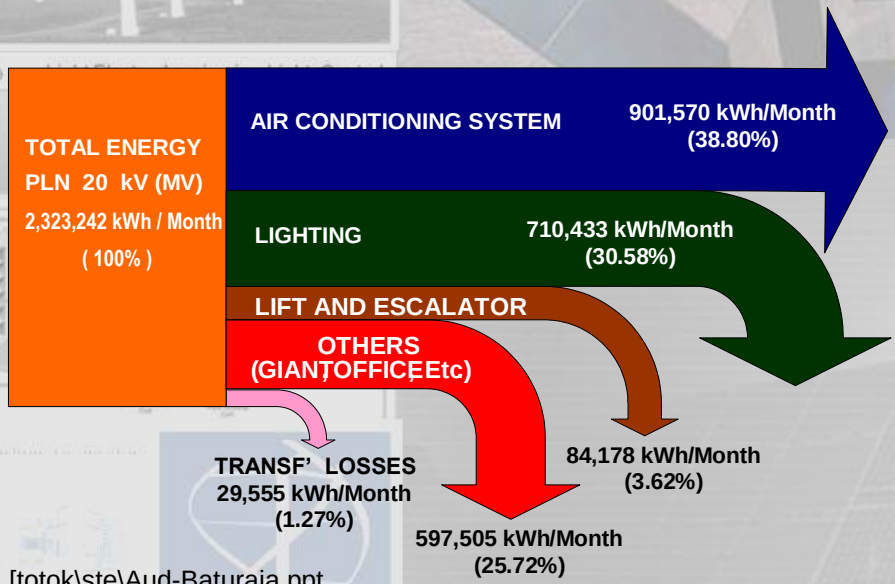
Hotel = **290 – 400 kWh/m²/y**

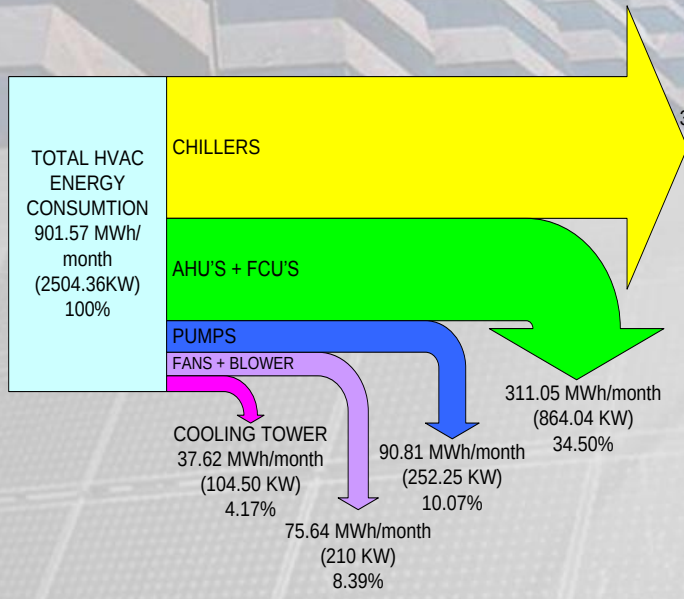
Office = **210 – 285 kWh/m²/y**

Education = **165 – 295 kWh/m²/y**

Case: Energy Balance - Supermall







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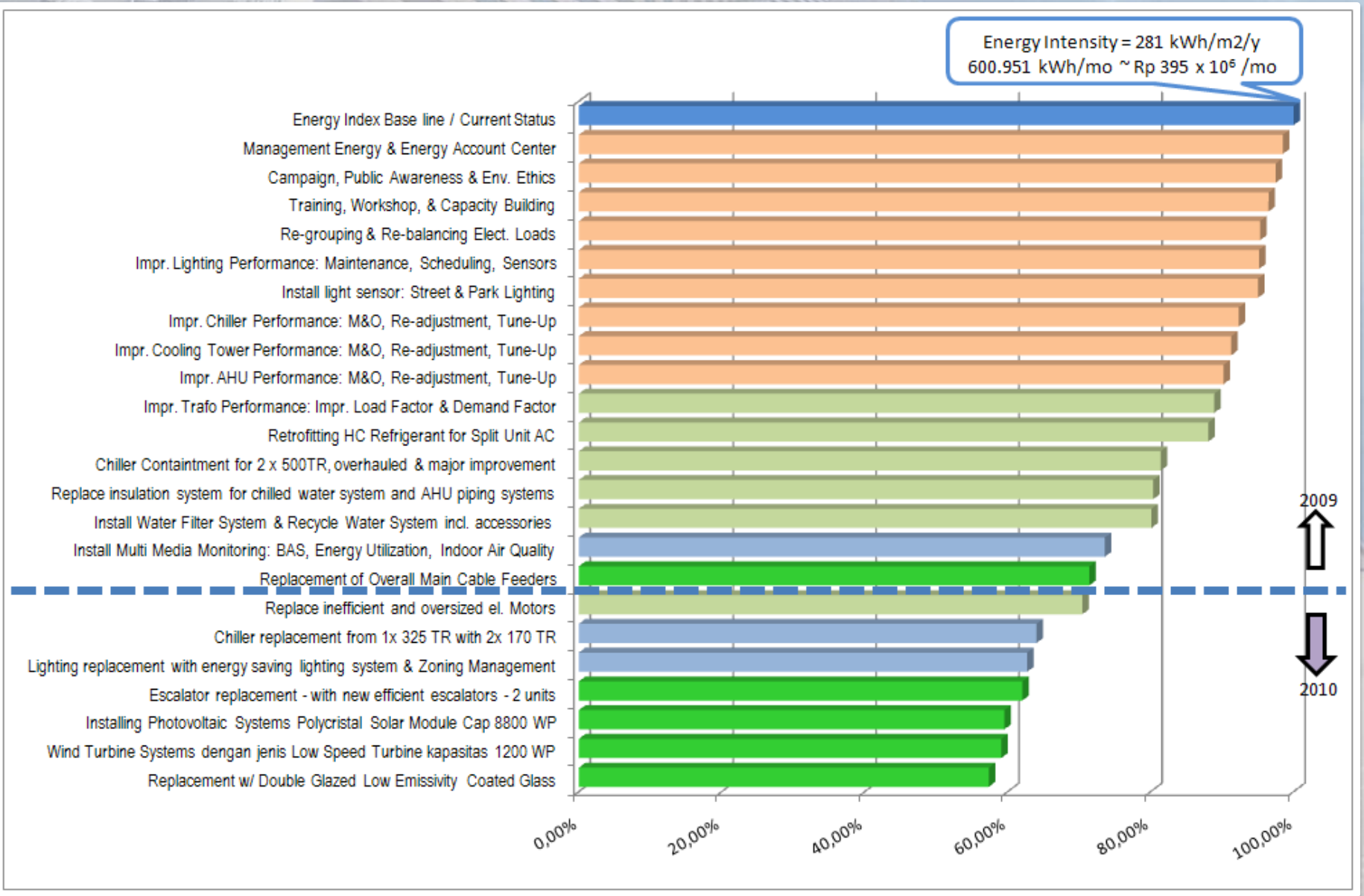
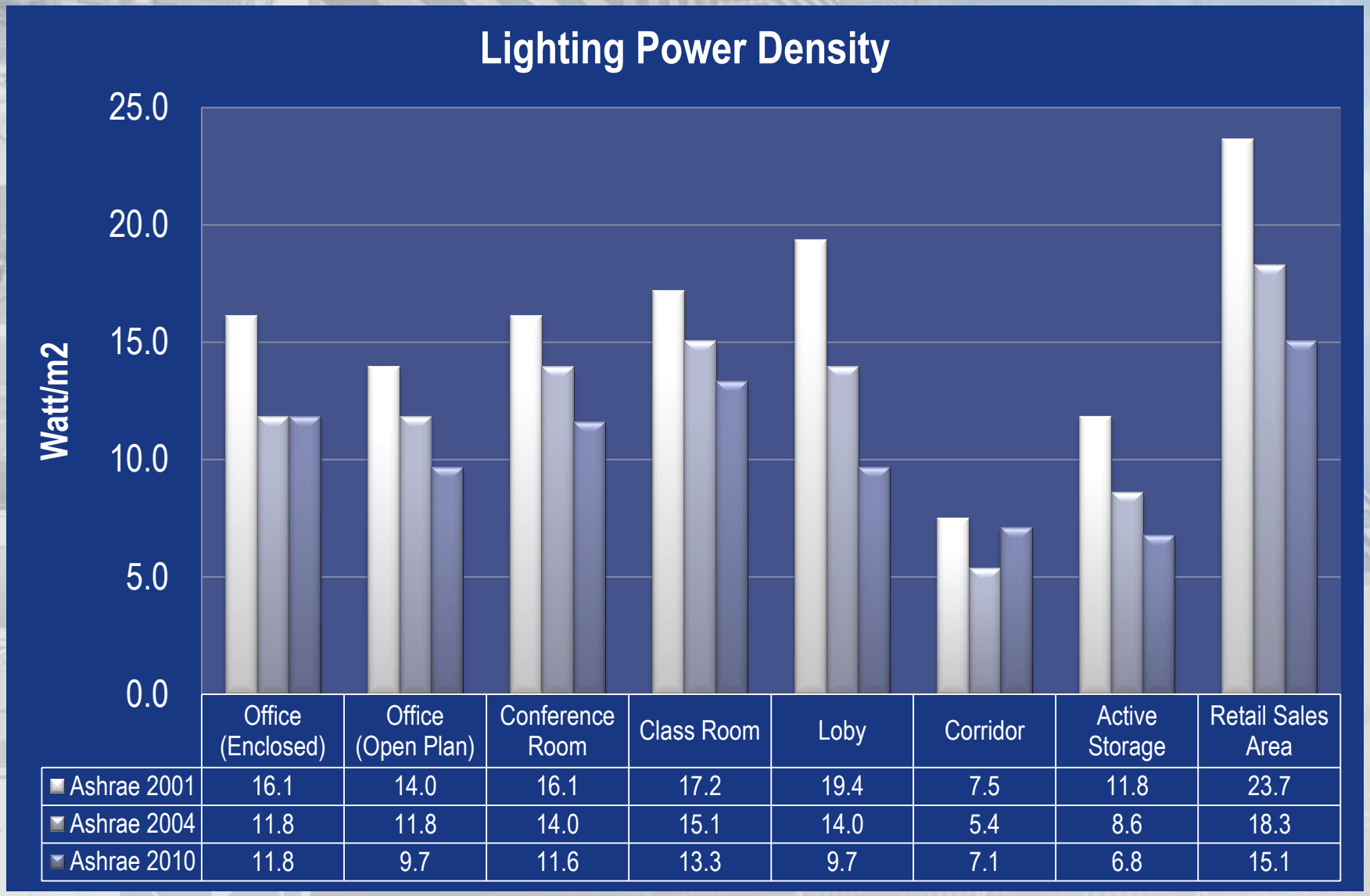
Case: Energy Saving Potential - Office



Indonesian National Standards (SNI) for Greenship Rating Tools

3 SNIs	• Appropriate Site Development
67 SNIs	• Energy Efficiency and Conservation
273 SNIs	• Water Conservation
257 SNIs	• Material resources and Cycles
75 SNIs	• Indoor and Health Comfort
4 SNIs	• Building Environment Management
20 SNIs	• Innovations
15 SNIs	• General, Guide, Sampling Methods, Specification

ASHRAE Standard 90.1



	Office (Enclosed)	Office (Open Plan)	Conference Room	Class Room	Loby	Corridor	Active Storage	Retail Sales Area
Ashrae 2001	16.1	14.0	16.1	17.2	19.4	7.5	11.8	23.7
Ashrae 2004	11.8	11.8	14.0	15.1	14.0	5.4	8.6	18.3
Ashrae 2010	11.8	9.7	11.6	13.3	9.7	7.1	6.8	15.1

Building Performance Improvement

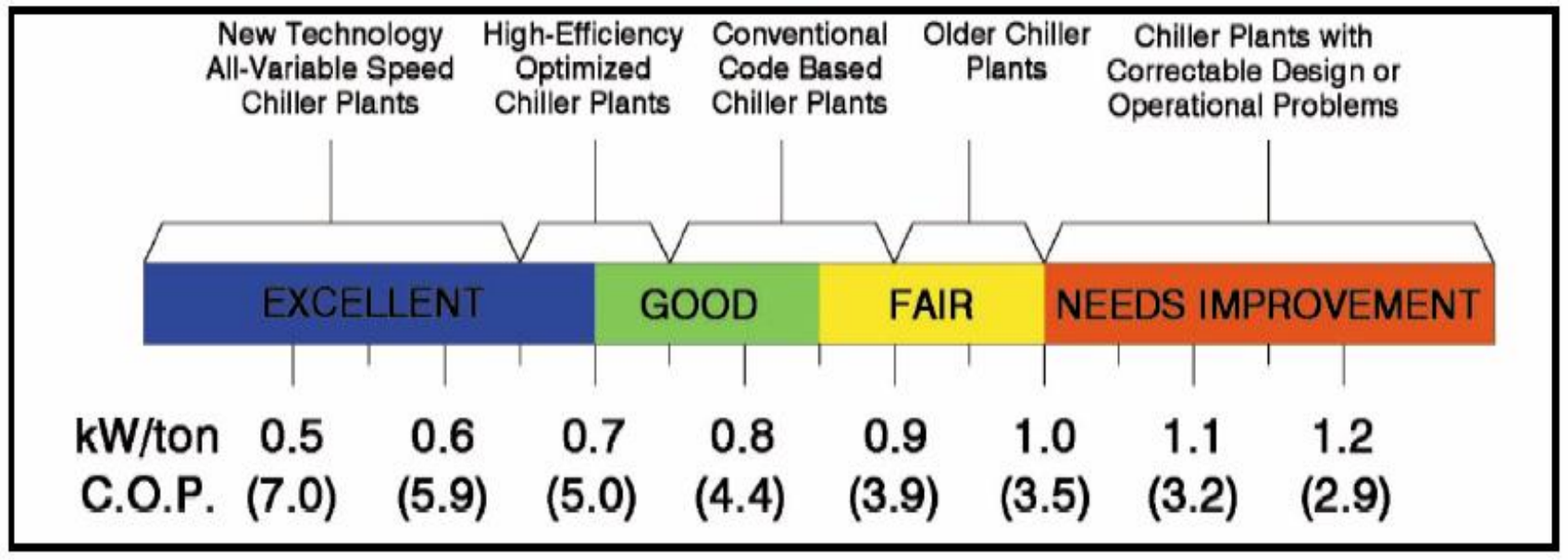
Item	90.1-2004	90.1-2007	90.1-2010	1891.P
Cooling Efficiency	10.3 EER	11.2 EER	11.0 EER/11.4 IPLV	11.2 EER
Economizer	NR	Yes	Yes	Yes
SWH Efficiency	80% Et	80% Et	90% Et	80% Et
Roof Insulation	R-15 ci	R-15 ci	R-20 ci	R-25 ci
Wall Insulation	R-13 + R-3.8 ci	R-13 + R-7.5 ci	R-13 + R-7.5 ci	R-13 + R-10.0 ci
Slab Insulation	NR	NR	NR	R-10 for 24”
Window U-Factor	0.57	0.55	0.42	0.45
Window SHGC	0.39	0.40	0.46	0.35
LPD	10.8 W/m2	10.8 W/m2	9.7 W/m2	9.7 W/m2
Avg. EUI	161 kWh/m2/yr	149 kWh/m2/yr	114 kWh/m2/yr	79 kWh/m2/yr

Source: Terry E. Townsend, P.E.; 2008; FASHRAE; ASHRAE - Leading the World to an Independent & Sustainable Future

Chiller System Plant :

- Water cooled chiller
- Chilled water pump
- Condenser water pump
- Cooling tower

ASHRAE Journal



Empirical Guidance

- Practical guidance for lighting systems:

Type of lamps: TL Daylight
Distance to the objects 3-4 m

BAD	VERY EFFICIENT	EFFICIENT	LUXURY	INEFFICIENT
5 watt/m^2	8 watt/m^2	15 watt/m^2	18 watt/m^2	

- Prctical Guidance for A/C systems

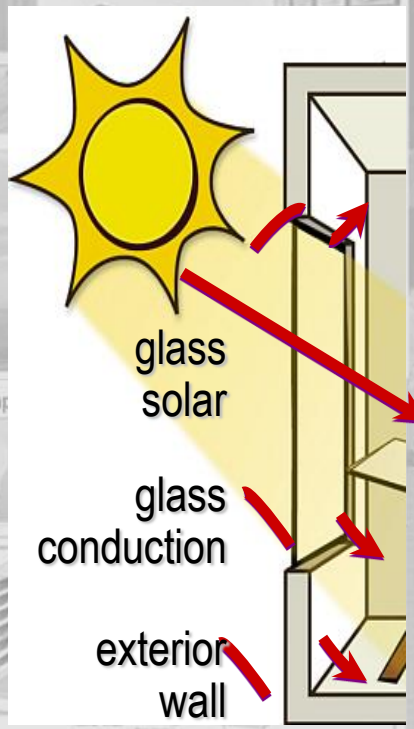
Type of A/C systems : Window/Split/Central
With the room height 3-4 m

BAD	VERY EFFICIENT	EFFICIENT	LUXURY	INEFFICIENT
0,04 PK/m^2 30 watt/m^2	0,06 PK/m^2 45 watt/m^2	0,08 PK/m^2 60 watt/m^2	0,1 PK/m^2 75 watt/m^2	

1 pk = 746 watt ~ 0,75 kW

Cooling Load from External → Building Envelope

- Contributes 54% of building cooling load
- The formula for the OTTV of any given wall orientation is as follows:



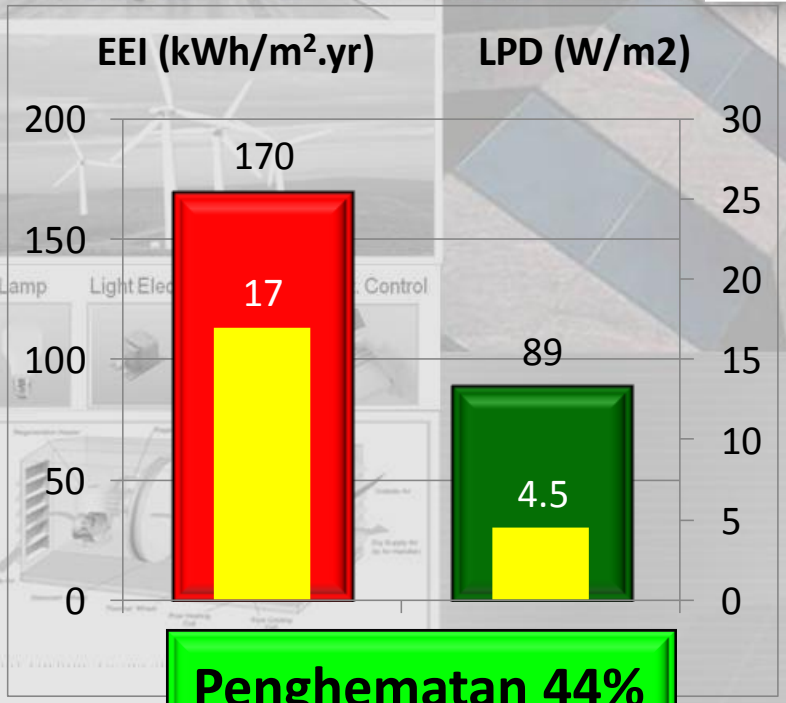
OTTV = Heat Conduction through Walls + Heat Conduction through Windows + Solar Heat Gain through Windows

0.2% to 5% | 10% to 20% | 70% to 85%

$$OTTV = \alpha((1-WWR)*Uw)*TDeq) + (WWR*Uf*\Delta T) + (WWR*SC*SF)$$

EE renovation of EECCHI office in MEMR

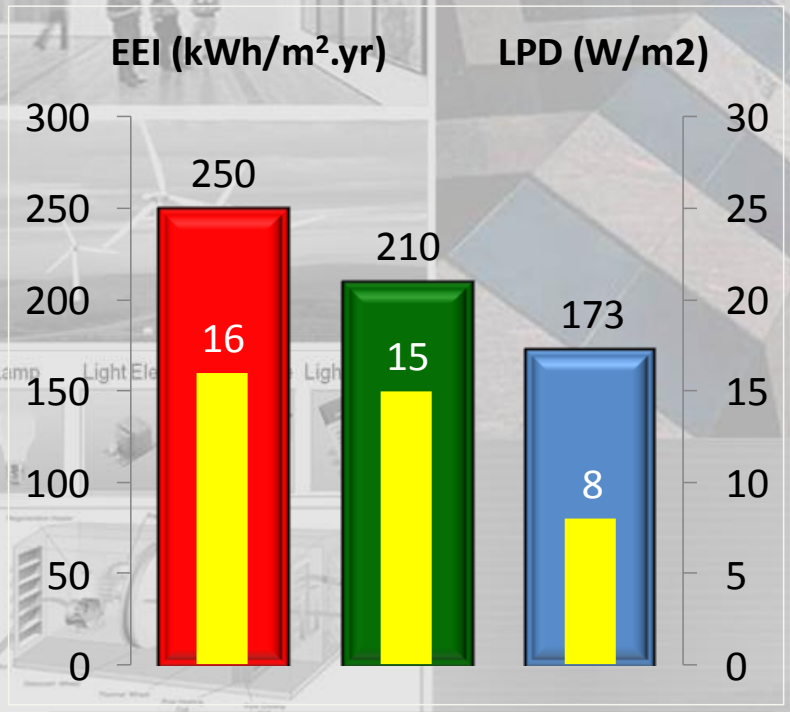
- AC-VRF multi split system
- Double glass panelling
- Sustainable materials
- On-line monitoring
- Space organization
- Eco friendly sanitary
- Airtighness & high ceiling
- T5 lighting



- Noise level reduction
- Day-light & occupancy control
- General lighting & task lighting

Existing Building

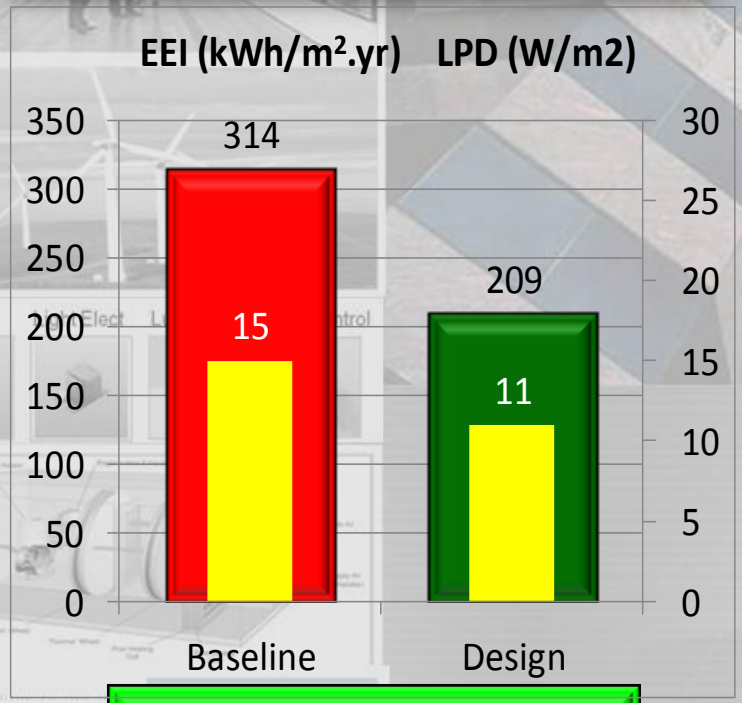
PLATINUM
GREENSHIP Existing Building
Achieved: 21 Desember 2011



Penghematan thd Rata2 : 30%
Penghematan thd Sebelum : 18,6%

GOLD

Design Recognition Award
GREENSHIP New Building
Achieved: February, 2013



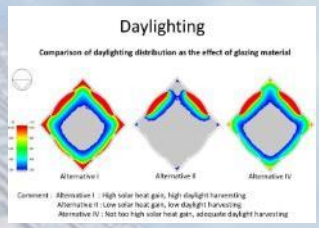
Penghematan 33,4%

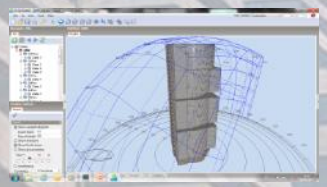
ENERGY	• MEASURE ENERGY CONSUMPTION (saving 33,35%) • ENERGY EFFICIENCY BY USING NATURAL LIGHTING, TAKING BUILDING ENVELOPE INTO OTTV ACCOUNT, REDUCE ENERGY USING
SITES	• GREENING AREA AND MIND THE ALBEDO SETTING • STORMWATER MANAGEMENT • BICYCLE PATH, PARKING AND SHOWER FOR BICYCLE USER
WATER	• MEASURE ENERGY CONSUMPTION • WATER EFFICIENCY BY USING GREEN WATER FIXTURES & RAINWATER HARVESTING
MATERIAL	• USING MATERIAL : ISO 14001 OR EQUAL, REGIONAL MATERIAL (PRODUCE IN AREA THAT NOT MORE THAN 1000 KM RADIUS) • FUNDAMENTAL REFRIGERANT AND NON ODS USAGE
INDOOR HEALTH & COMFORT	• CO2 MONITORING AND FRESH AIR INTAKE • LOW VOC FOR PAINT, NOT USING MATERIAL THAT CONTAIN FORMALDEHYDE, ASBESTOS, MERCURY AND STYROFOAM
BUILDING MANAGEMENT	• PROPER COMMISIONING • WASTE MANAGEMENT
COST ANALYSIS	• COST ANALYSIS BETWEEN GREEN BUILDING VS STANDART BUILDING • PAYBACK PERIOD ANALYSIS = 7,7 YEARS

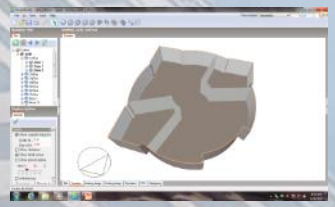
Platinum - Target

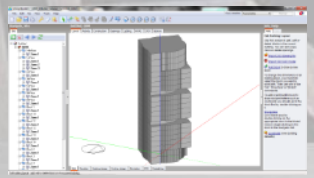
Design Recognition Award
GREENSHIP New Building
Construction started: Nov 2012

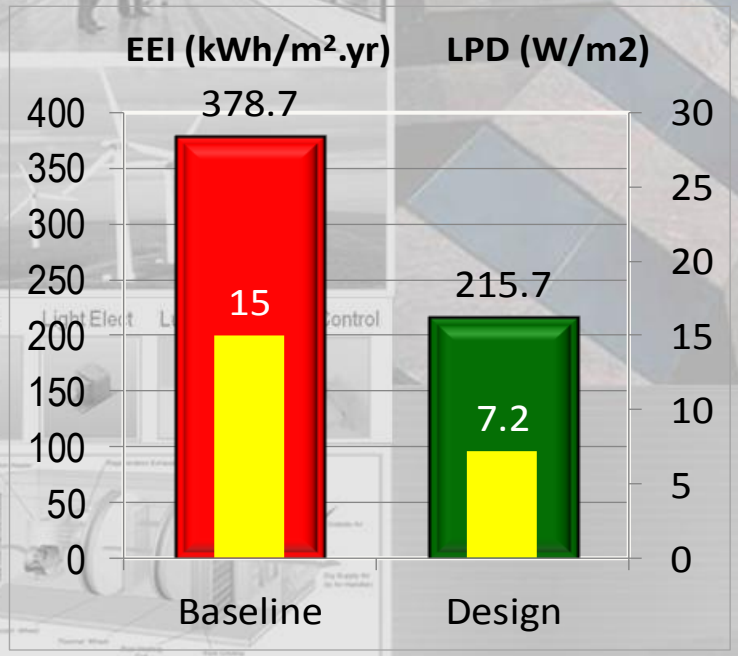
Tipe Kaca	Alternative I	Alternative II	Alternative IV
Name	6 mm Panasap Green	6 mm Stopsol Classic Green	6 mm Panasap Green
	5 mm Air	0.38 mm PVB Clear	0.38 mm PVB Clear
	5 mm Clear Glass	5 mm Sunergy Clear	5 mm Sunergy Clear
Properties			
U-value (W/m² K)	3.3	4	3.92
Light Transmission (%)	61.8	27	50
SHGC	0.456	0.28	0.38
T_{sol} (%)	68	76	72









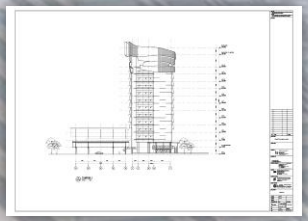


Penghematan 42,9%

Platinum - Target

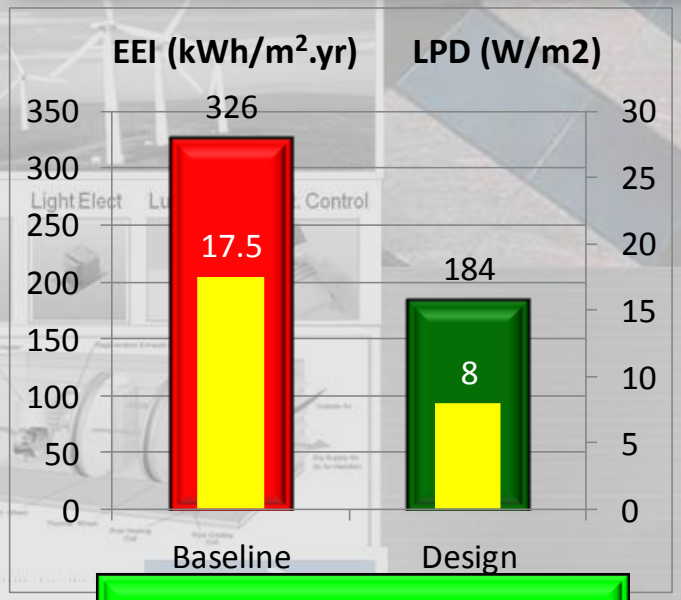
Design Recognition Award
GREENSHIP New Building
Achieved DR: Feb 2013

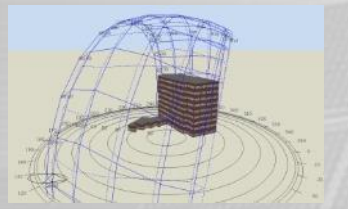
NARAMA

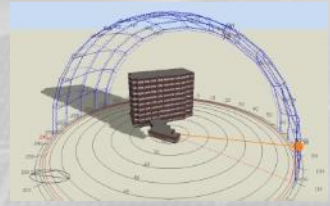


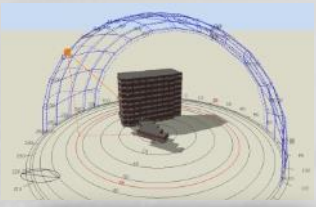
KOMBINASI 1	KOMBINASI 2	KOMBINASI 3
1. CLEAR GLASS INDOFLOT 8MM 2. SUPER SILVER EUROGREY 8MM (400 RB) 3. STOPSOL SUPERSILVERGREY 6MM+A12+PLANIBEL G 6MM (700-800 RB)	1. CLEAR GLASS INDOFLOT 8MM 2. SUPER SILVER EUROGREY 8MM (400 RB) 3. STOPSOL CLASSICGREEN 6MM+A12+PLANIBEL G 6MM (700-800 RB)	1. CLEAR GLASS INDOFLOT 8MM 2. STOPSOL CLASIC GREEN 8 MM (400 RB) 3. STOPSOL CLASSICGREEN 6MM+A12+PLANIBEL G 6MM (700-800 RB)
OTTV **31.33**	OTTV **30.04**	OTTV **29.07**
1→ U_1 5.19 ; SC_1 0,89 2→U_2 5.6 ; SC_2 0,49 3 →U_3 1,9 ; SC_3 0,38 Sumber : Asahimas	1→ U_1 5.19 ; SC_1 0.89 2→U_2 5.6 ; SC_2 0.49 3 →U_3 1,9 ; SC_3 0.28 Sumber : Asahimas	1→ U_1 5.19 ; SC_1 0.89 2→U_2 5,7 ; SC_2 0.4 3 →U_3 1,9 ; SC_3 0.28 Sumber : Asahimas

KOMBINASI 4	KOMBINASI 5	KOMBINASI 6
1. CLEAR GLASS INDOFLOT 8MM 2. SUPERSILVER EUROGREY 8MM (400 RB) 3. SUPER SILVER EUROGREY 6mm +PVB 0.38+PLANIBEL G 6mm	1. CLEAR GLASS INDOFLOT 8MM 2. SUPERSILVER EUROGREY 8MM (400 RB) 3. STOPSOL CLASSIC GREEN 6mm +PVB 0.38+PLANIBEL G 6mm	1. CLEAR GLASS INDOFLOT 8MM 2. STOPSOL CLASIC GREEN 8 MM (400 RB) 3. STOPSOL CLASSIC GREEN 6mm +PVB 0.38+PLANIBEL G 6mm
OTTV **32.82**	OTTV **31.53**	OTTV **30.56**
1→ U_1 5.19 ; SC_1 0,89 2→U_2 5.6 ; SC_2 0,49 3 →U_3 3.6 ; SC_3 0,43 Sumber : Asahimas	1→ U_1 5.19 ; SC_1 0.89 2→U_2 5.6 ; SC_2 0.49 3 →U_3 3.6 ; SC_3 0.33 Sumber : Asahimas	1→ U_1 5.19 ; SC_1 0.89 2→U_2 5.7 ; SC_2 0.4 3 →U_3 3.6 ; SC_3 0.33 Sumber : Asahimas

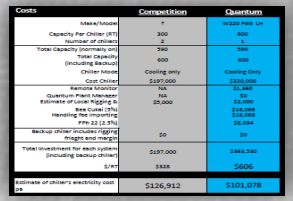


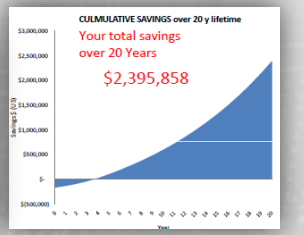






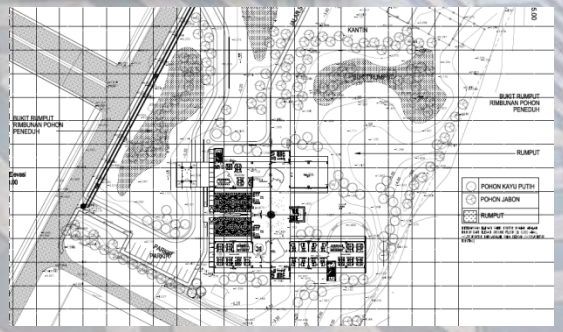
Financial Summary	
Savings p.a. (only electricity, in year 1)	$25,834
% savings electrical	19%
Culmulative Savings over 20 Y life	$2,395,858
Dynamic Payback (based on energy and maintance savings over 20 Y)	3.5

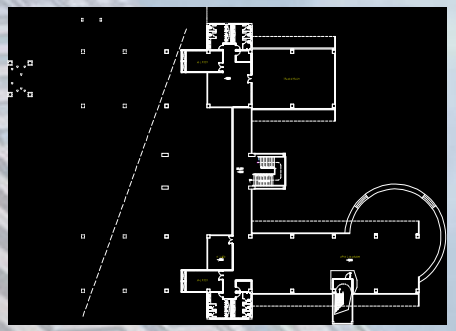




Platinum - Target

Design Recognition Award
GREENSHIP New Building
Construction Started: Dec 2012

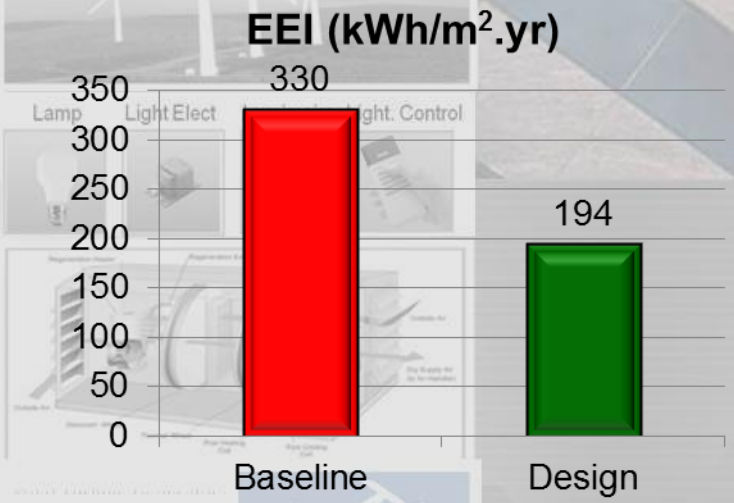




		Perkantoran	Hotel	Apartemen	Mall	Rumah Sakit	
	Standar 100%	50	250	120	5	500	POINT
	Satuan:	Liter/pegawai. hari	Liter/tempat tidur.hari	Liter/penghuni. hari	Liter/m².hari	Liter/tempat tidur pasien.hari	
Reduksi setiap 5%	>75%-80%	>37.5-40	>187.5-200	>90-96	>3.75-4	>375-400	1
	>70%-75%	>35-37.5	>175-187.5	>84-90	>3.5-3.75	>350-375	2
	>65%-70%	>32.5-35	>162.5-175	>78-84	>3.25-3.5	>325-350	3
	>60%-65%	>30-32.5	>150-162.5	>72-78	>3-3.25	>300-325	4
	>55%-60%	>27.5-30	>137.5-150	>66-72	>2.75-3	>275-300	5
	>50%-55%	>25-27.5	>125-137.5	>60-66	>2.5-2.75	>250-275	6
	>45%-50%	>22.5-25	>112.5-125	>54-60	>2.25-2.5	>225-250	7
	≤ 45%	≤22.5	≤112.5	≤54	≤2.25	≤225	8

Contoh :
Bangunan perkantoran pemakaian air 28 lt/pegawai/hari ----- point = 5

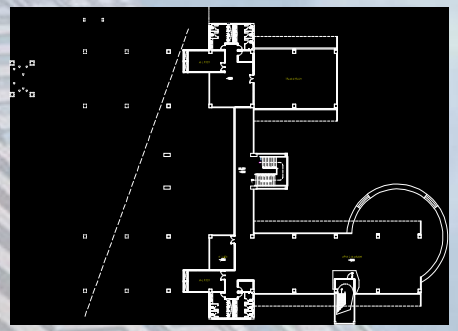
SNI 03-7065-2005

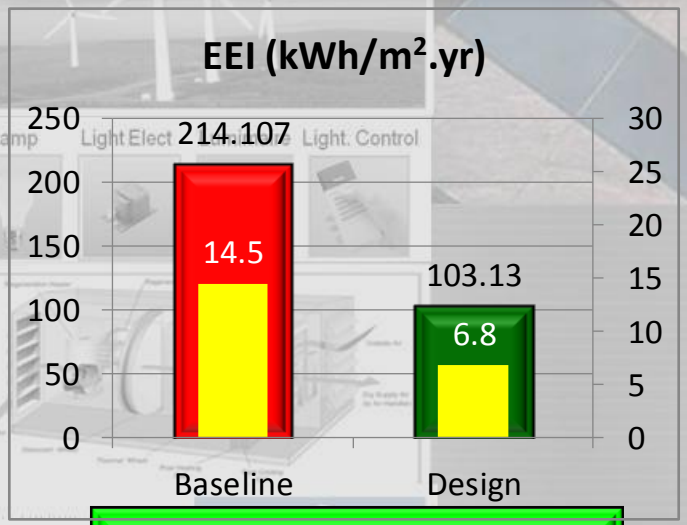


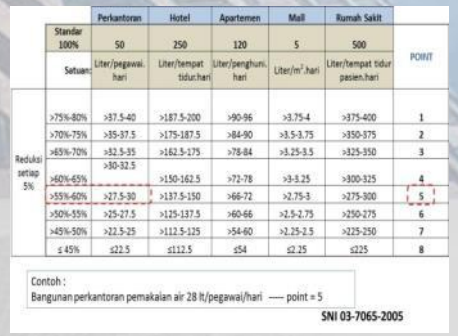
Saving 41.2%

Platinum - Target

Design Recognition Award
GREENSHIP New Building
Construction started: Dec 2012







	Perkantoran	Hotel	Apartemen	Mall	Rumah Sakit	
Standar 100%	50	250	120	5	500	POINT
Satuan	Liter/pegawai. hari	Liter/tempat tidur.hari	Liter/penghuni. hari	Liter/m².hari	Liter/tempat tidur pasien.hari	
Reduksi setiap 5%	>75%-80%	>37.5-40	>187.5-200	>90-96	>3.75-4	>375-400	1
	>70%-75%	>35-37.5	>175-187.5	>84-90	>3.5-3.75	>350-375	2
	>65%-70%	>32.5-35	>162.5-175	>78-84	>3.25-3.5	>325-350	3
	>60%-65%	>30-32.5	>150-162.5	>72-78	>3-3.25	>300-325	4
	>55%-60%	>27.5-30	>137.5-150	>66-72	>2.75-3	>275-300	5
	>50%-55%	>25-27.5	>125-137.5	>60-66	>2.5-2.75	>250-275	6
	>45%-50%	>22.5-25	>112.5-125	>54-60	>2.25-2.5	>225-250	7
	≤ 45%	≤22.5	≤112.5	≤54	≤2.25	≤225	8

Contoh :
Bangunan perkantoran pemakaian air 28 lt/pegawai/hari ---- point = 5

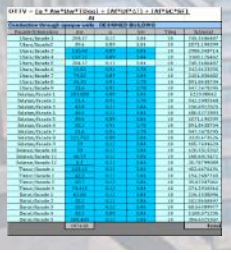
SNI 03-7065-2005

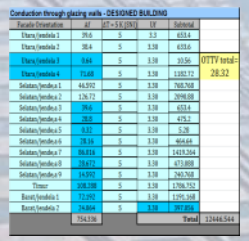
444

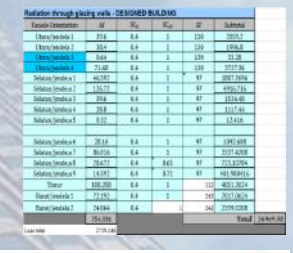
Wisma Pusdiklat KEBTKE

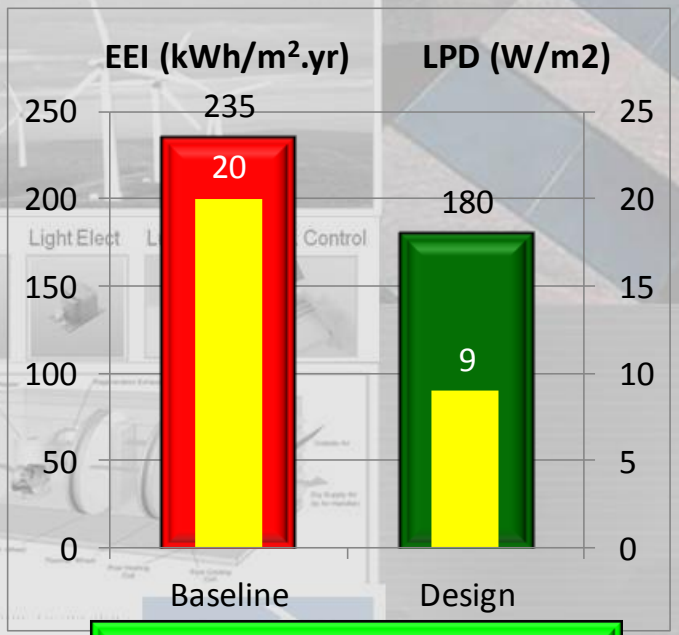
Platinum - Target

Design Recognition Award
GREENSHIP New Building
Construction Started : Dec 2012

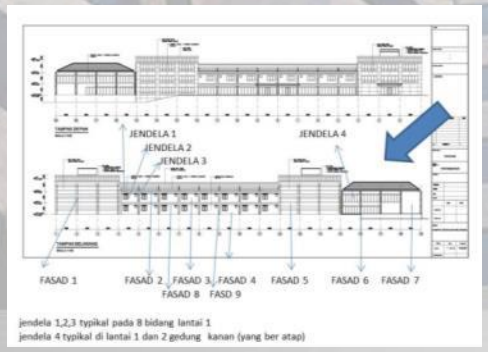




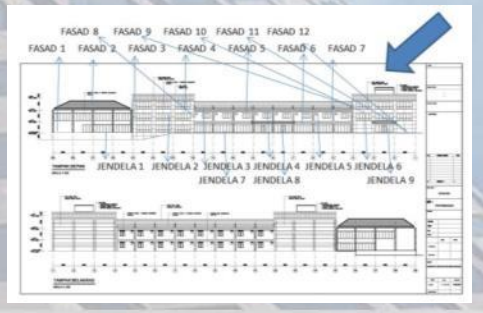




Penghematan 23,4%



jendela 1,2,3 typikal pada 8 bidang lantai 1
jendela 4 typikal di lantai 1 dan 2 gedung kanan (yang ber atap)



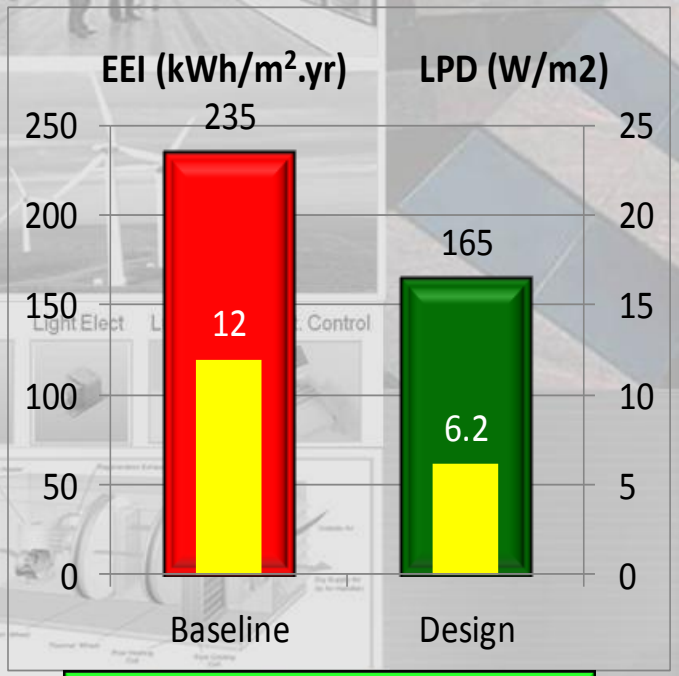
Salah satu upaya untuk mengurangi limpasa air pada saat hujan adalah dengan menggunakan cukup banyak tanaman rerumputan resapan air

Penggunaan design penunjang drainase juga dapat dilakukan dengan menyediakan grass block di area parkir motor kendaraan, sehingga terjadi resapan air yang seimbang di wilayah tapak

Office and Gallery
Kota Baru Parahyangan

Platinum - Target

Design Recognition Award
GREENSHIP New Building
Construction started: August 2013



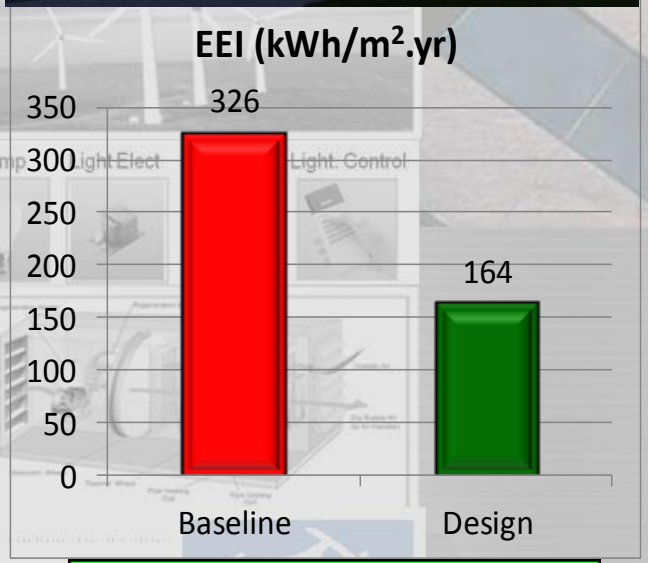
Penghematan 29,8%

TELKOM LANDMARK TOWER

Platinum - Target

Design Recognition Award
GREENSHIP New Building
Construction Started: Feb 2013

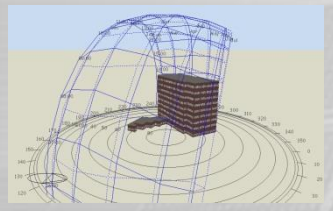
NARAMA

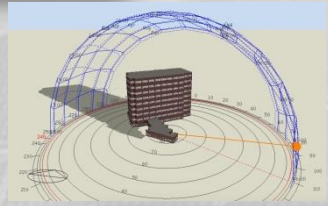


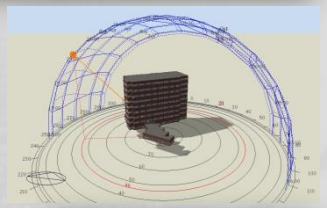
Saving 43.6%

KOMBINASI 1	KOMBINASI 2	KOMBINASI 3
1. CLEAR GLASS INDOFLOT 8MM 2. SUPER SILVER EUROGREY 8MM (400 RB) 3. STOPSOL SUPERSILVERGREY 6MM+A12+PLANIBEL G 6MM (700-800 RB)	1. CLEAR GLASS INDOFLOT 8MM 2. SUPER SILVER EUROGREY 8MM (400 RB) 3. STOPSOL CLASSICGREEN 6MM+A12+PLANIBEL G 6MM (700-800 RB)	1. CLEAR GLASS INDOFLOT 8MM 2. STOPSOL CLASIC GREEN 8 MM (400 RB) 3. STOPSOL CLASSICGREEN 6MM+A12+PLANIBEL G 6MM (700-800 RB)
OTTV **31.33**	OTTV **30.04**	OTTV **29.07**
1→ U_i 5.19 ; SC_s 0.89 2→ U_i 5.6 ; SC_s 0.49 3 →U_i 1.9 ; SC_s 0.38 Sumber : Asahimas	1→ U_i 5.19 ; SC_s 0.89 2→ U_i 5.6 ; SC_s 0.49 3 →U_i 1.9 ; SC_s 0.28 Sumber : Asahimas	1→ U_i 5.19 ; SC_s 0.89 2→ U_i 5.7 ; SC_s 0.4 3 →U_i 1.9 ; SC_s 0.28 Sumber : Asahimas

KOMBINASI 4	KOMBINASI 5	KOMBINASI 6
1. CLEAR GLASS INDOFLOT 8MM 2. SUPERSILVER EUROGREY 8MM (400 RB) 3. SUPER SILVER EUROGREY 6mm +PVB 0.38+PLANIBEL G 6mm	1. CLEAR GLASS INDOFLOT 8MM 2. SUPERSILVER EUROGREY 8MM (400 RB) 3. STOPSOL CLASSIC GREEN 6mm +PVB 0.38+PLANIBEL G 6mm	1. CLEAR GLASS INDOFLOT 8MM 2. STOPSOL CLASIC GREEN 8 MM (400 RB) 3. STOPSOL CLASSIC GREEN 6mm +PVB 0.38+PLANIBEL G 6mm
OTTV **32.82**	OTTV **31.53**	OTTV **30.56**
1→ U_i 5.19 ; SC_s 0,89 2→ U_i 5.6 ; SC_s 0,49 3 →U_i 3.6 ; SC_s 0,43 Sumber : Asahimas	1→ U_i 5.19 ; SC_s 0.89 2→ U_i 5.6 ; SC_s 0.49 3 →U_i 3.6 ; SC_s 0.33 Sumber : Asahimas	1→ U_i 5.19 ; SC_s 0.89 2→ U_i 5.7 ; SC_s 0.4 3 →U_i 3.6 ; SC_s 0.33 Sumber : Asahimas

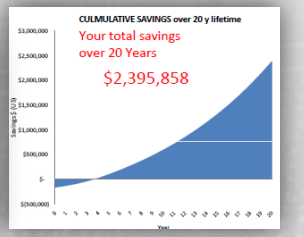






Financial Summary	
Savings p.a. (only electricity, in year 1)	$25,834
% savings electrical	19%
Culmulative Savings over 20 Y life	$2,395,858
Dynamic Payback (based on energy and maintance savings over 20 Y)	3.5

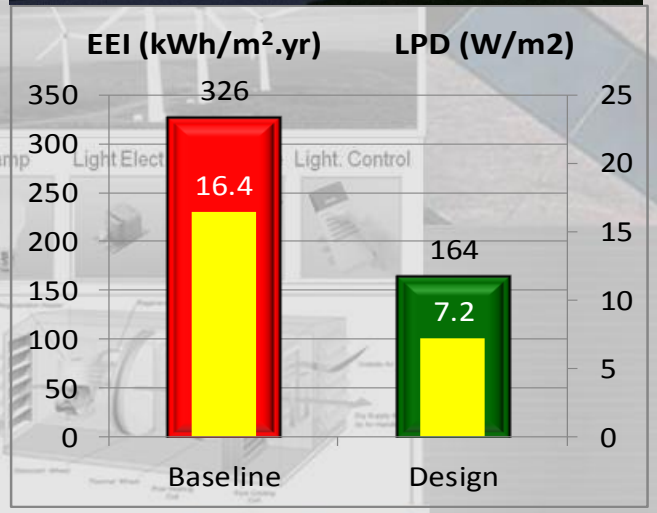
Costs	Competition	Quantum
Make/Model	?	W220 Pack LH
Capacity Per Chiller (RT)	300	600
Number of chillers	2	1
Total Capacity (normally on)	590	590
Total Capacity (including Backup)	600	600
Chiller Mode	Cooling only	Cooling Only
Cost Chiller	$197,000	$220,000
Remote Monitor	NA	$1,940
Quantum Plant Manager	NA	$0
Estimate of Local Rigging & Sea Cukai (5%)	$5,000	$2,000
Handling fee importing		$16,068
PPh 22 (2.5%)		$16,068
		$6,034
Backup chiller includes rigging, freight and margin	$0	$0
Total investment for each system (including backup chiller)	$197,000	$242,540
$/RT	$328	$605
Estimate of chiller's electricity cost pa	$126,912	$101,078



TELKOM LANDMARK TOWER

Platinum - Target

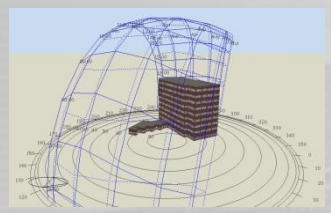
Design Recognition Award
GREENSHIP New Building
Construction Started: Feb 2013

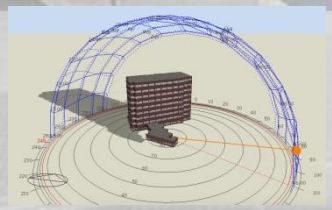


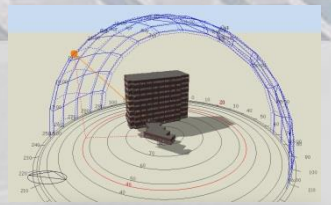
Penghematan 49.7%

KOMBINASI 1	KOMBINASI 2	KOMBINASI 3
1. CLEAR GLASS INDOFLOT 8MM 2. SUPER SILVER EUROGREY 8MM (400 RB) 3. STOPSOL SUPERSILVERGREY 6MM+A12+PLANIBEL G 6MM (700-800 RB)	1. CLEAR GLASS INDOFLOT 8MM 2. SUPER SILVER EUROGREY 8MM (400 RB) 3. STOPSOL CLASSICGREEN 6MM+A12+PLANIBEL G 6MM (700-800 RB)	1. CLEAR GLASS INDOFLOT 8MM 2. STOPSOL CLASIC GREEN 8 MM (400 RB) 3. STOPSOL CLASSICGREEN 6MM+A12+PLANIBEL G 6MM (700-800 RB)
OTTV **31.33**	OTTV **30.04**	OTTV **29.07**
1→ U_i 5.19 ; SC_q 0,89 2→U_i 5.6 ; SC_q 0,49 3 →U_i 1.9 ; SC_q 0,38 Sumber : Asahimas	1→ U_i 5.19 ; SC_q 0.89 2→U_i 5.6 ; SC_q 0.49 3 →U_i 1.9 ; SC_q 0.28 Sumber : Asahimas	1→ U_i 5.19 ; SC_q 0.89 2→U_i 5.7 ; SC_q 0.4 3 →U_i 1.9 ; SC_q 0.28 Sumber : Asahimas

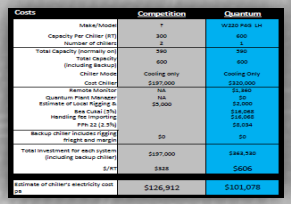
KOMBINASI 4	KOMBINASI 5	KOMBINASI 6
1. CLEAR GLASS INDOFLOT 8MM 2. SUPERSILVER EUROGREY 8MM (400 RB) 3. SUPER SILVER EUROGREY 6mm +PVB 0.38+PLANIBEL G 6mm	1. CLEAR GLASS INDOFLOT 8MM 2. SUPERSILVER EUROGREY 8MM (400 RB) 3. STOPSOL CLASSIC GREEN 6mm +PVB 0.38+PLANIBEL G 6mm	1. CLEAR GLASS INDOFLOT 8MM 2. STOPSOL CLASIC GREEN 8 MM (400 RB) 3. STOPSOL CLASSIC GREEN 6mm +PVB 0.38+PLANIBEL G 6mm
OTTV **32.82**	OTTV **31.53**	OTTV **30.56**
1→ U_i 5.19 ; SC_q 0,89 2→U_i 5.6 ; SC_q 0,49 3 →U_i 3.6 ; SC_q 0,43 Sumber : Asahimas	1→ U_i 5.19 ; SC_q 0.89 2→U_i 5.6 ; SC_q 0.49 3 →U_i 3.6 ; SC_q 0.33 Sumber : Asahimas	1→ U_i 5.19 ; SC_q 0.89 2→U_i 5.7 ; SC_q 0.4 3 →U_i 3.6 ; SC_q 0.33 Sumber : Asahimas

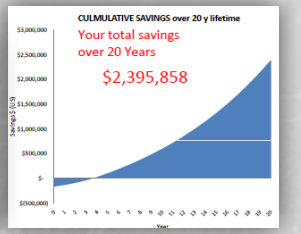






Financial Summary	
Savings p.a. (only electricity, in year 1)	$25,834
% savings electrical	19%
Culmulative Savings over 20 Y life	$2,395,858
Dynamic Payback (based on energy and maintance savings over 20 Y)	3.5

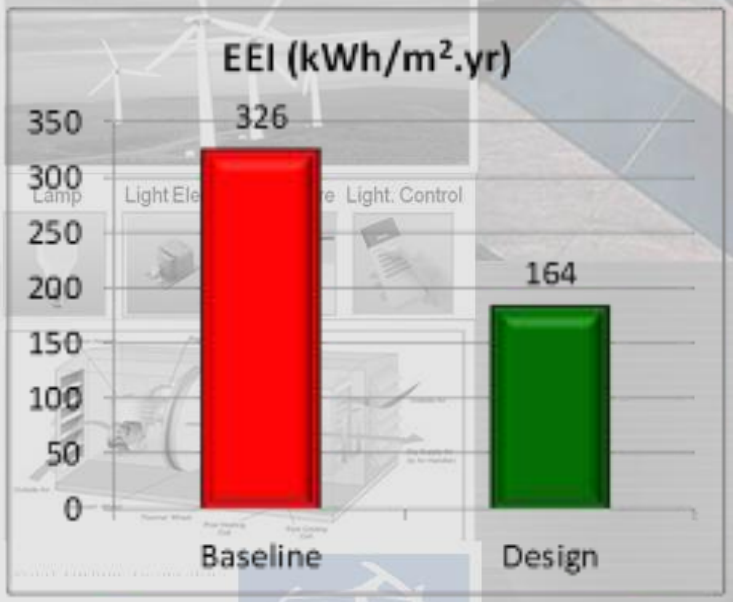




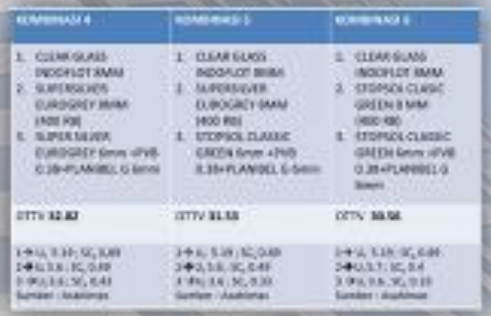
Telkom Landmark Tower

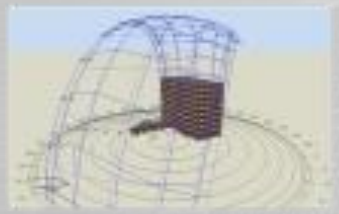
Platinum - Target

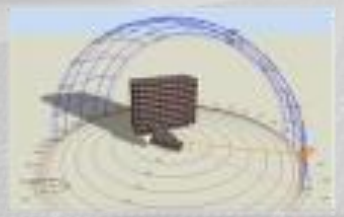
Design Recognition Award
GREENSHIP New Building
Dated: Dec 2012

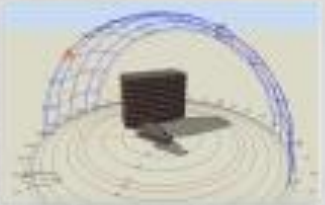


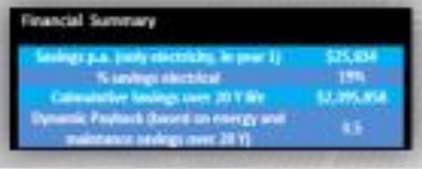
Saving 47.6%





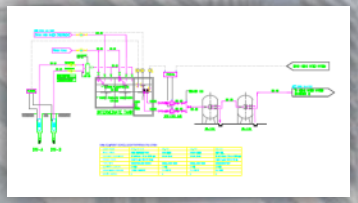
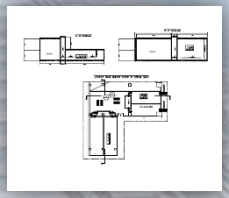
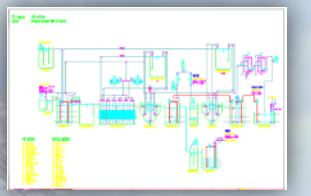
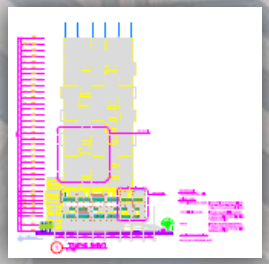


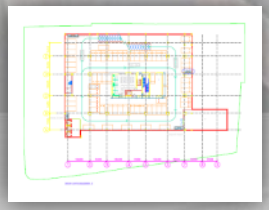
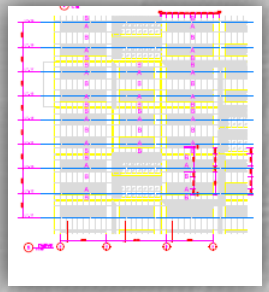


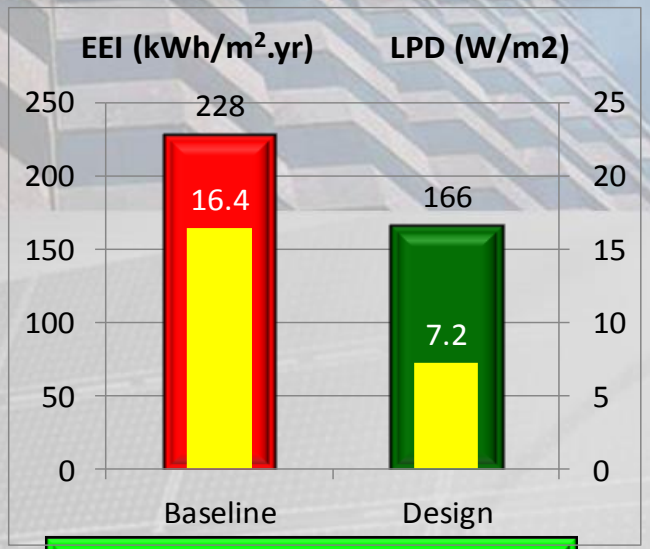


Platinum - Target

Design Recognition Award
GREENSHIP New Building
Construction Started: June 2013



Penghematan 29,6%

CONSTRUCTION PLANNING SERVICES
GREEN BUILDING CERTIFICATION
PERTAMINA ENERGY TOWER

PT. Narama Mandiri

Greenship Professional

WORLD GREEN BUILDING COUNCIL

NARAMA

GREEN BUILDING COUNCIL INDONESIA

To Sum up…

Environmental & Global Drivers: 1. Climate change; 2. Peak oil; 3. Energy security; 4. Water scarcity and cost, related health concerns; 5. Increasing cost and decreasing availability of raw materials; 6. Environmental impact of centralized power generation;

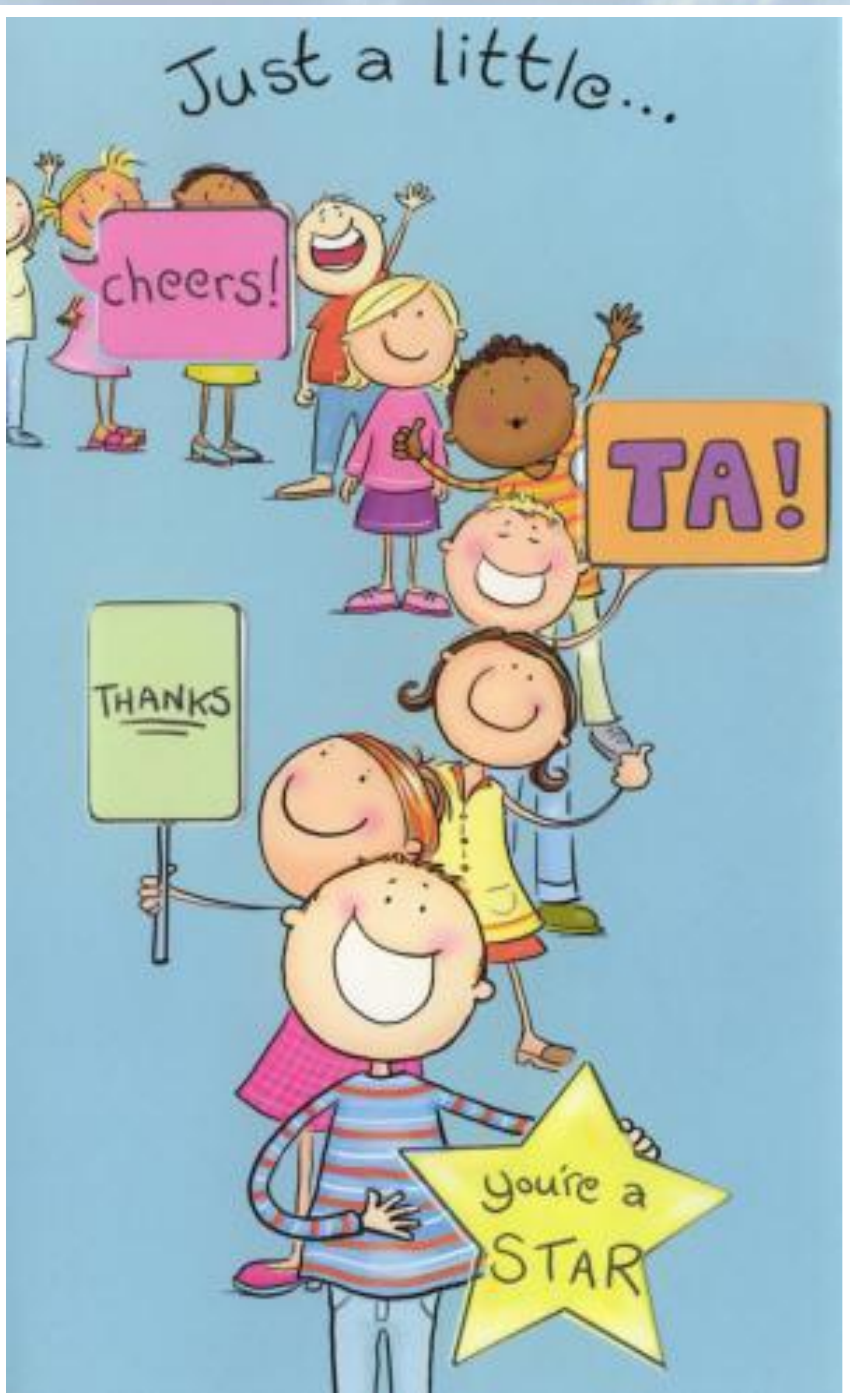
Market Drivers: 1. Increasing and uncertain future cost of electricity and gas; 2. Proliferation of consumer electronics (increased plug loads); 3. More and cheaper products due to globalization of manufacturing; 4. Increase in available funding for EE; 5. Increased adoption of Green Building; 6. Market awareness, utility demos and outreach; 7. Energy efficiency promoted through mainstream media

Behavior Drivers: 1. Consumer desire to be "green" and reduce embedded & used energy; 2. Consumer desire for comfort and aesthetics; 3. Personal energy independence/interest in living off the grid; 4. Increased awareness of impact of behavior on energy usage; 5. People like cool, new technologies; 6. People more "plugged in" electronically, digital information, social networking

Policy & Regulatory Drivers: 1. Carbon emissions penalties and/or incentives; 2. Use of codes and standards to lock in efficiency gains; 3. Increasing budgets for emerging technology R&D; 5. Integrated resource planning; 6. Increased interest among legislators in efficiency and renewables; 7. Limits to existing transmission and generation capacity; 8. Smart grid technology development

Technology Innovation Drivers: 1. Integration of info, communication & entertainment devices; 2. Availability of new technologies such as solid state lighting; 3. Availability of cross-cutting, low-cost technology building blocks

Thank you for your attention



NARAMA