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Indonesia Hotel Energy Benchmarking and Strategic Energy Management Pilot Program

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Today's Agenda

1. **Background and Context**
2. Introduction to Benchmarking and Energy Management
3. Success Stories
4. Overview of the Program
5. Benefits for Participants
6. How to Participate
7. Q&A

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The Equation

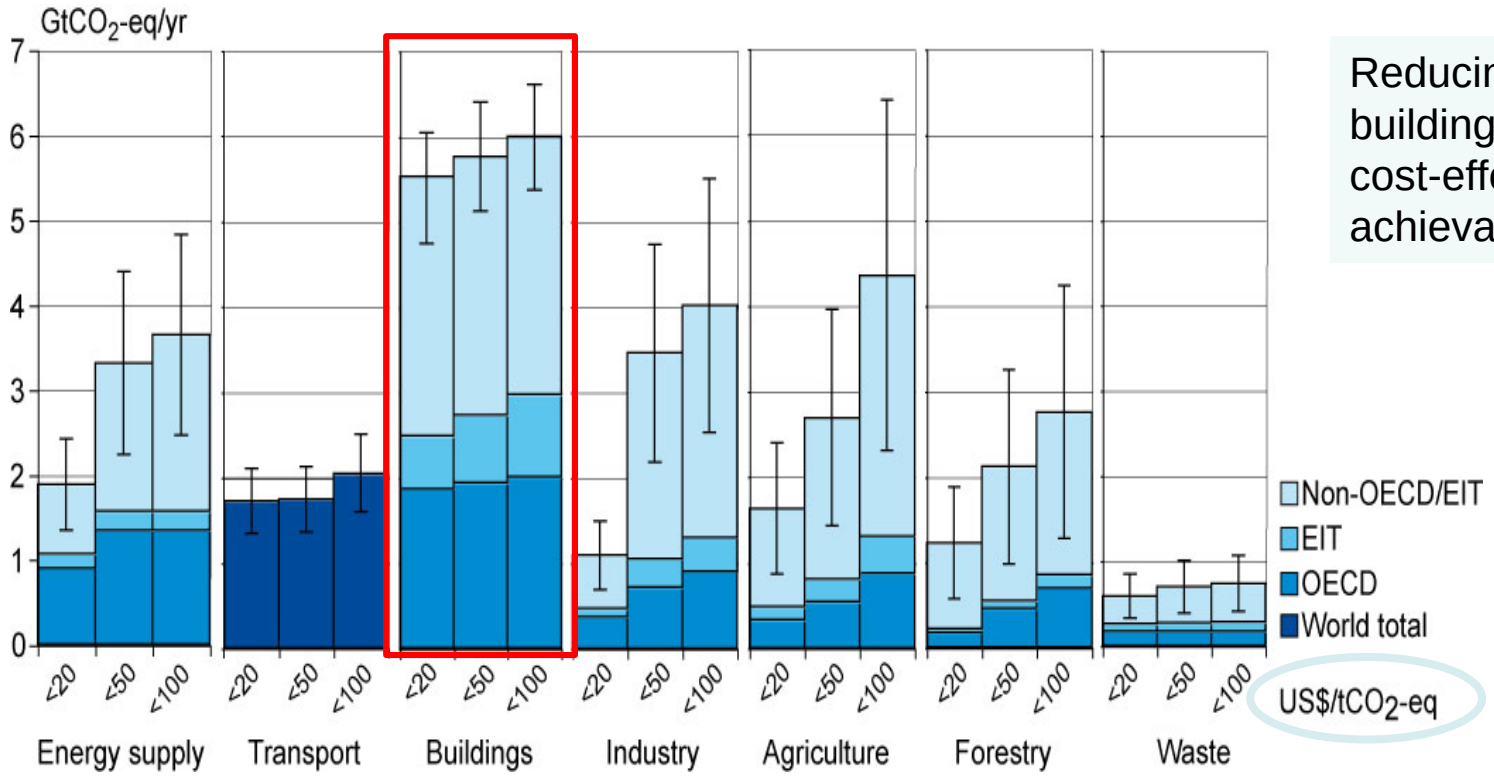
Buildings =

Energy Consumption =

Burning Fossil Fuel =

CO_2 Emissions

Building Energy Use and Impacts: Highest Potential for Reductions Across Key Sectors

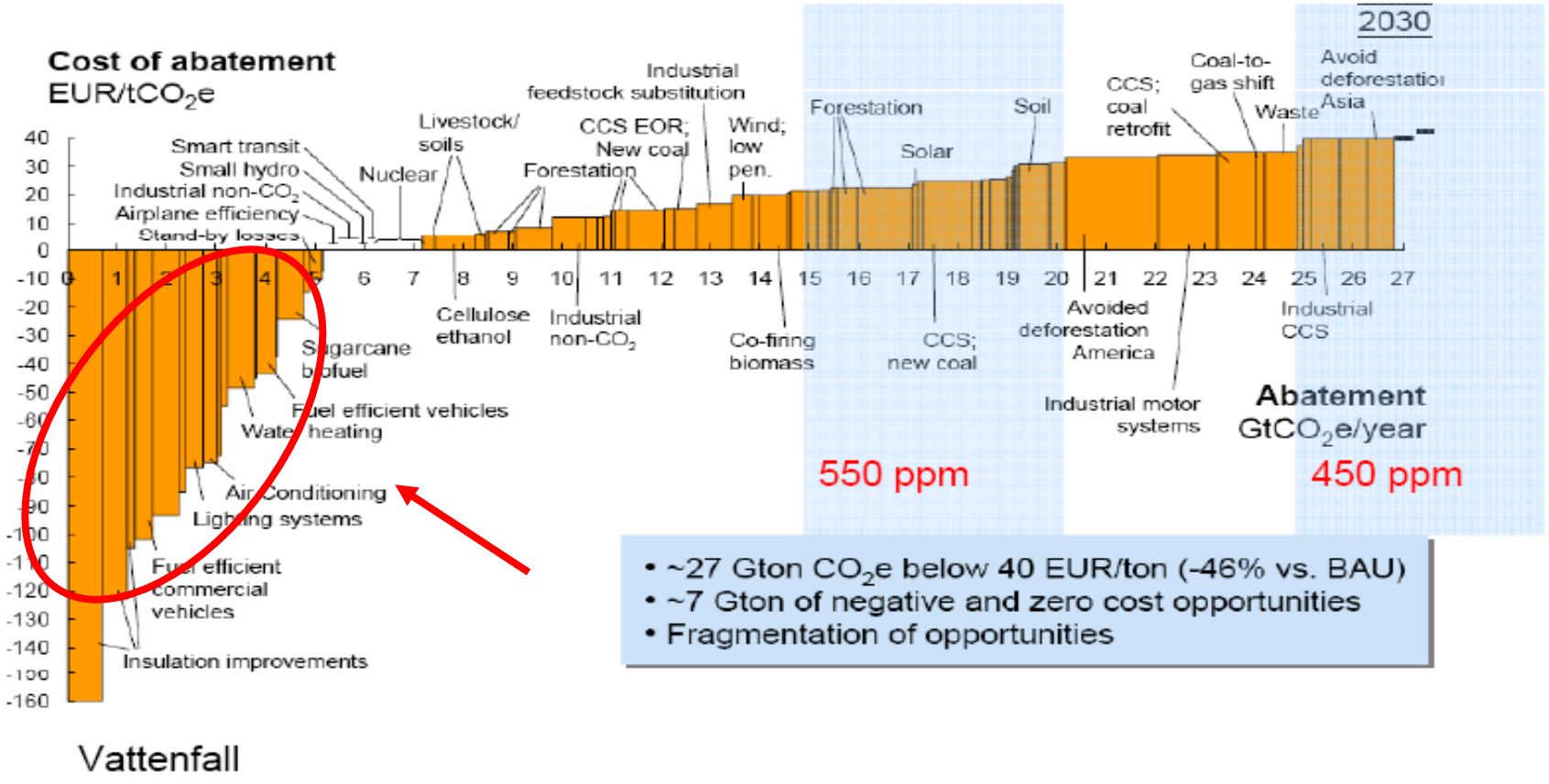


Reducing Impacts from buildings is also the most cost-effective and achievable

Cumulative Mitigation Potentials in 2030 as a Function of Cost across Sectors

*"Non-OECD/EIT" categorizes countries that are not part of the Organization for Economic Cooperation and Development (OECD) and are not Economies in Transition (EIT)

Most of the low cost options for reducing GHG emissions are for buildings.



Vattenfall

Rapid and Expected Continued Growth in Indonesian Building Sector

- The Indonesian buildings sector is among the largest and fastest growing in Asia –comprised of 37,827 commercial and residential buildings.

- Average annual construction expenditure growing at an estimated 15% per year since 2004.

- The Indonesian building sector currently accounts for **20% of total final energy consumption in the country**, and this figure is expected to grow rapidly as more buildings are constructed.

Jakarta, Indonesia Skyline

Rapid and Expected Continued Growth for the Indonesian Hotel Sector

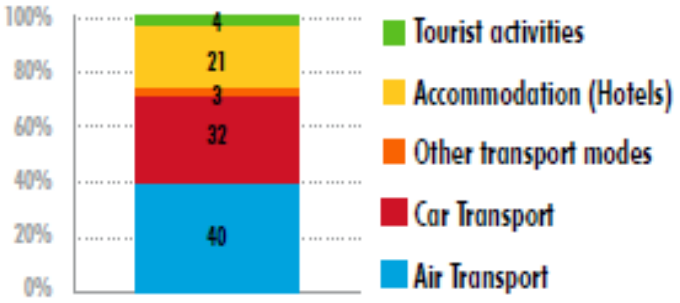
- Since 2006, the Indonesia hotel sector has been at the forefront of growth in Southeast Asia, experiencing steady growth with annual increases of visitors between **9% and 13%.**
- Foreign investments in the tourism sector in Indonesia reached **US$7.3 billion** for the first nine months of 2012.
- Indonesia has now become a destination which **provides hotel developers and chains with significant opportunities for growth**.

Horwath 2012 Indonesia Hotel Industry Study

Tourism's Symbiotic Relationship with the Environment

- With its close connections to the environment, tourism is considered to be a **highly climate-sensitive economic sector**.
- At the same time, the hospitality sector is a **huge consumer of energy and a major contributor of GHG emissions**, resulting in climate change.
  - Tourism is responsible of about **5% of global CO_2** emissions.
  - The accommodation sector accounts for approximately 20% of emissions from tourism, or **1% of global CO_2 emissions**.

Action	CO_2 (Mt)
Air transport	517
Other transport modes	468
Accommodation (Hotels)	274
Tourist activities	45
Total emissions on tourism	1.307
Total emissions of the planet	26.400
Contribution of tourism to the total emissions	4,95%



http://www.travelandtourworld.com/news/article/global-warming-threatens-tourism/

Data Source: Horwath and PHRI Annual Energy Benchmarking Survey

Category	Specific Data Points Required for Benchmarking
Annual Hotel Energy Use / Cost Data	- Electricity; Natural gas; Liquefied Petroleum Gas; Gasoline, Diesel Fuel.
Annual Water Use / Cost Data	- Water consumption; reclaimed water consumption.
Hotel Attribute Data	- Star rating; - Gross floor area; - No. of floors; - No. of guest rooms; - No. of employees on main shift; - Occupancy rates; - Year hotel built; - Year or last major renovation / rebranding; - % of floor space cooled; - Amenities (spa, restaurant, retail stores, etc.) and floor area of amenities; - No. of walk-in, open, and closed refrigeration units; and - Size of indoor/outdoor swimming pool(s).

ENERGY BENCHMARKING I *BAROMETER ENERGI*

Q.27 Percentage of floor space heated/cooled I
Persentase area yang menggunakan pemanas/ pendingin udara:

Percentage of floor space heated I
Persentase area yang menggunakan pemanas:
Percentage of floor space cooled I
Persentase area yang menggunakan pendingin:

Q.29 Number of commercial refrigeration units I
Jumlah lemari pendingin yang ada di hotel anda?

Type I *Tipe*	Numbers I *Jumlah*
Walk-In I *Bisa Dimasuki*	
Open I *Terbuka*	
Closed I *Tertutup*	
Total I *Jumlah*	-

Q.28 Heating/Cooling degree days and temperatures (celcius) I
Lama penggunaan pemanas/ pendingin udara & temperat

	No. of Days I	Temperature I
Heating I *Pemanas*		
Cooling I *Pendingin*		

Q.30 Please specify the type and size of the public pools in the hotel (if they exist in the hotel) I *Mohon jabarkan tipe dan luas kolam renang yang ada di hotel anda (jika*

Type I *Tipe*	Size I Ukuran
Indoor I Di *Dalam Ruangan*	
Outdoor I *Di Luar Ruangan*	

Q. 31 Please provide 12 months or 1 year of energy consumption and cost data for all types (electricity, natural gas, steam, water etc.), including the units I *Mohon jabarkan konsumsi energi (termasuk listrik, gas, uap, air, dll.) dan biaya yang dikeluarkan selama 12 bulan atau 1tahun penuh:*

Type I *Tipe*	Units I Satuan	Consumption I	Cost I *Biaya*
Electricity I *Listrik*			
Natural Gas I *Gas Alam*			
Steam I *Uap*			
Hot Water I *Air panas*			
Chilled Water I *Air dingin*			
Recycle Water I *Air daur ulang*			
Other Fuel I *Bahan bakar lain*			

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Indonesia FY2012 Hotel Data Set

Total # of Hotels		Star Category Breakdown		
Country Zone	# of Hotels	5-Star	4-Star	3-Star
Bali	48	27	18	3
Bandung	6	2	4	0
Banten	5	2	2	1
Jakarta	36	12	16	8
Kalimantan	6	0	5	1
Lombok	4	1	3	0
Semarang	6	2	0	4
Sulawesi	5	2	1	2
Sumatera	14	2	3	9
Surabaya	7	2	1	4
West Java	7	2	4	1
Ypgya/Solo	14	6	5	3
Total	**158**	**60**	**62**	**36**

Energy and Cost Intensity Spread

Energy and Cost Intensity Spread	Entire Portfolio 2013	5-Star	4-Star	3-Star
Energy Intensity Spread Between Top and Poor Performers (GJ/SM)	199%	199%	199%	155%
Cost Intensity Spread Between Top and Poor Performers (USD/SM)	195%	195%	193%	171%

Among all classes of Indonesian hotels surveyed in 2013 (5-Star to 3-Star), there is a large spread (i.e., performance variance) in energy use and cost intensity performance.

The wide range in energy and cost intensity performance, even among hotels of the same star category, is consistent with ICF findings globally.

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What is Top Energy Performance?

Top Energy Performance (Top 25%)	Entire Portfolio
Average Top Quartile Energy Intensity (GJ/SM)	0.29
Average Top Quartile Cost Intensity (USD/SM)	8.73

Hotels with energy intensity between 0.05 GJ/SM and 0.54 GJ/SM as among the top quartile, or top 25%, of those surveyed.

Top performing hotels in 2013 use approximately 83% less energy per square meter, and spend 59% USD less per square meter, than average hotels in Indonesia.

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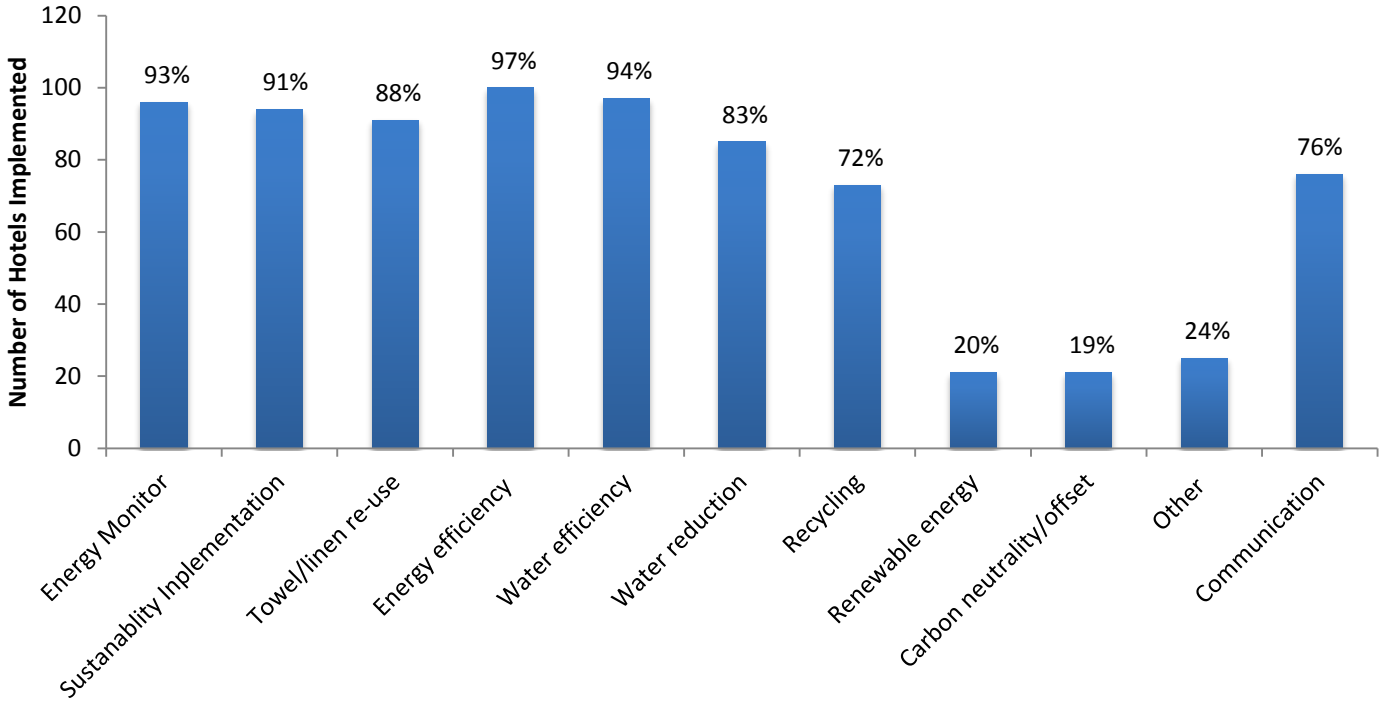
How Indonesia Hotels Compare to those in the US?

	Entire Portfolio	5-Star	4-Star	3-Star
Indonesian Hotel Average Portfolio Energy Intensity (GJ/SM)	1.73	2.16	0.84	1.13
CBECS Hotel Energy Intensity	1.14	n/a	n/a	n/a

On average, 2013 Horwath hotels surveyed in Indonesia use approximately 52% more energy per square meter than hotels operating in the US.

These findings are based on comparisons to the US Department of Energy quadrennial Commercial Buildings Energy Consumption Survey (CBECS) for lodging

Sustainability Measures for Indonesian Hotels



Among the most widely implemented measures were:

- Energy efficiency measures (97%)
- Water efficiency measures (94%)
- Energy monitoring (93%)

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Indonesia Opportunity

- Through improved energy efficiency at 1,000 hotels in Indonesia, annual energy, cost, and carbon savings could equate to the following:

Total Annual Energy Savings	533,166,666 kilowatt hours (kWh)
Total Annual Energy Cost Savings	IDR 388,678,500,002 (US$ 38,867,850)
Total Annual GHG Emissions Reductions	381,214 $MtCO_2e$
Estimated Annual New Trees Planted	9.7 million

Assumes average energy use intensity of 192.94 gigajoules / room (or 53,594 kWh / room) for Indonesian hotels based on Horwath HTL 2011 data. Assumes 1,000 hotels reduce energy usage by 10% annually through no-/low-cost O&M measures. ICF experience working in 10,000 properties in Asia shows that 10% annual energy savings is achievable through O&M.

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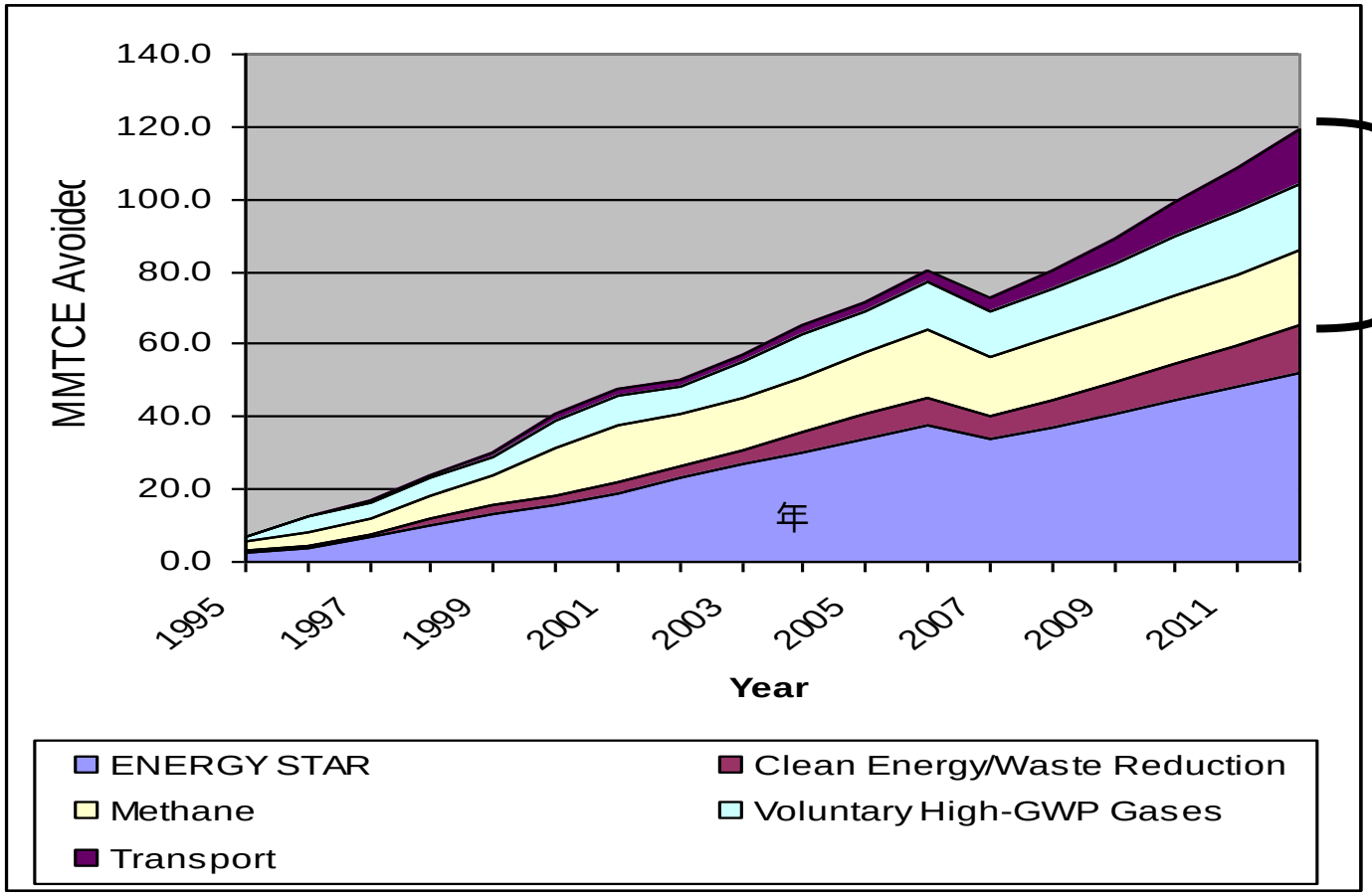
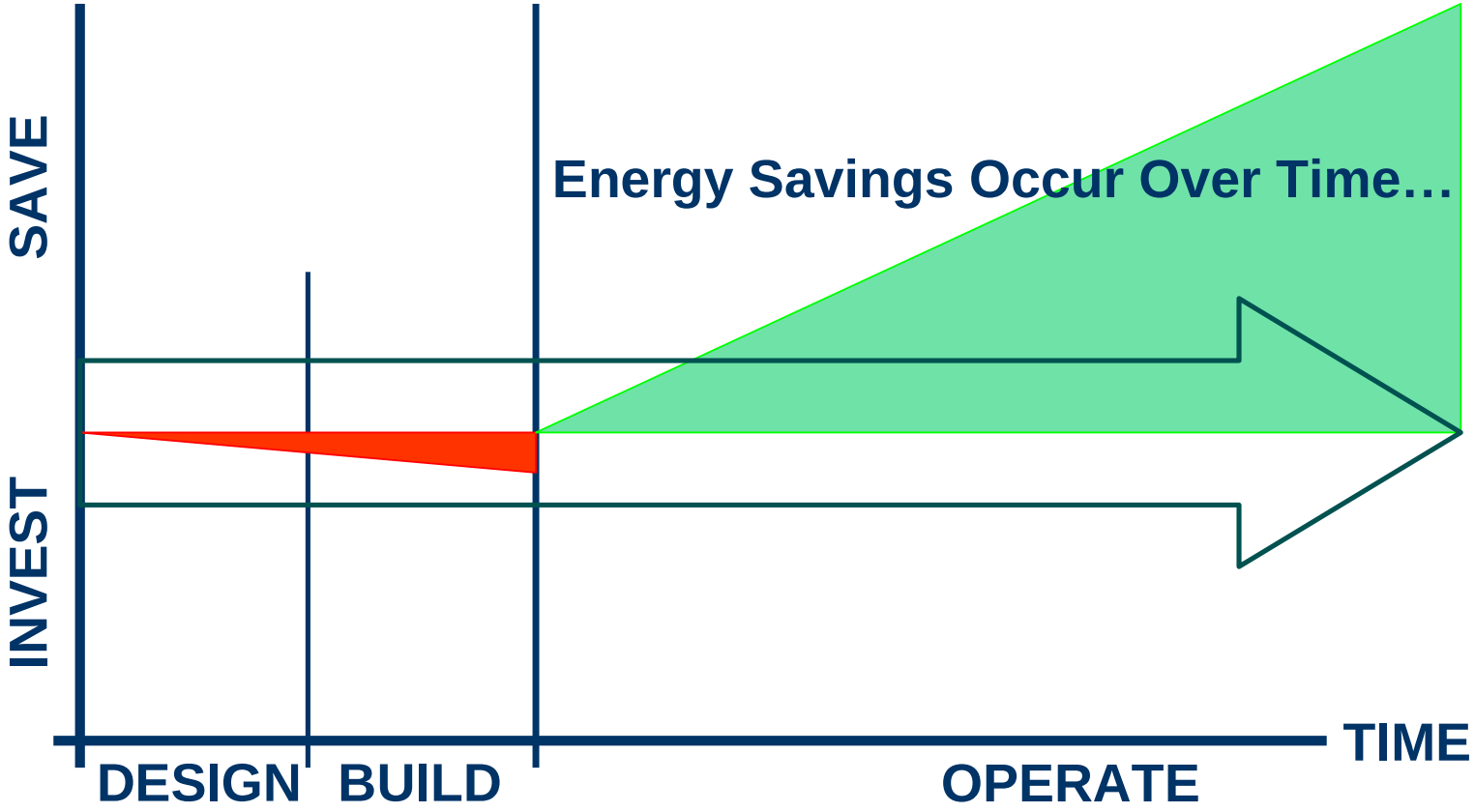
EPA ENERGY STAR Success



ENERGY STAR has delivered massive energy savings over time, and is considered the most successful program of its kind

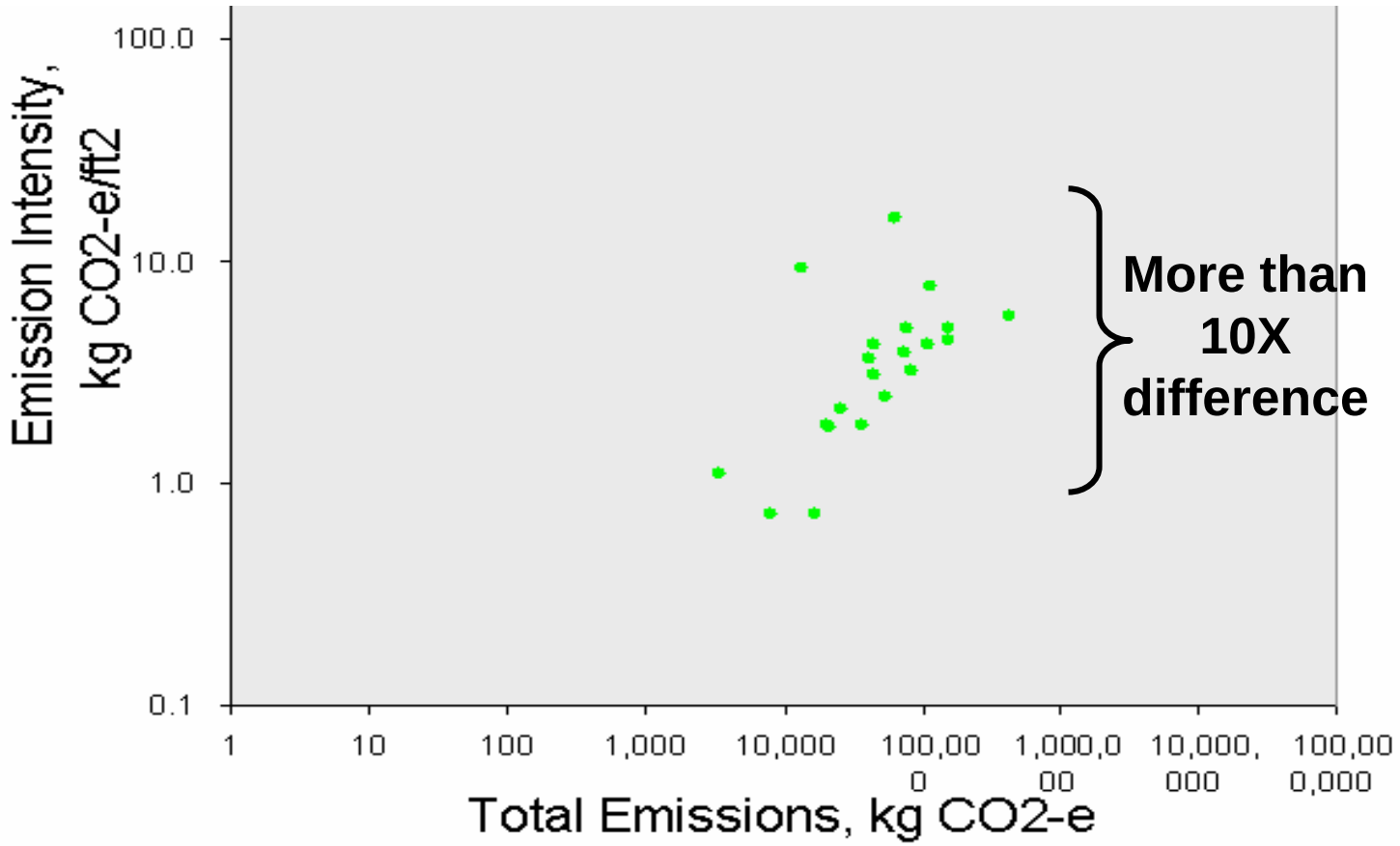
Why Do Existing Buildings Matter?

No energy is saved until a building is operating – even in buildings designed for high levels of efficiency.



Buildings Vary Widely in Energy Performance

Even "homogenous" building types that should use similar amounts of energy can have large differences



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Technology ≠ Performance

- 60% fan systems oversized by 60%.
- Chillers oversized 50% to 200%.
- Improper installation and poor maintenance.
- Buildings can exceed code, but not perform as intended.
- "Class of 1999, 2000, and 2001" research found technology is not driving great performance.

Source: EPA Fan Study & Chillers - Lawrence Berkeley National Laboratory

Green Design Case Study –

A disconnect between designers and building operators

- Modern, new, high profile R&D site.
- Well known “green” designer.
- Award winning design (in US).
- Daylit design (atria, clerestories, operable shading inside and out).

yet….

- All lights on, shades up.
- “*This is not an efficient building*.”
- Now, culture and operation change issue, not technology issue…
- “*Turn off the lights*” is the wrong approach.

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What Has Experience Shown Us

- Experience in Asia working with approximately 10,000 buildings property managers across 15 cities.
- ***Buildings that benchmark and implement simple no-/low-cost O&M measures can reduce energy use by 10-20% annually***.
- These buildings do not need to purchase new equipment to achieve these savings.

USAID US-China Sustainable Buildings Partnership

- Trained 4,665 engineers and 8,812 buildings from 2008 to 2012
- Reduced energy consumption by 3.4 billion kWh, saving $ 465.7 million in energy costs, and reducing GHG emissions equivalent to planting 72.5 million new trees!

Through the end of 2017, the program's total impact is estimated at 7.1 million MtCO2e avoided, equivalent to planting 181.9 million new trees!

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What is a “Benchmark?”

- **Relative ranking** based on energy performance. It provides a comparison between your building against other similar buildings.
- **Normalizes for key drivers of energy usage** (such as weather, climate, occupancy, and operating conditions), which are outside the owner’s or manager’s control, so that buildings’ energy performance can be fairly compared.
- Provides a **numerical common met**ric to allow for buildings to compare energy use in an easy to understand format.
- Can provide the foundation for a **certification program**, to support national regulations, or “voluntary” market-based programs.

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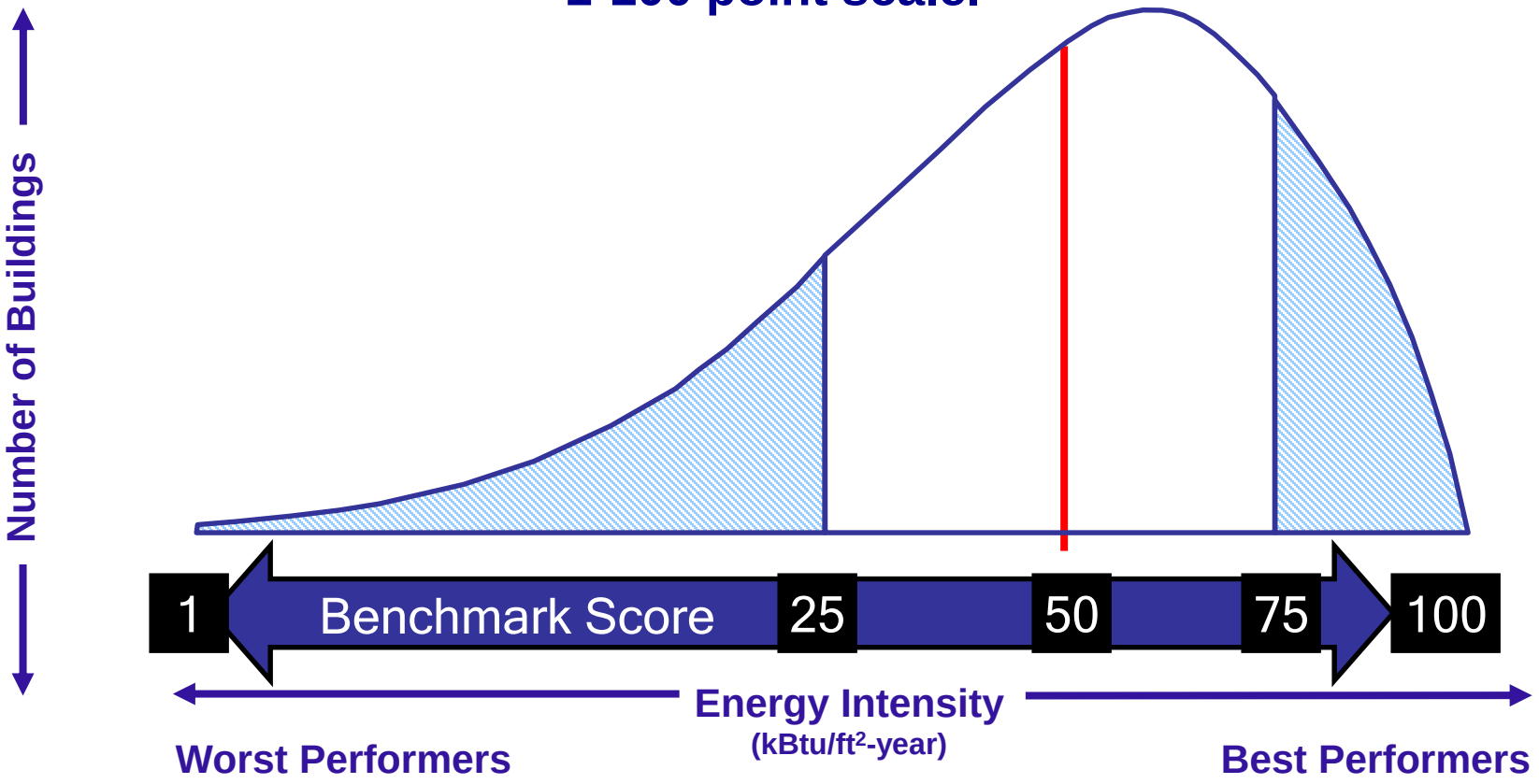
The Indonesian, US, and Chinese Benchmarking Systems use a 1-100 point scale.



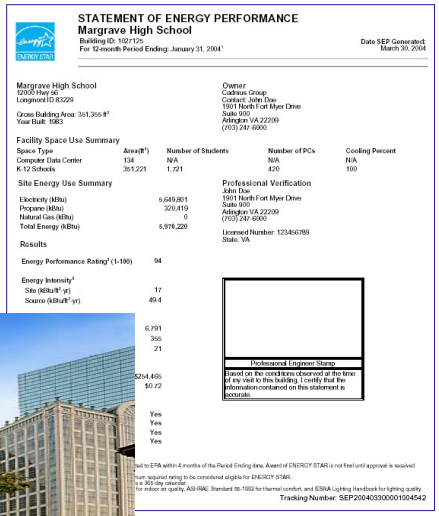
Is Your Building Performing Well?

The Importance of Clear, Understandable Metrics

Fuel Efficiency

Km per Liter of Petrol

Is 250 kWh/SM/YR high or low for a building?



STATEMENT OF ENERGY PERFORMANCE
Margrave High School
Building ID: 102/125
For 12-month Period Ending: January 31, 2004[1]
Date SEP Generated: March 30, 2004

Margrave High School
12000 Hwy 90
Longmont ID 83229

Gross Building Area: 361,355 ft²
Year Built: 1983

Owner
Cadmus Group
Contact: John Doe
1901 North Fort Myer Drive
Suite 900
Arlington VA 22209
(703) 247-6000

Facility Space Use Summary

Space Type	Area(ft²)	Number of Students	Number of PCs	Cooling Percent
Computer Data Center	134	N/A	N/A	N/A
K-12 Schools	361,221	1,121	420	100

Site Energy Use Summary

Electricity (kBtu)	5,649,801
Propane (kBtu)	329,419
Natural Gas (kBtu)	0
Total Energy (kBtu)	5,979,220

Professional Verification
John Doe
1901 North Fort Myer Drive
Suite 900
Arlington VA 22209
(703) 247-6000

Licensed Number: 123456789
State: VA

Results

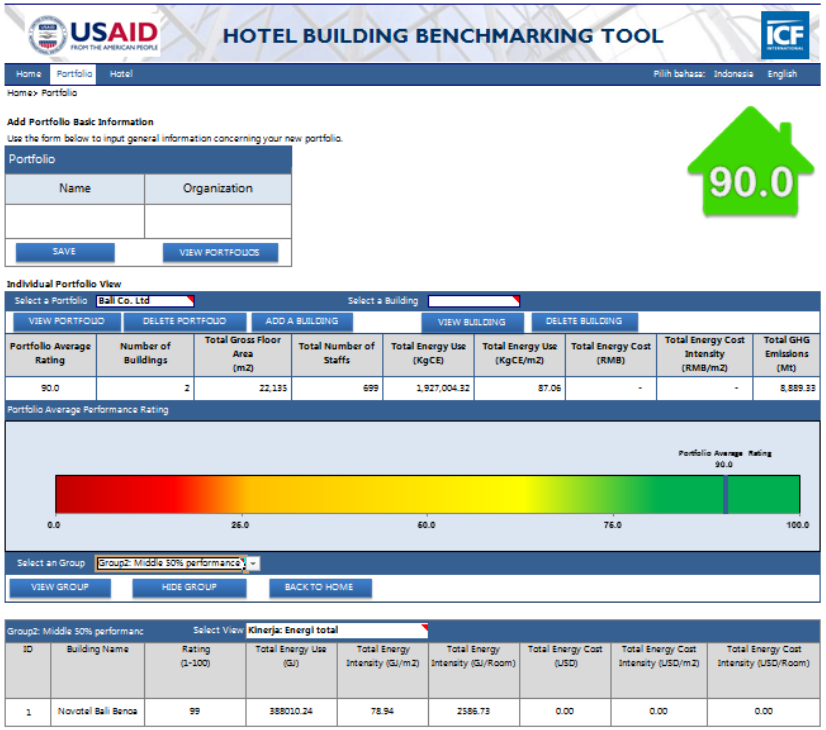
Energy Performance Rating[2] (1-100)	94
Energy Intensity[3]	
Site (kBtu/ft²·yr)	17
Source (kBtu/ft²·yr)	49.4
	6,791
	355
	21
	$264,485
	$0.72
	Yes
	Yes
	Yes
	Yes

Professional Engineer Stamp
Based on the conditions observed at the time of my visit to this building, I certify that the information contained on this statement is accurate.

Tracking Number: SEP20040330000104542

Indonesia Hotel Benchmarking Tool Overview

- **Provides a score 1 to 100, where 75 is performance better than 75% of the market**, and indicates how energy efficient a hotel is, compared to similar hotels in the marketplace.
- **Normalizes** for factors such as occupancy, weather, size (which are factors outside the owner's or manager's control).
- **Converts site to source energy** for a more equitable comparison of performance.
- Algorithms based on **large national hotel data sets from Horwath and PHRI**.
- Can form the basis for voluntary certification systems for energy-efficient buildings and **integrate with GREENSHIP rating system.**



Indonesian Hotel Energy Benchmarking Tool Screenshot

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Advantages of a Benchmarking Tool

- Management Tool – Helps business and organizations by offering a platform to:
  - Assess whole building energy and water consumption
  - Track changes in energy, water, greenhouse gas emissions, and cost over time
  - Track green power purchase
  - Share/report data with others
  - Create custom reports

- Metrics Calculator – Provides key performance metrics to integrate into a strategic management plan
  - Energy Consumption (source, site, weather normalized)
  - Water Consumption (indoor, outdoor)
  - Greenhouse Gas Emissions (indirect, direct, total, avoided)

Indonesian Hotel Benchmarking Tool

How to use this tool

Easy to use: 3 steps to get performance and rating

Create and input portfolio information

Create and input hotel information

Floor Area, Star Designation, Number of Workers, Number of Rooms, Number of Commercial refrigeration Units, Occupancy Rate.

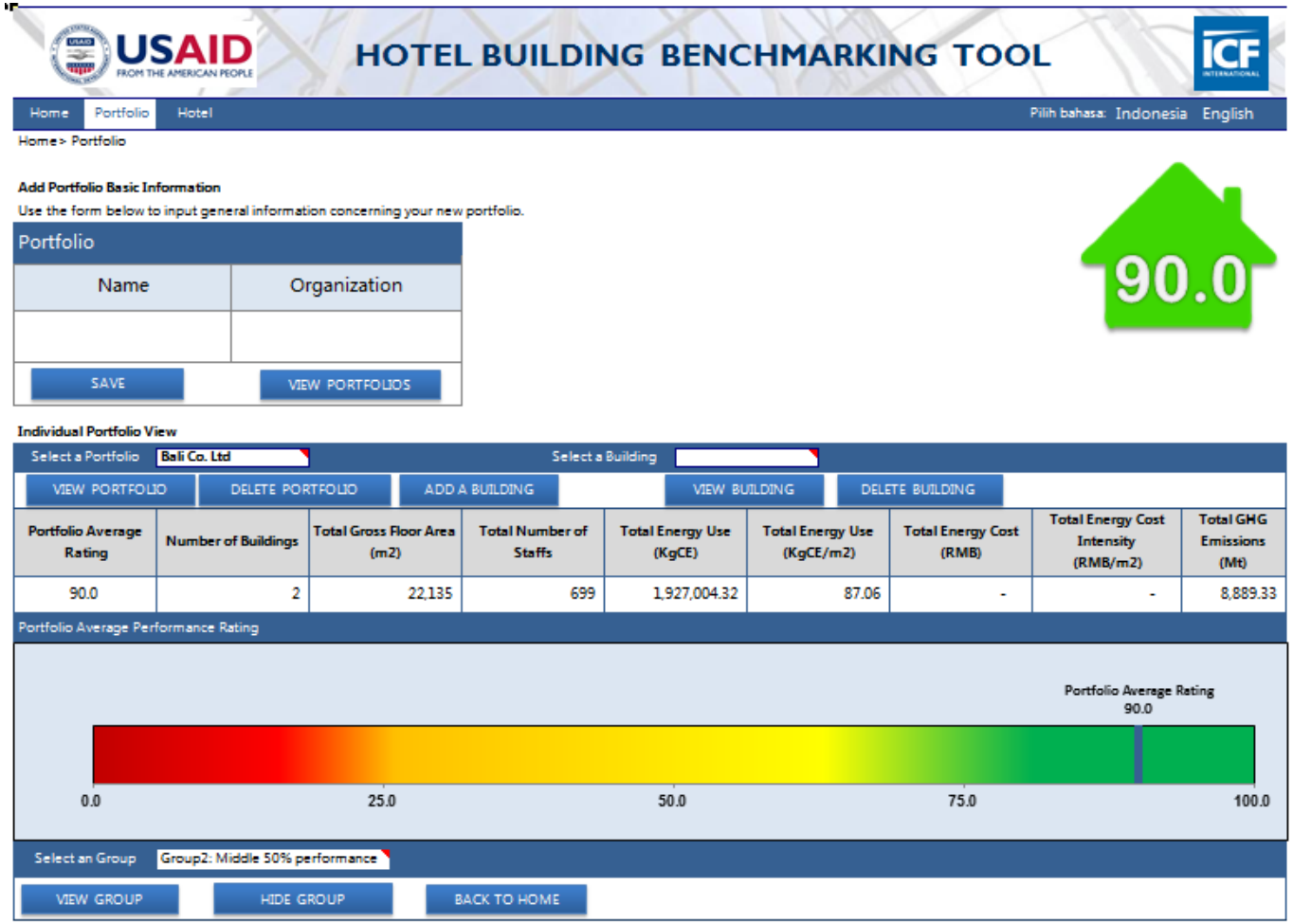
Input energy/water consumption and cost data

Indonesian Hotel Benchmarking Tool

Step-wise Guidance

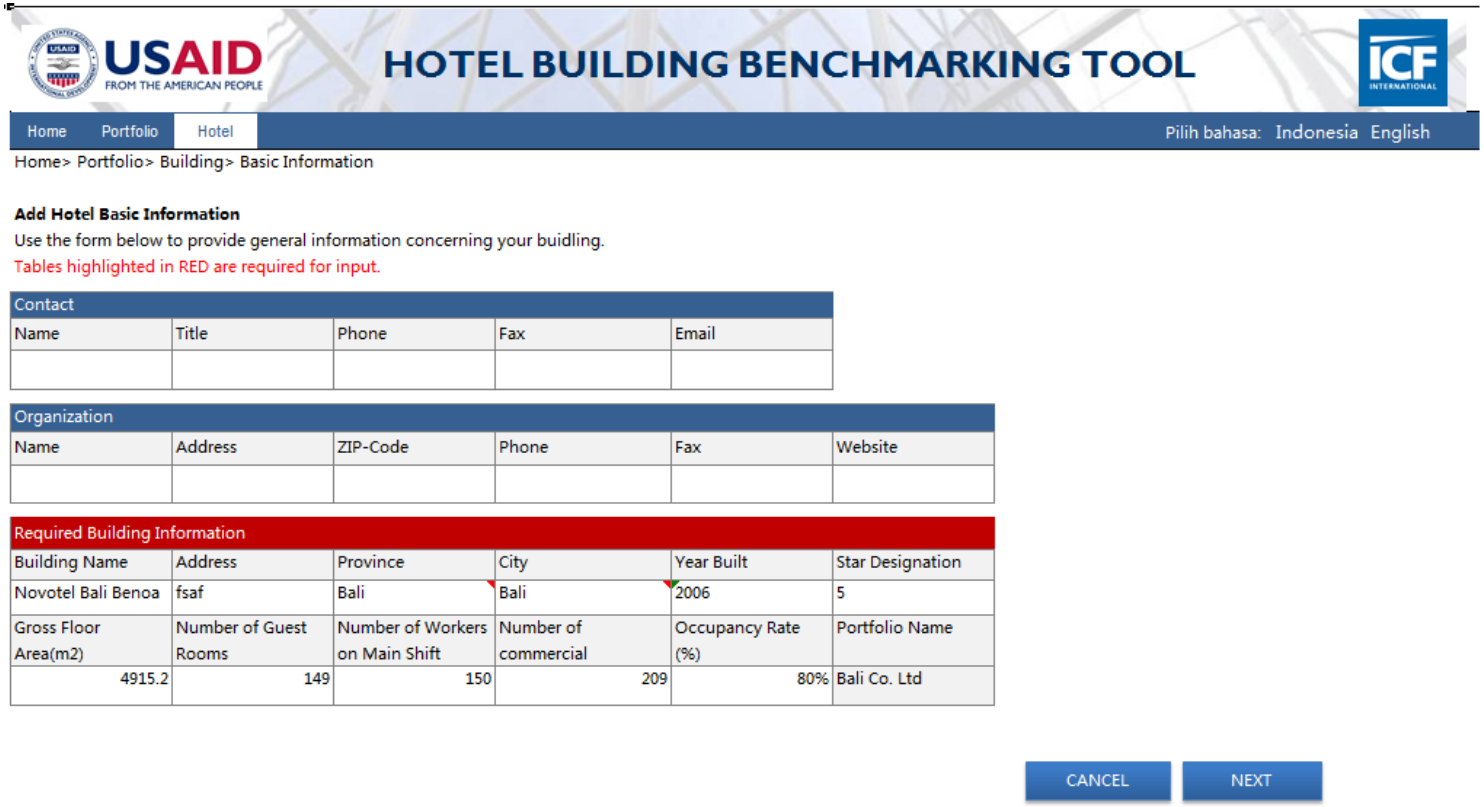
1.Portfolio

- Create Portfolio: input portfolio **Name** and **Organization**
- Portfolio : add and view hotel under a portfolio



Indonesian Hotel Benchmarking Tool
Step-wise Guidance
2.Hotel Information input

- The **RED** part is necessary for benchmark and rating



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HOTEL BUILDING BENCHMARKING TOOL

ICF INTERNATIONAL

Home | Portfolio | Hotel | Pilih bahasa: Indonesia English

Home> Portfolio> Building> Basic Information

Add Hotel Basic Information

Use the form below to provide general information concerning your buidling.

Tables highlighted in RED are required for input.

Contact				
Name	Title	Phone	Fax	Email

Organization					
Name	Address	ZIP-Code	Phone	Fax	Website

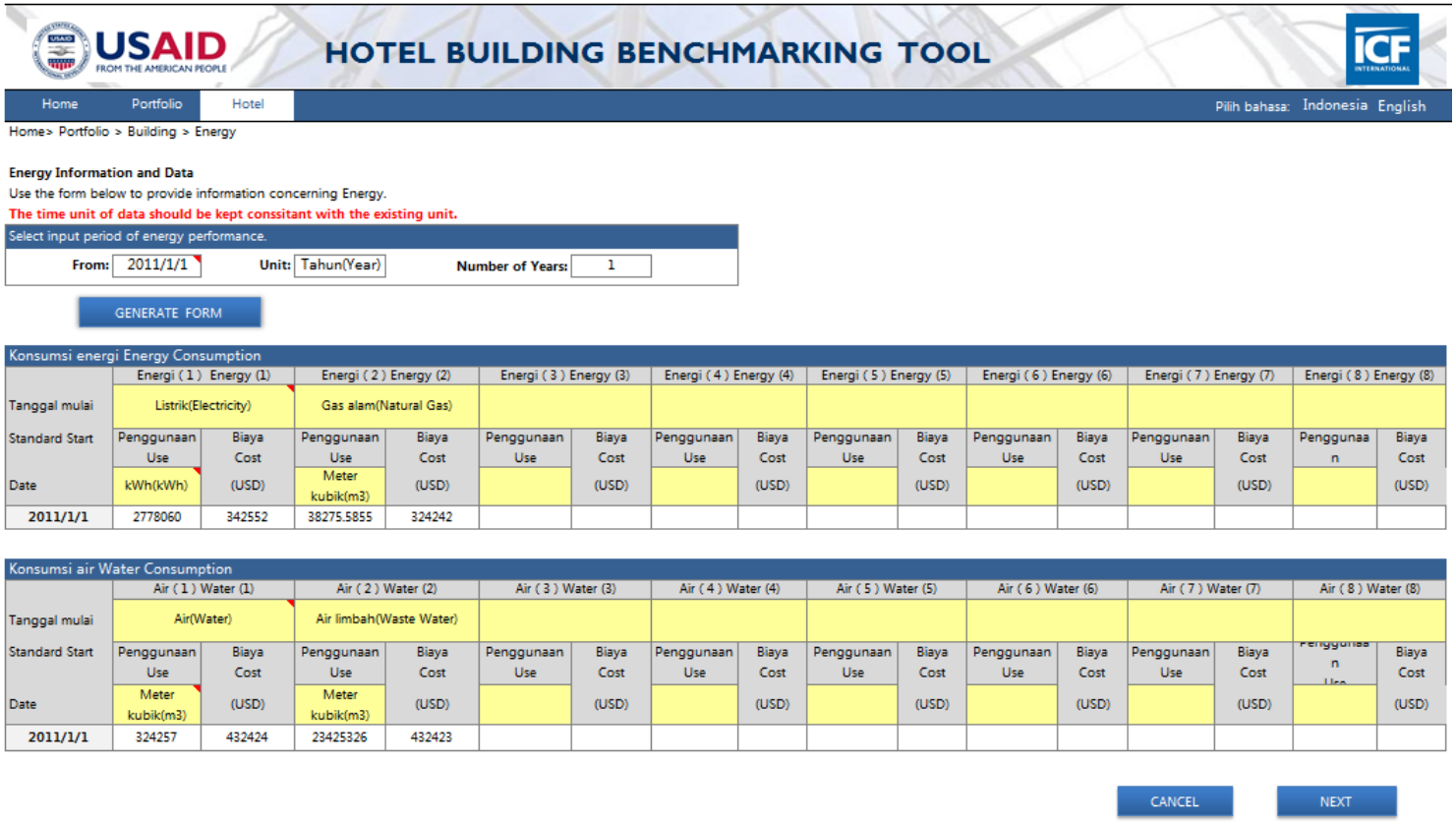
Required Building Information					
Building Name	Address	Province	City	Year Built	Star Designation
Novotel Bali Benoa	fsaf	Bali	Bali	2006	5
Gross Floor Area(m2)	Number of Guest Rooms	Number of Workers on Main Shift	Number of commercial	Occupancy Rate (%)	Portfolio Name
4915.2	149	150	209	80%	Bali Co. Ltd

CANCEL NEXT

Step-wise Guidance

3.Energy data input

- Select period start date, Time Unit and time amount, generate the input table by month or annually
- Input energy and water consumption and cost data



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HOTEL BUILDING BENCHMARKING TOOL

ICF INTERNATIONAL

Home | Portfolio | Hotel | Pilih bahasa: Indonesia English

Home> Portfolio > Building > Energy

Energy Information and Data

Use the form below to provide information concerning Energy.

The time unit of data should be kept conssitant with the existing unit.

Select input period of energy performance.

From: 2011/1/1 Unit: Tahun(Year) Number of Years: 1

GENERATE FORM

Konsumsi energi Energy Consumption

	Energi (1) Energy (1)		Energi (2) Energy (2)		Energi (3) Energy (3)		Energi (4) Energy (4)		Energi (5) Energy (5)		Energi (6) Energy (6)		Energi (7) Energy (7)		Energi (8) Energy (8)	
Tanggal mulai	Listrik(Electricity)		Gas alam(Natural Gas)													
Standard Start	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaa n	Biaya Cost
Date	kWh(kWh)	(USD)	Meter kubik(m3)	(USD)		(USD)		(USD)		(USD)		(USD)		(USD)		(USD)
2011/1/1	2778060	342552	38275.5855	324242												

Konsumsi air Water Consumption

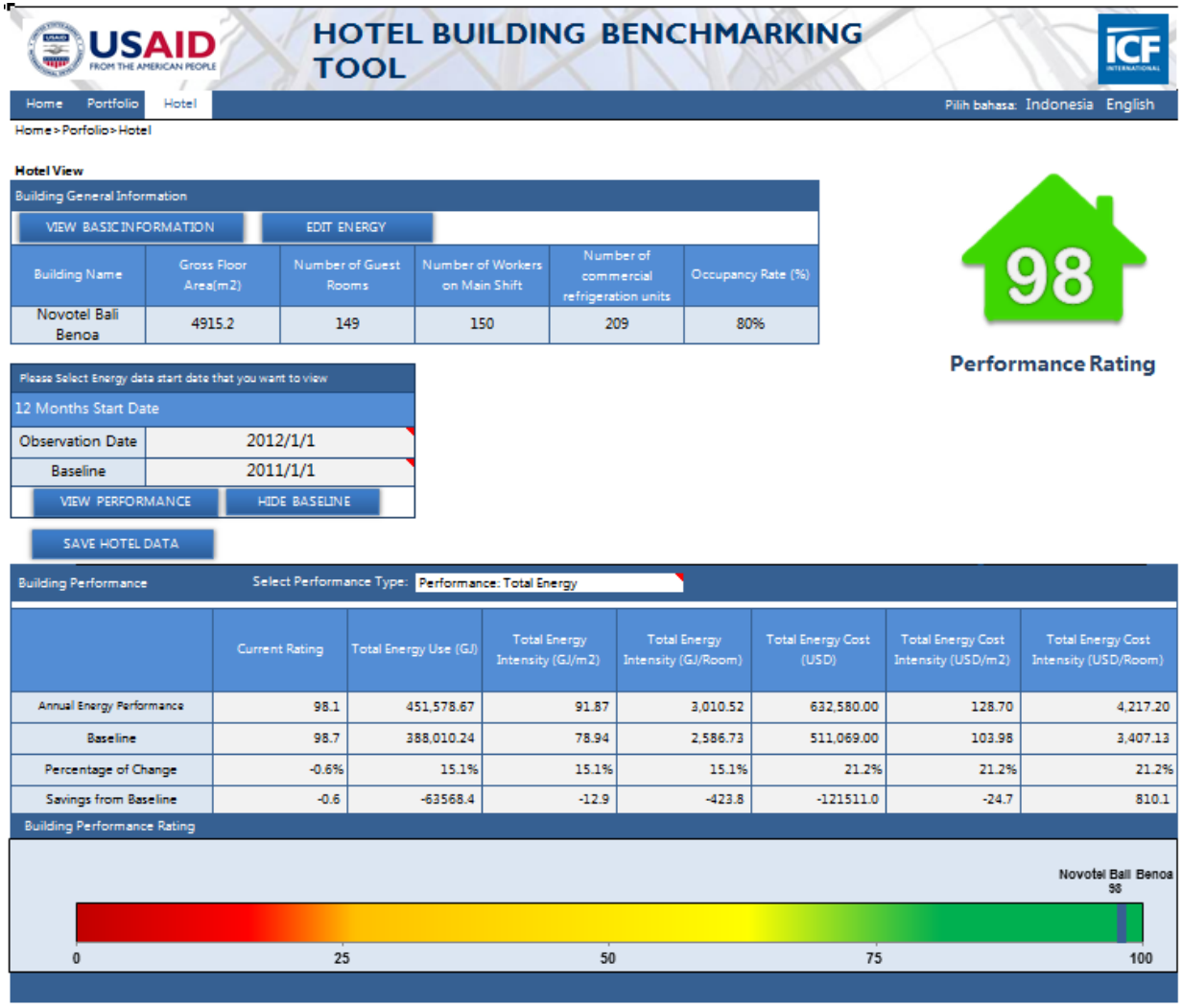
	Air (1) Water (1)		Air (2) Water (2)		Air (3) Water (3)		Air (4) Water (4)		Air (5) Water (5)		Air (6) Water (6)		Air (7) Water (7)		Air (8) Water (8)	
Tanggal mulai	Air(Water)		Air limbah(Waste Water)													
Standard Start	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaa n Use	Biaya Cost
Date	Meter kubik(m3)	(USD)	Meter kubik(m3)	(USD)		(USD)		(USD)		(USD)		(USD)		(USD)		(USD)
2011/1/1	324257	432424	23425326	432423												

CANCEL NEXT

Step-wise Guidance

4. View Hotel Performance

- Select the **Observation Year** and **Baseline** and click **VIEW HOTEL PERFORMANCE**



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HOTEL BUILDING BENCHMARKING TOOL

ICF INTERNATIONAL

Home | Portfolio | Hotel — Pilih bahasa: Indonesia English

Home > Porfolio > Hotel

Hotel View

Building General Information

VIEW BASIC INFORMATION | EDIT ENERGY

Building Name	Gross Floor Area(m2)	Number of Guest Rooms	Number of Workers on Main Shift	Number of commercial refrigeration units	Occupancy Rate (%)
Novotel Bali Benoa	4915.2	149	150	209	80%

98

Performance Rating

Please Select Energy data start date that you want to view

12 Months Start Date

Observation Date	2012/1/1
Baseline	2011/1/1

VIEW PERFORMANCE | HIDE BASELINE

SAVE HOTEL DATA

Building Performance — Select Performance Type: Performance: Total Energy

	Current Rating	Total Energy Use (GJ)	Total Energy Intensity (GJ/m2)	Total Energy Intensity (GJ/Room)	Total Energy Cost (USD)	Total Energy Cost Intensity (USD/m2)	Total Energy Cost Intensity (USD/Room)
Annual Energy Performance	98.1	451,578.67	91.87	3,010.52	632,580.00	128.70	4,217.20
Baseline	98.7	388,010.24	78.94	2,586.73	511,069.00	103.98	3,407.13
Percentage of Change	-0.6%	15.1%	15.1%	15.1%	21.2%	21.2%	21.2%
Savings from Baseline	-0.6	-63568.4	-12.9	-423.8	-121511.0	-24.7	810.1

Building Performance Rating

Novotel Bali Benoa 98

0 | 25 | 50 | 75 | 100

Step-wise Guidance

5.View Basic Information/Edit Energy

- Click the **VIEW BASIC INFORMATION or EDIT ENERGY** button to view or edit all related hotel information or energy data.

Select input period of energy performance.

From: 2011/1/1 Unit: Tahun(Year) Number of Years: 2

GENERATE FORM

Konsumsi energi Energy Consumption

	Energi (1) Energy (1)		Energi (2) Energy (2)		Energi (3) Energy (3)		Energi (4) Energy (4)		Energi (5) Energy (5)		Energi (6) Energy (6)		Energi (7) Energy (7)		Energi (8) Energy (8)	
Tanggal mulai	Listrik(Electricity)		Gas alam(Natural Gas)													
Standard Start	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan	Biaya Cost
Date	kWh(kWh)	(USD)	Meter kubik(m3)	(USD)		(USD)		(USD)		(USD)		(USD)		(USD)		(USD)
2011/1/1	2778060	435636	38275.5855	75433												
2012/1/1	3246346	543535	43224	89045												

Konsumsi air Water Consumption

	Air (1) Water (1)		Air (2) Water (2)		Air (3) Water (3)		Air (4) Water (4)		Air (5) Water (5)		Air (6) Water (6)		Air (7) Water (7)		Air (8) Water (8)	
Tanggal mulai																
Standard Start	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan Use	Biaya Cost	Penggunaan	Biaya Cost
Date		(USD)		(USD)		(USD)		(USD)		(USD)		(USD)		(USD)		(USD)
2011/1/1																
2012/1/1																

Contact

Name	Title

Organization

Name	Address

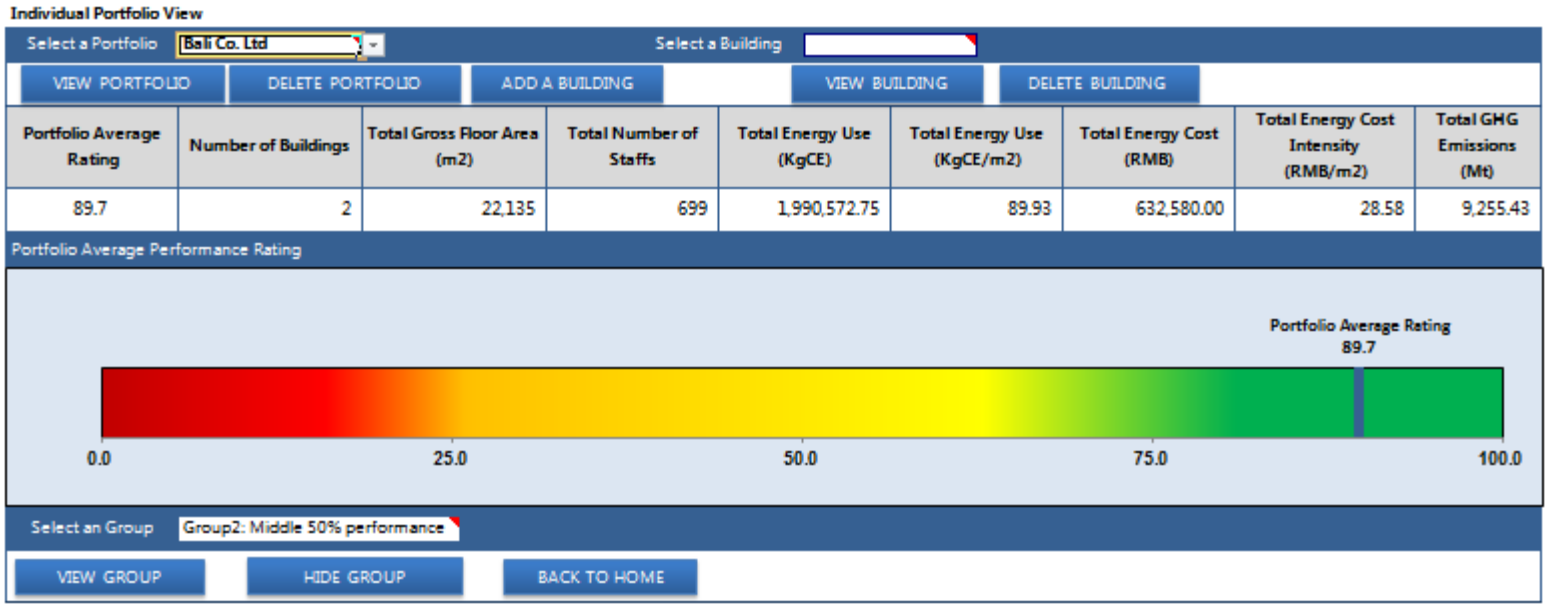
Required Building Information

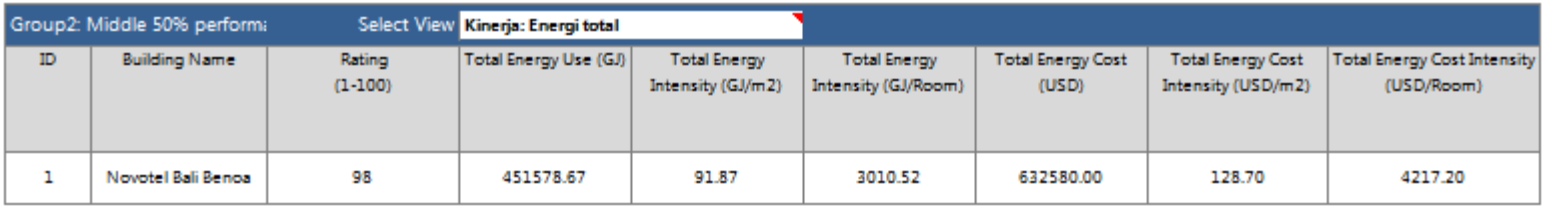
Building Name	Address	Province	City	Year Built	Star Designation
Novotel Bali Benoa	fsaf	Bali	Bali	2006	5
Gross Floor Area(m2)	**Number of Guest Rooms**	**Number of Workers on Main Shift**	**Number of commercial**	**Occupancy Rate (%)**	**Portfolio Name**
4915.2	149	150	209	80%	Bali Co. Ltd

Step-wise Guidance

6.View Portfolio performance

- Back to the Portfolio page and Select a portfolio to view its performance
- Select a hotel group then click **VIEW GROUP** to view hotels performance of a group under the portfolio





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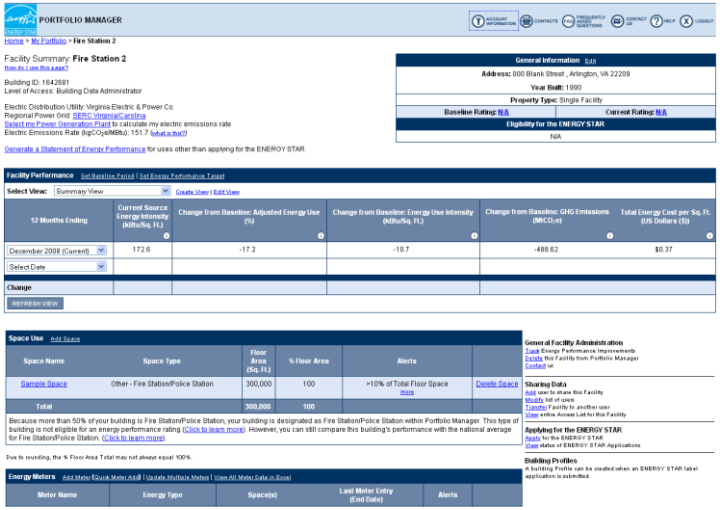
Today's Agenda

1. Background and Context
2. Introduction to Benchmarking and Energy Management
3. ***Success Stories***
4. Overview of the Program
5. Benefits for Participants
6. How to Participate
7. Q&A

US Benchmarking Tool Results

- Utilized by more than 260,000 US buildings (40% of commercial buildings market) to rate energy performance.
- Through 2011, nearly 16,500 Certified buildings have saved nearly $2.3 billion in energy costs annually and reduced 12 $MMTCO_2e$ a year!
- Plays a key role in:
  - Improving the design, construction, and operations of US buildings;
  - Identifying cost-effective policy solutions to improve energy performance in building;
  - Pinpointing where technology upgrades are most needed, driving technology application to its most efficient application in US buildings.



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US Space Types Eligible for Benchmarking

Hospitals

Retail

Office Buildings

Hotels

Houses of Worship

Medical Office Buildings

Waste Water Treatment Plants

Courthouses

Financial Centers

Senior Living Facilities

Warehouses

Dormitories

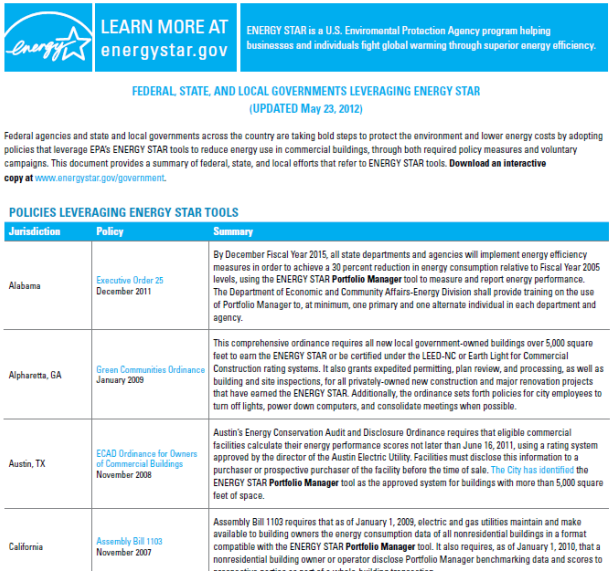
Supermarkets

Schools

Data Centers

How Benchmarking is Used in the US

- A component of US Green Building Council's (USGBC's) Leadership in Energy and Environmental Design (LEED) system.
- Integrated into 40+ US Federal, state and local building energy efficiency laws and policies.
  - Federal agencies are required to lease space in buildings that have earned a score of 75 or above using the benchmarking tool.
  - Buildings in New York City required to track energy use using the US Benchmarking Tool. Performance metrics are published on a publicly available online database.



LEARN MORE AT energystar.gov

ENERGY STAR is a U.S. Enviromental Protection Agency program helping businesses and individuals fight global warming through superior energy efficiency.

FEDERAL, STATE, AND LOCAL GOVERNMENTS LEVERAGING ENERGY STAR
(UPDATED May 23, 2012)

Federal agencies and state and local governments across the country are taking bold steps to protect the environment and lower energy costs by adopting policies that leverage EPA's ENERGY STAR tools to reduce energy use in commercial buildings, through both required policy measures and voluntary campaigns. This document provides a summary of federal, state, and local efforts that refer to ENERGY STAR tools. **Download an interactive copy at** www.energystar.gov/government.

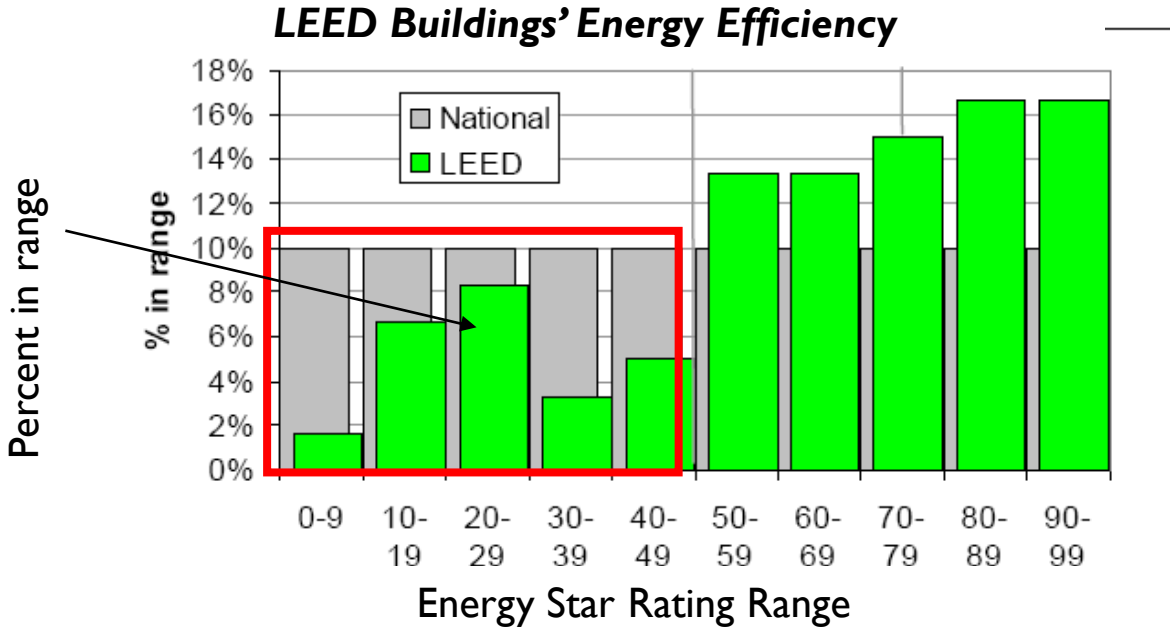
POLICIES LEVERAGING ENERGY STAR TOOLS

Jurisdiction	Policy	Summary
Alabama	Executive Order 25 December 2011	By December Fiscal Year 2015, all state departments and agencies will implement energy efficiency measures in order to achieve a 30 percent reduction in energy consumption relative to Fiscal Year 2005 levels, using the ENERGY STAR **Portfolio Manager** tool to measure and report energy performance. The Department of Economic and Community Affairs-Energy Division shall provide training on the use of Portfolio Manager to, at minimum, one primary and one alternate individual in each department and agency.
Alpharetta, GA	Green Communities Ordinance January 2009	This comprehensive ordinance requires all new local government-owned buildings over 5,000 square feet to earn the ENERGY STAR or be certified under the LEED-NC or Earth Light for Commercial Construction rating systems. It also grants expedited permitting, plan review, and processing, as well as building and site inspections, for all privately-owned new construction and major renovation projects that have earned the ENERGY STAR. Additionally, the ordinance sets forth policies for city employees to turn off lights, power down computers, and consolidate meetings when possible.
Austin, TX	ECAD Ordinance for Owners of Commercial Buildings November 2008	Austin's Energy Conservation Audit and Disclosure Ordinance requires that eligible commercial facilities calculate their energy performance scores not later than June 16, 2011, using a rating system approved by the director of the Austin Electric Utility. Facilities must disclose this information to a purchaser or prospective purchaser of the facility before the time of sale. The City has identified the ENERGY STAR **Portfolio Manager** tool as the approved system for buildings with more than 5,000 square feet of space.
California	Assembly Bill 1103 November 2007	Assembly Bill 1103 requires that as of January 1, 2009, electric and gas utilities maintain and make available to building owners the energy consumption data of all nonresidential buildings in a format compatible with the ENERGY STAR **Portfolio Manager** tool. It also requires, as of January 1, 2010, that a nonresidential building owner or operator disclose Portfolio Manager benchmarking data and scores to

US Findings

- 25% of surveyed LEED buildings performed *below* the US average for energy efficiency.
- **This means even "green designed" buildings can be inefficient in terms of energy.**

25% of LEED buildings fell below the average energy performance score (50)



Benchmarking and LEED

- **LEED for Existing Building Operations and Maintenance (EBOM).**
- Energy & Atmosphere prerequisite: Minimum Energy Efficiency Performance
  - Buildings eligible for an EPA energy performance rating **must achieve a rating of at least 69.**
  - Buildings not eligible for an EPA rating must **demonstrate energy efficiency at least 19% better than the national average.**
- Additional Energy & Atmosphere points are earned through higher EPA ratings or reduced source energy intensity.

EPA ENERGY STAR Rating	LEED for Existing Buildings: O&M points	Percentage better than national average (for buildings not eligible for an EPA rating)*	LEED for Existing Buildings: O&M points
65	NA	15%	NA
67	1	17%	1
69	2	19%	2
71	3	21%	3
73	4	23%	4
75	5	25%	5
77	6	27%	6
79	7	29%	7
81	8	31%	8
83	9	33%	9
85	10	35%	10
87	11	37%	11
89	12	39%	12
91	13	41%	13
93	14	43%	14
95+	15	45%	15

* projects should use the Portfolio Manager tool available on the ENERGY STAR web site to benchmark their building even when it is not eligible for an EPA rating: http://www.energystar.gov/benchmark

LEED E&A Points

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Marriott US Case Studies

– *Awarded Sustained Excellence Award by U.S. EPA 3 years in a row.*

– *Long-term goal of benchmarking all US properties.*

– *Through benchmarking and improving energy performance:*

- *Avoided **$1.3 million** in costs.*
- *Decreased GHG emissions by **3% per available room.***

Courtyard by Marriott, ES certified 2009

TownePlace Suites by Marriot BWI, ES certified 2009

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STARWOOD
HOTELS & RESORTS WORLDWIDE, INC.

US Case Studies

- *Supported development of the US Benchmarking Tool.*
- *Use US EPA Benchmarking Tool to assist with hotel purchasing decisions.*
- *Utilize energy-efficient products when possible.*
  - *2001: **$3.5 million** in energy cost savings.*
  - *2002: **$1.3 million** in energy cost savings.*

- *"…Realized it was more beneficial to Starwood to invest in energy efficiency than marketing due to a higher return on investment."*
- John Lembo, Starwood Energy Manager in 2002 and 2003.

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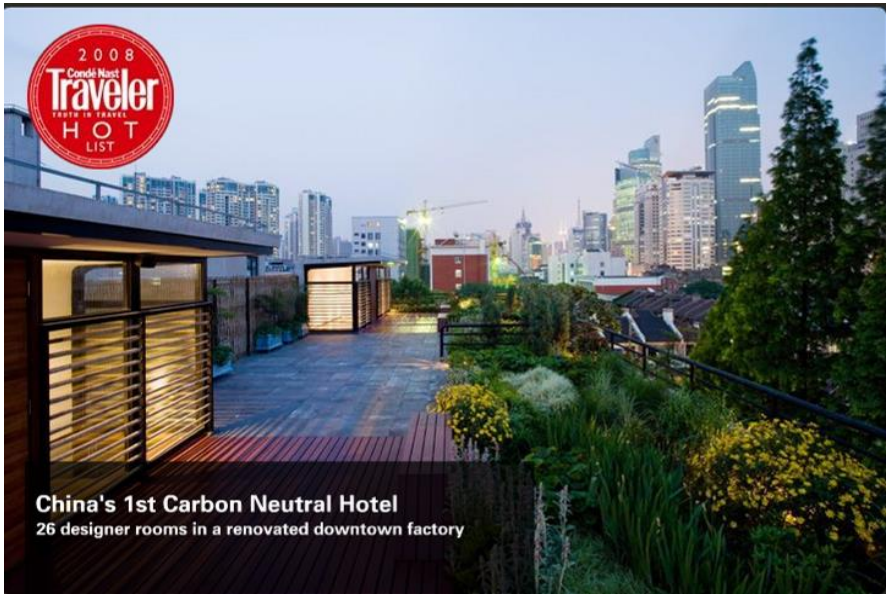
Case Study

- China's First Carbon Neutral Hotel from the purchase of offsets from local green energy projects.



- Green and sustainable features
  - Reclaimed Shanghai hardwood and brick
  - Passive solar shading
  - Double-paned windows
  - Low volatile organic compound (VOC) paints
  - Low wattage lighting

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Case Study: Measures Taken

- **Four-pipe system allows for both heating and cooling to be running simultaneously:** analyzed past energy consumption data to identify swing seasons and develop a schedule for when both cooling and heating may be necessary within a 24-hour period.

- **Coil temperature reset:** manually resets the chiller coil temperature approximately every ten days so that chiller coil temperatures are not lower than required to meet building cooling loads, thereby wasting electricity**.**

- **Guest room temperature management:** Facility staff adjusted the thermostat range on guest room temperatures to a minimum of 22˚C in summer and a maximum of 26˚C in winter.

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Case Study: Measures Taken

- **Clean HVAC coils and filters:** URBN regularly removes dust and dirt from filters and heating and cooling coils.
- **Hallway lighting strategy:** adjusted the operation time of hallway lights.
- **Toilet water saving measures:** reduced water levels in guest toilets so flushing would consume less water but still meet guest standards.

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Case Study

- Annual estimated results:
  - 9% reduction in energy use
  - 27% reduction in energy costs
  - Reduced carbon footprint by 139 MtCO2e
  - $33,537 USD

  Approximately more than 4X cost to offset carbon emissions from electricity and natural gas consumption annually!

"We believe that many of even the most sustainably built or green certified buildings fall short of delivering on their environmental goals because they do not incorporate proper sustainable management techniques and tracking into their operational standards."

-Scott Barrack, URBN Founder.

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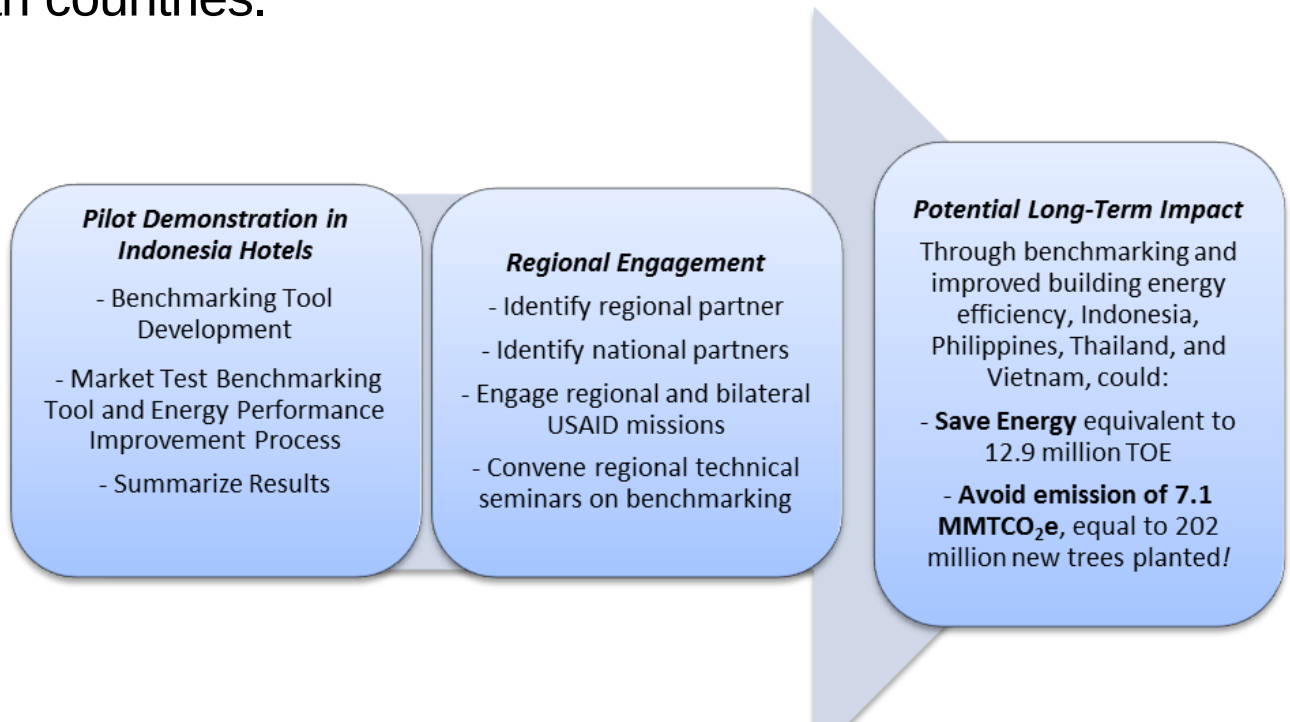
Program Objective

Reduce energy usage and GHG emissions in hotels in Indonesia through development and deployment of a **hotel energy benchmarking tool** and **energy efficiency pilot program**. The results of this pilot program will be shared across other Southeast Asian countries.



Program Stakeholders

Leadership and Direction

- Ministry of Energy and Mineral Resources, Director General for New and Renewable Energy and Energy Conservation, Directorate for Energy Conservation (DGNREEC)

Advisory and Implementation

- Ministry of Tourism
- Ministry of Public Works
- Indonesia Hotel and Restaurant Association (PHRI)
- Green Building Council Indonesia (GBCI)
- Engineers Association of Indonesian Hotels (ASATHI)
- American Society of Heating, Refrigeration and Air-conditioning Engineers – Indonesia Chapter (ASHRAE)
- Building Engineers Association (BEA)
- Horwath HTL

Technical Support

- USAID Indonesia Clean Energy Development (ICED)
- USAID Energy Efficiency for Clean Development Program (EECDP)

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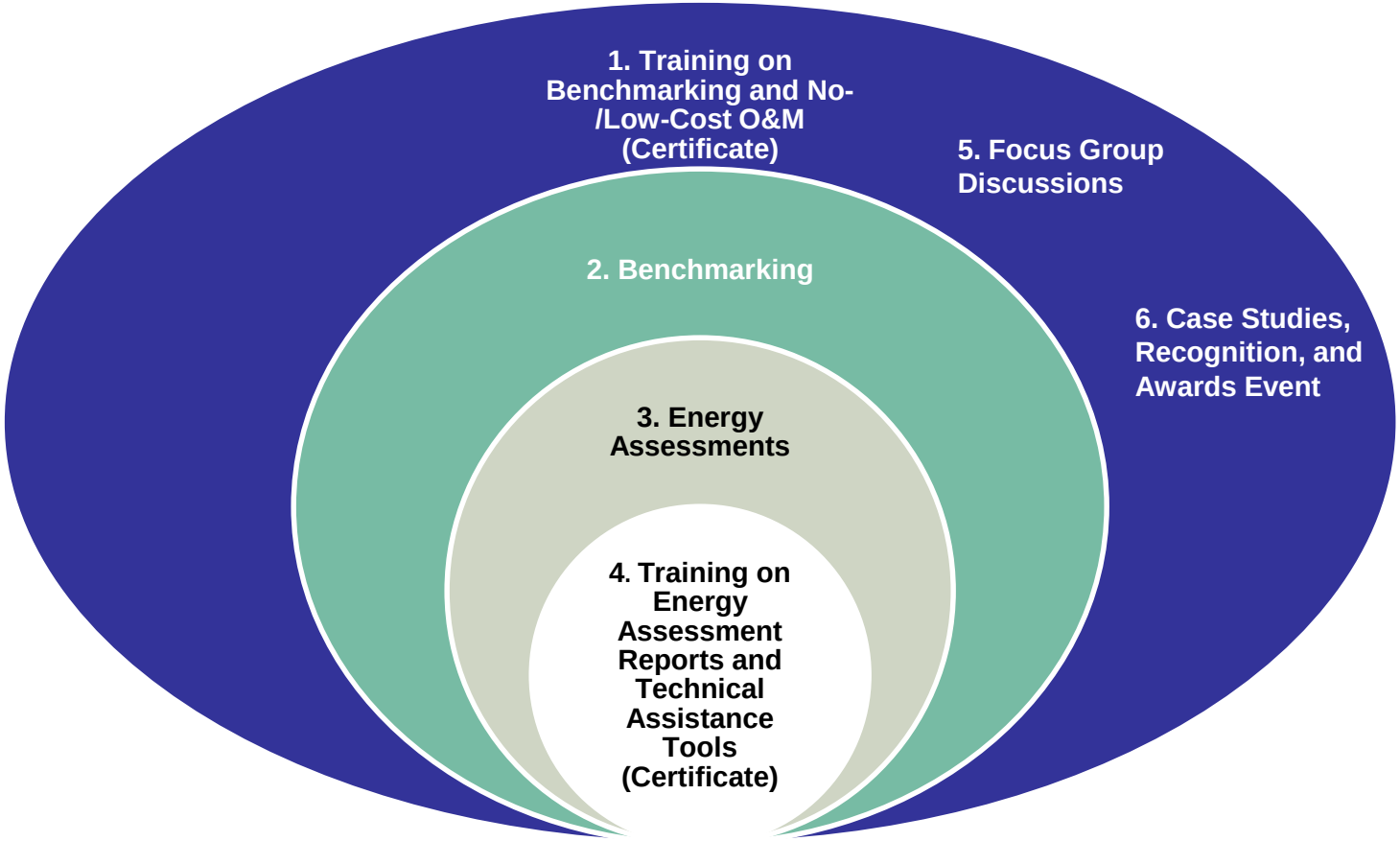
Program Locations and Timeframe

- The program **will run through August 2014**.
- Implemented in three pilot areas: **Jakarta, Bali, and Yogyakarta**.
- From **30 to 80 hotels in each location**.
- Additional support provided by **local government tourism offices, hotel associations, engineering associations, and universities**.

Activities


1. Training on Benchmarking and No-/Low-Cost O&M (Certificate)
5. Focus Group Discussions
2. Benchmarking
6. Case Studies, Recognition, and Awards Event
3. Energy Assessments
4. Training on Energy Assessment Reports and Technical Assistance Tools (Certificate)

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Activity 1: Training on Benchmarking and No-/Low-Cost Energy Management Measures

Eligibility	Open to all hotels in the pilot program.
Description	Full-day training workshop in each of 3 locations (Bali, Yogya, Jakarta).
Schedule	November 2013
Benefits	▪ Guidance on benchmarking energy performance using Indonesia's new hotel benchmarking tool. ▪ Technical guidance on implementing 50+ no-/low-cost O&M measures to reduce energy use by 5-27% annually. ▪ **Certificate for attendees** that bring completed data form.

Requirements	▪ Bring **completed data collection template** to the training with data for:
	  ▪ Past 12 consecutive months of energy/water usage (Oct. 2012 – Sept. 2013)
	  ▪ 23 hotel attribute data points (size, amenities, etc.)
	▪ Data will be used by participants to benchmark energy performance using the Indonesia hotel benchmarking tool.
	▪ **Data stays confidential** to ICED/EECDP.

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Overview of Benchmarking and No-/Low-Cost Energy Management Training Curriculum

Data → Schedules → Lighting → Air → HVAC → Management

- Covers 50+ O&M measures derived from experience in Asia assisting 10,000 buildings to improve energy efficiency across 17 cities in Asia.
- ***Buildings that benchmark and implement simple no-/low-cost O&M measures can reduce energy use by 5-27% annually***.
- These buildings do not need to purchase new equipment or hire outside consultants to achieve these savings.
- Will provide ***energy management certification*** to property managers that attend the training course and bring completed data collection form.

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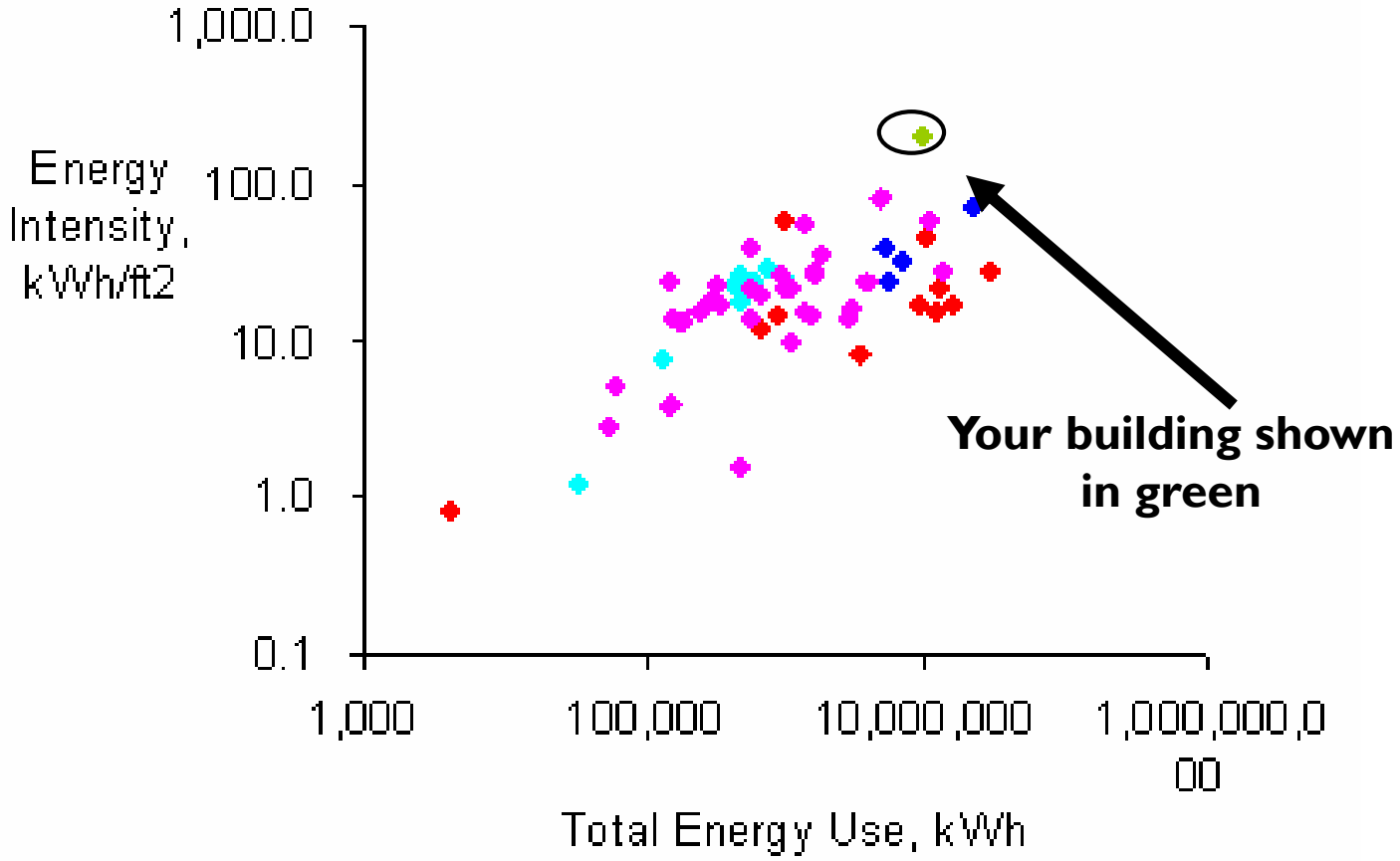
Activity 2: Benchmarking

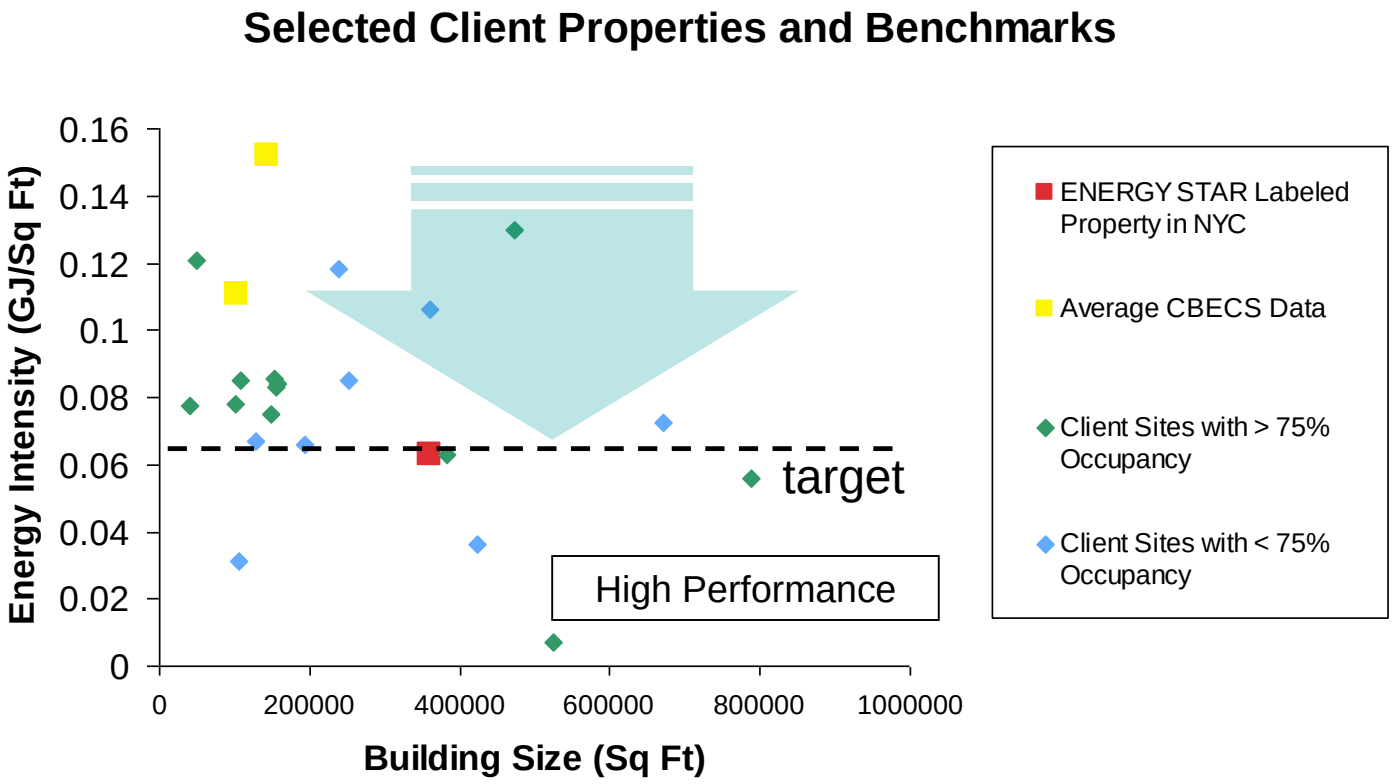
Eligibility	Open to all hotels attending the "Training on Benchmarking and No-/Low-Cost Energy Management Measures"
Description	Report showing energy performance relative to peers in Indonesian market and potential energy-/cost-savings for your hotel.
Schedule	▪ Provide data to ICED/EECDP at Oct 2013 training. ▪ Receive report w/ results in Nov/Dec 2013.
Benefits	▪ A report which provides a visual understanding of the relative energy performance of your hotel in Indonesia and estimates energy/cost-saving potential – are you a leader or a laggard? ▪ The report can help you set energy-/cost-saving targets, prioritize investments, and identify best practices for hotel energy management.

Requirements	▪ **Share completed data collection template with ICED/EECDP**:
	  ▪ Past 12 consecutive months of energy/water usage (Oct. 2012 – Sept. 2013)
	  ▪ 23 hotel attribute data points (size, amenities, etc.)
	▪ **Data stays confidential** to ICED/EECDP.

Benchmarking Report – Current Performance



Benchmarking Report – Target and Potential Savings



This hotel could reduce its energy use by 5% through no-/low-cost O&M, saving 1,075,030,000 IRD ($96,000 USD) annually.

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Data Collection Template – 12 Consecutive Months of Hotel Energy and Water Usage Data (2012 Oct. to 2013 Sept.)

Energy Data	Fuel type					Water Type	
	Electricity	Natural Gas	Liquefied Petroleum Gas (LPG)	Diesel Fuel Oil	Gasoline	Water	Reclaimed Water
	Use	Use	Use	Use	Use	Use	Use
Enter Units	kWh	M3	Liters	Liters	Liters	Liters	Liters
2012 October							
2012 November							
2012 December							
2013 January							
2013 February							
2013 March							
2013 April							
2013 May							
2013 June							
2013 July							
2013 August							
2013 September							
Annual Total	0	0	0	0	0	0	0

Data Collection Template – 23 Hotel Attribute Data Points

Star Designation	
Building Gross Area	Square meters
Number of floors	
Number of Guest Rooms	
Number of workers on Main Shift	
Number of Commercial Refrigeration or Freezer Units	
Number of commercial open refrigeration units	
Number of commercial closed refrigeration units	
Number of commercial walk-in refrigeration units	
Presence of cooking facilities	
Average Annual Occupancy Rate (%)	
Percent of the gross floor area that is cooled (%)	
Year hotel built	
Year of Last Major Renovation or Re-branding	
Area of Indoor Swimming Pools	Square meters
Area of Outdoor Swimming Pools	Square meters
Floor area of Full-service Spas	Square meters
Floor area of On-Site Laundry Services	Square meters
Floor area of Gym/Fitness Center	Square meters
Floor area of Banquet	Square meters
Floor area of Meeting Room	Square meters
Floor area of Garage	Square meters
Floor area of On-site Retail Store	Square meters

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Data Confidentiality Policy

1. **Data provided by participants, or information regarding hotel data disclosed by participants, shall not be disclosed by USAID to any other person outside the USAID pilot project team.**
2. **USAID will use the data only for the purpose of and in connection with the development of a prototype energy performance benchmarking tool for Indonesia and measurement of energy savings from pilot project activities, and not for any other purpose, unless written permission is obtained from the participant.**
3. **For the purposes of analysis, participant data will be combined with that of other participants without any company or site references.**
4. **The result will be an analytical database that protects participant confidentiality.**

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Activity 3: Energy Assessments

Eligibility	Open to all hotels attending the "Training on Benchmarking and No-/Low-Cost Energy Management Measures"
Description	½-day to 1-day site visits to identify no-/low-cost O&M, and cost-effective retrofit measures, to save energy in hotels.
Schedule	▪ Demo energy assessments: 6 (2 in each location): October 2013 ▪ General energy assessments: 24 (8 in each location): Dec 2013 to Jan 2014
Benefits	Report that describes recommended no-/low-cost O&M, and cost-effective retrofit opportunities, to reduce energy/water usage, costs, and carbon emissions at your hotel. (Delivered 2-4 weeks after assessment.)
Requirements	▪ **Completed data collection template** ▪ Willing to provide **periodic data updates** to assess savings. ▪ Willing to **attend 2-day training** on Energy Assessment Reports and Technical Assistance Tools. ▪ Has management and engineering **staff committed to energy, water, and carbon savings** and cooperation with ICED/EECDP. ▪ Has central HVAC. ▪ Has an average annual occupancy rate of > 60%. ▪ Has full control of the chillers, boilers, and most energy-consuming equipment. ▪ Has a Building Automation System (BAS). ▪ The hotel's energy use must be metered only for the hotel. In other words, the hotel is separately metered and can provide actual monthly energy usage for all fuels consumed by the hotel

Energy Assessment Process

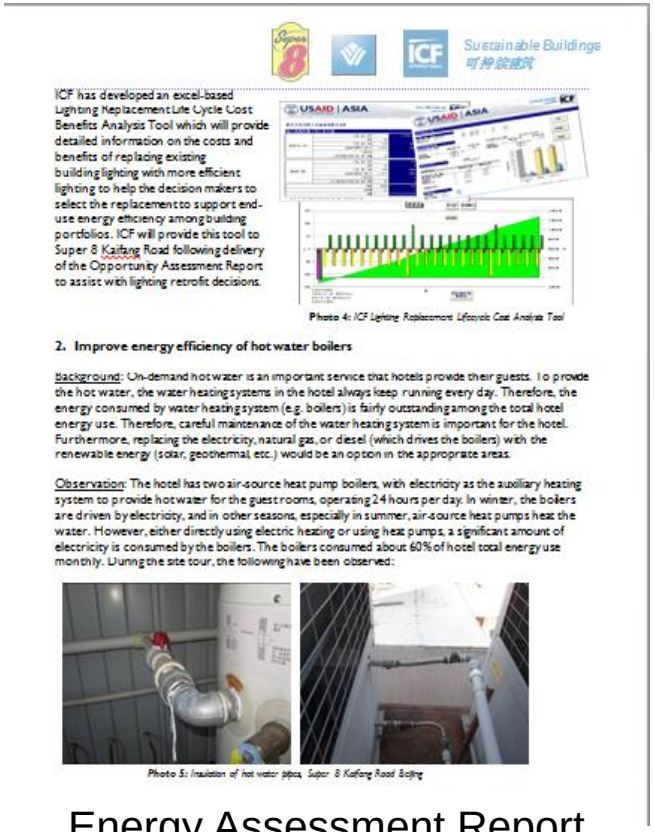
- Step 1. Hotels complete data collection template.
- Step 2. ICED/EECDP and hotel arrange site visit logistics.
- Step 3. Hotel Chief Engineer and General Manager complete "Energy Assessment Questionnaire," which includes 100+ questions on:
  - Staffing and O&M Schedule
  - Use of Outside Contractors
  - Documentation
  - HVAC systems
  - BAS and schedule for HVAC and Lighting
  - Water
  - Coil Temperature Control
  - Coil and Filter Cleaning
  - Building Envelope
  - Lighting
  - Parking Garage Ventilation
  - Amenities
  - Data Collection and Display
  - Cleaning

Staffing and Operations & Maintenance (O&M) Schedule		
1.	Who is the Chief Operating Engineer for the hotel?	
2.	How many O&M staff are assigned to this hotel?	
3.	What is the typical working schedule for O&M staff?	
4.	What types of training have the O&M staff received?	
5.	Is there someone who manages energy consumption and environmental initiatives at the property?	
6.	Is there a regular inspection and maintenance program? What does it involve? Who conducts this program? How often? What does the program include? What is the result?	
7.	Is there a maintenance management system that can integrate initiatives? If not, what strategies are used to implement preventive maintenance initiatives? (e.g. checklists)	

Energy Assessment Questionnaire

Energy Assessment Process

- Step 4. ICED/EECDP conduct ½-day to 1-day site visit to identify no-/low-cost O&M, and cost-effective retrofit, opportunities.
  - Interview with management and engineering staff to clarify responses from the questionnaire.
  - Tour of equipment rooms, common areas, guest rooms, and hotel amenities (restaurants, pool, spa, etc.)
  - Interview with reception/front desk staff.
  - Interview housekeeping staff.
- Step 5. Hotels receive “Energy Assessment Report” with step-wise guidance for reducing energy/water usage at the hotel. (2-4 weeks after site visit)
- Step 6. Hotels implement energy-saving measures and provide periodic energy data updates.
- Step 7. ICED/EECDP develop case studies for successful energy-saving hotels.


Sustainable Buildings

ICF has developed an excel-based Lighting Replacement Life Cycle Cost Benefits Analysis Tool which will provide detailed information on the costs and benefits of replacing existing building lighting with more efficient lighting to help the decision makers to select the replacement to support end-use energy efficiency among building portfolios. ICF will provide this tool to Super 8 Kaifang Road following delivery of the Opportunity Assessment Report to assist with lighting retrofit decisions.

Photo 4: ICF Lighting Replacement Lifecycle Cost Analysis Tool

2. Improve energy efficiency of hot water boilers

Background: On-demand hot water is an important service that hotels provide their guests. To provide the hot water, the water heating systems in the hotel always keep running every day. Therefore, the energy consumed by water heating system (e.g. boilers) is fairly outstanding among the total hotel energy use. Therefore, careful maintenance of the water heating system is important for the hotel. Furthermore, replacing the electricity, natural gas, or diesel (which drives the boilers) with the renewable energy (solar, geothermal, etc.) would be an option in the appropriate areas.

Observation: The hotel has two air-source heat pump boilers, with electricity as the auxiliary heating system to provide hot water for the guest rooms, operating 24 hours per day. In winter, the boilers are driven by electricity, and in other seasons, especially in summer, air-source heat pumps heat the water. However, either directly using electric heating or using heat pumps, a significant amount of electricity is consumed by the boilers. The boilers consumed about 60% of hotel total energy use monthly. During the site tour, the following have been observed:

Photo 5: Insulation of hot water pipes, Super 8 Kaifang Road Beijing

Energy Assessment Report

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Requirements for Energy Assessment Hotels

For hotels that would like to be considered for free energy assessments to identify no-/low-cost O&M and cost-effective retrofit opportunities, the following requirements must be met:

- Has management and engineering staff committed to energy and water savings.
- Has central HVAC.
- Has an average annual occupancy rate of > 60%.
- Has full control of the chillers, boilers, and most energy-consuming equipment.
- Has a Building Automation System (BAS).
- The hotel's energy use must be metered only for the hotel. In other words, the hotel is separately metered and can provide actual monthly energy usage for all fuels consumed by the hotel.

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Activity 4: Training on Energy Assessment Reports and Technical Assistance Tools

Eligibility	Open to all hotels attending the "Training on Benchmarking and No-/Low-Cost Energy Management Measures", but required for energy assessment hotels.
Description	2-day training on Training on Energy Assessment Reports and Technical Assistance Tools
Schedule	February to March 2014 (1 workshop in each location).

Benefits	▪ Deeper training on energy management, utilities, monitoring (day 1) and equipment, operations, and maintenance (day 2)
	▪ Training on technical assistance tools to identify cost-effective retrofits:
	  ▪ Chiller retrofit financial analysis calculator
	  ▪ Lighting retrofit financial analysis calculator
	  ▪ Technology Snapshots
	▪ Training on energy management tools:
	  ▪ Energy management checklists
	▪ **Hotels that participate and share data receive certificate**.

Requirements	▪ Completed Energy Assessment. ▪ Bring copy of Energy Assessment Report to the training. ▪ Completed data collection form.

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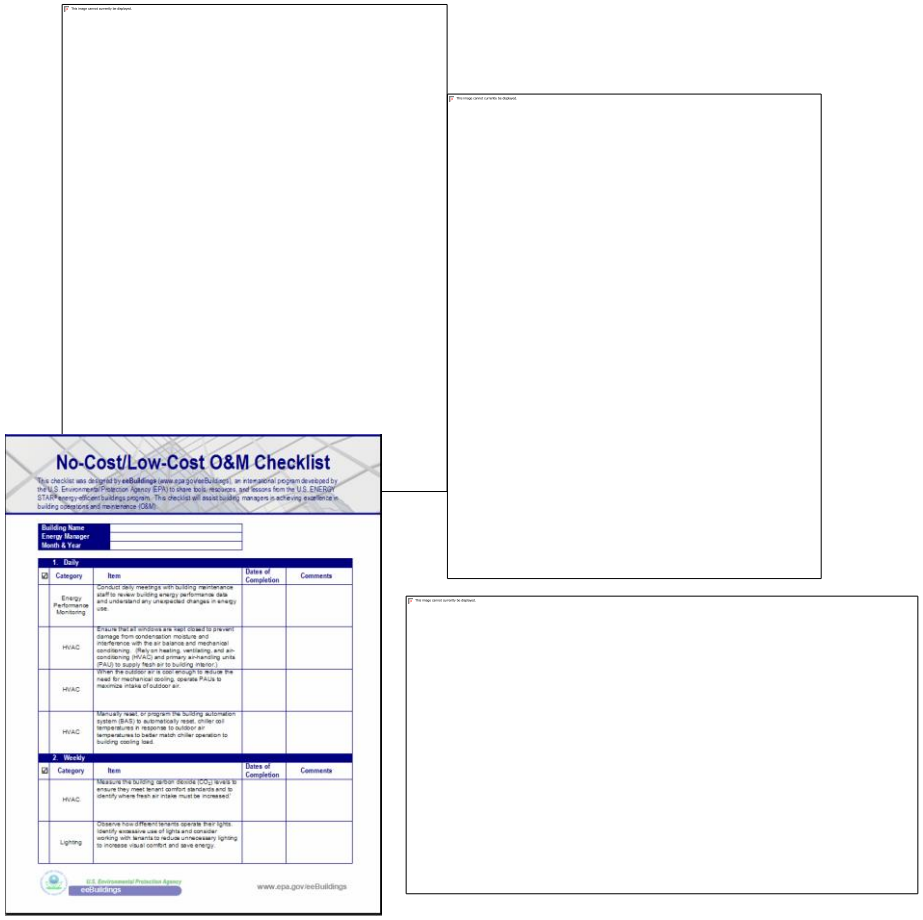
Sample Technical Assistance Tools

- ✓ Case Studies
- ✓ Technology Snapshots
- ✓ No-Cost/Low-Cost O&M Energy Management Checklist
- ✓ Lighting, Chiller, Retrofit Financial Analysis Tools



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Activity 5: Focus Group Sessions

Eligibility	Open to all hotels attending the "Training on Benchmarking and No-/Low-Cost Energy Management Measures" or "Training on Energy Assessment Reports and Technical Assistance Tools"
Description	Two ½-day workshops to respond to technical questions on energy-saving measures, share progress, and network with other professionals.
Schedule	▪ First workshop: May 2014 (locations TBD) ▪ Second workshop: August 2014 (locations TBD)
Benefits	▪ Get technical questions answered. ▪ Report on energy/water savings and progress. ▪ Learn from what other hotels are doing to save energy. ▪ Identify hotels for case studies and recognition. ▪ Network with other professionals.

Requirements	▪ Bring **updated energy data collection template** to the Focus Group with data for:
	  ▪ First workshop: Nov. 2012 to April 2013.
	  ▪ Second workshop: May 2013 to July 2014.
	▪ Data will be used ICED/EECDP to assess savings from the pilot program, develop case studies, and awards.
	▪ Data stays confidential to ICED/EECDP.
	▪ Bring other updates on energy-saving activities at hotel.

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Activity 6: Case Studies, Recognition, and Awards Event

Eligibility	Open to all hotels attending the “Training on Benchmarking and No-/Low-Cost Energy Management Measures” or “Training on Energy Assessment Reports and Technical Assistance Tools”
Description	Delivery of case studies and awards, and recognition event.
Schedule	▪ Deliver case studies: June/July 2014 ▪ Final awards event: August 2014
Benefits	▪ Receive finalized case studies from ICED/EECDP. ▪ High level Ministry of Energy and Mineral Resources and Ministry of Tourism Recognition and Awards for commitment and achievement in saving energy/water and carbon emissions. ▪ The results of this pilot program will be shared across other Southeast Asian countries through the USAID EECDP program.
Requirements	▪ Completed at least 1 training session. ▪ Implemented energy-saving measures at hotel. ▪ Reported energy-savings data to ICED/EECDP. ▪ Reported activities undertaken to save energy to ICED/EECDP.

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Recognition Samples

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Timeline of Activities	S	O	N	D	J	F	M	A	M	J	J	A
Demo Energy Assessments for 6 hotels *Hotels receive Energy Assessment Reports within 2-3 weeks*												
1-day Training on Benchmarking and No-/Low-Cost Energy Management Measures *Participating hotels bring data and receive certificate* *Hotels wanting benchmark assessment share data*												
Benchmark Assessment Reports Delivered												
General Energy Assessments for 24 hotels *Hotels receive Energy Assessment Reports within 3-4 weeks*												
2-day Training on Energy Assessment Reports and Technical Assistance Tools *Participating hotels share data and receive certificate*												
1/2-day Focus Group Discussions *Participating hotels share data updates and energy savings (6 to 8 months) for case studies and awards.*												
Case studies delivered												
Award and Recognition Event												

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Benefits to Participants

- ✓ Free training on energy benchmarking and energy management best practices that can save up to 27% annually in hotel operating costs.
- ✓ Free site assessments to identify specific no-/low-cost O&M measures to improve hotel energy performance, and detailed guidance on how to implement energy-saving measures.
- ✓ Annual energy and water cost savings up to 27%.
- ✓ Free benchmark assessment of energy performance compared to other hotels in the Indonesia market to identify best practices and investment opportunities.
- ✓ Recognition for participating and high-achieving hotels through awards, certificates of achievement, and marketing case studies.
- ✓ Access to hotel energy management resources, such as energy management checklists, lighting and chiller retrofit financial analysis calculators, case studies, and technology snapshots.

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Immediate Next Steps

- Sign up to participate in “Demo” Energy Assessments:
  - Need 2 hotels in Bali, 2 hotels in Yogya, and 2 hotels in Jakarta.
  - Demo energy assessments scheduled for mid- or late-October 2013.

- Sign up to participate in “Benchmarking and Energy Management Training” (1 day) in November 2013.
  - Open to all participants.
  - ***Begin gathering data to prepare for November 2013 workshop!***

- Sign up to participate in “General” Energy Assessments:
  - Need 8 hotels in Bali, 8 hotels in Yogya, and 8 hotels in Jakarta
  - General energy assessments scheduled for Nov. 2013 to Jan. 2014.

Prepare Hotel Energy/Water and Attribute Data

- Prepare 12 consecutive months of energy and water usage data and hotel attribute data for the November training workshop on benchmarking and O&M.

Energy Data	Fuel type					Water Type	
	Electricity	Natural Gas	Liquefied Petroleum Gas (LPG)	Diesel Fuel Oil	Gasoline	Water	Reclaimed Water
	Use	Use	Use	Use	Use	Use	Use
Enter Units	kWh	M3	Liters	Liters	Liters	Liters	Liters
2012 September							
2012 October							
2012 November							
2012 December							
2013 January							
2013 February							
2013 March							
2013 April							
2013 May							
2013 June							
2013 July							
2013 August							
Annual Total	0	0	0	0	0	0	0

ea	Square meters
Number of Guest Rooms	
ers on Main Shift	
mercial Refrigeration or Freezer Units	
ercial open refrigeration units	
ercial closed refrigeration units	
ercial walk-in refrigeration units	
ng facilities	
Occupancy Rate (%)	
ss floor area that is cooled (%)	
r Renovation or Re-branding	
vimming Pools	Square meters
Swimming Pools	Square meters
Floor area of Full-service Spas	Square meters
Floor area of On-Site Laundry Services	Square meters
Floor area of Gym/Fitness Center	Square meters
Floor area of Banquet	Square meters
Floor area of Meeting Room	Square meters
Floor area of Garage	Square meters
Floor area of On-site Retail Store	Square meters

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Thank you!

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