

Energy Conservation in green hospital at **Phyathai 2 International Hospital** Thailand



ESCI BEST PRACTICES AWARDS
LOW ENERGY BUILDINGS NETWORK

Category: ☒ Buildings ☒ Large ☐ Small and Medium
☐ Industries

Title of Activity / Project / Theme:

Energy Conservation Campaign at Phyathai2 **international hospital**, Thailand.

Applicant General Information

Name of Company	: Phyathai 2 international hospital
Business Address	: 943 Phaholyothin Road, Samsannai, Phyathai, Bangkok 10400
Number of Employees	: 1,300 Persons
Type of Building	: Hospital Building
Age of Building	: 27 Year
Nature of Business	: Public general hospital.
Contact Person	
Name	: Dr. Anantasak Apairatana
Position	: Hospital Executive Director
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Project Abstract

Phyathai 2 International Hospital was established on July 22nd, 1987, the hospital consists of two large buildings with 260 bed-days with 1,300 staffs, and the air-conditioned area is 59,638 square meters where the services are open 24 hours daily. The electricity power is supplied by the Metropolitan Electricity Authority, where both buildings consist of two transformers each (2 sets of 2,000 kVA for each building). Diesel fuel is used for backup generator where Building 2 also uses LPG gas to produce hot water. The total average energy consumption is 42,878,039 MJ/ year. Since 2011, the energy conservation campaign has been introduced and implemented; the goal is aimed for the improvement in 3 major aspects; People ware, Hardware and System ware. To best achieved result in energy conservation, the hospital provides the proper training and public relation to raise the energy awareness consistently. Through the energy conservation campaign (2011-Present) proved to be very successful in reducing the total energy consumption, the result showed in 2013 where the energy/patient index (MJ/bed-day) had decreased by 24.9% for the in-patient and 34.4% for the out-patient respectively; the overall energy consumption dropped by 15.12% in comparison to the baseline energy consumption in the past six years, which is the lowest so far. Recently, Phyathai2 International Hospital was awarded *the best Energy Saving Building of MEA 2013 from Metropolitan Electricity Authority of Thailand with the prize money of 2 MB and also Thailand Energy Awards 2014*. These indications showcased the proper applications of energy management and appropriate technology applied with continuous public relation and trainings to motivate staff in achieving the best result in energy conservation campaign and sustainability.

CERTIFICATION AND ENDORSEMENT

The **Phyathai 2 international hospital** hereby agreed to allow the ESCI and other experts that may be designated by ESCI to visit the building and verify the authenticity of the data. However, two weeks advance notice is required to allow for necessary arrangements.

We also hereby agreed that ESCI can publish the whole submission in ESCI publications and website, without any prior consent of the owner of the buildings. If the submission will be published in other publications, the consent of the concerned building would be required.

We, the undersigned certified that the information given is true and accurate and prepared with the consent of the parties involved.

(Dr.Anantasak Apairatana)

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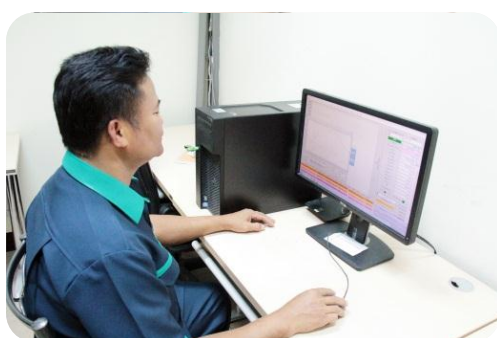
Overview

As the current problems related to energy and environment has risen constantly, the changing in global temperature further affect us. Like in 2011 Great Flood, many suffered broken homes, lost business, this brought about the realization that we must work together in reducing the energy consumption and preserve the environment to help reduce the global warming effects. As per say, *“If we don’t work together to reduce the energy consumption and preserve our environment, eventually we’ll be the one who’ll suffer.”* Phyathai 2 Hospital then proposed to be one of the leaders in energy conservation campaign by setting a highest standard to become a display center in term of best energy and environment management practice in the society.

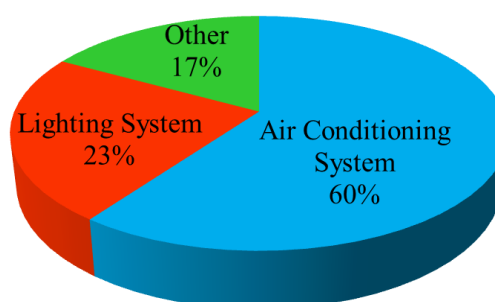


P2H was a main organizer in raising the fund for flood victim during 2011 Great flood and Join Children Day at Energy Conservation building in the Honor of the King.

Through the serious commitment of Mr.Att Thongtang, CEO of the Phyathai-Paolo Memorial Hospital Group, who designated the energy conservation policy. Phyathai 2 International Hospital, since **Dr.Anantasak Apairatana**, ED (Hospital Executive Director) has accepted the position, the Energy Conservation Policy 2011(1st Policy) was announced as part of his commitment to comply with the task. The policy was assigned for acknowledgement and everyone’s corporation within the hospital, to effectively reduce the energy consumption and the unnecessary energy losses in operation. The energy management committees, 5S agent and SGA agent have been formed to apply policy strategic goals with employee through all channels of communications while encouraging and monitoring the progress. As Dr.Anantasak often said, *“Everyone in every square inch of the hospital will be responsible for the energy usage. Energy conservation is part of the KPI in every unit, which will be evaluating from the annual energy conservation presentation of every department.”*



Energy Management System Software



Energy Consumption Index Ratio

1. Innovations

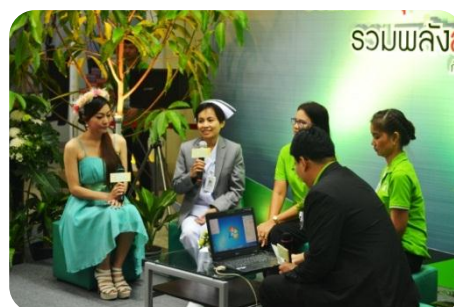
1.1 Level of Participation and Involvement

Dr. Anantasak Apairatana, Hospital Executive Director once said, *“The most difficult challenge in energy conservation project is to help encourage them to realize the action is to be admired, only after then the success can be achieved.”*



PYT2 Energy Hero Contest

Throughout the campaign, the hospital makes sure everyone in all levels is involved by often organizing both trainings and activities. The energy management committees, 5S Agent and SGA help keep track the progress contributed in each department, while assisting with encouragement. SGA also act as a coach to deal with staff in personal level; have a talk to find the problem, giving suggestions to help solve the problem properly. Follow with the energy audit and analyze the progress and activities in each unit monthly. The quarterly contest like monthly energy usage contest from each unit and innovative ideas contest are implementing frequently. While the yearly main event will promote the annual results to the public and award the winners; the Energy Hero, the saving considered your free usage contest (providing the winner with prize money).



Best Innovation P2 Green Hospital Contest



Executive Director often visits every unit

1.2 Top Level Management Commitment

Through the commitment of Mr. Att Thongtang, CEO of the Phyathai-Paolo Hospital Group, in reducing the energy consumption. At Phyathai 2 International Hospital, since Dr. Anantasak Apairatana, Hospital ED. has accepted the position, the Energy Conservation Policy 2011(1st Policy) was announced as displaying his commitment to execute the task. The policy was assigned for acknowledgement and corporation of everyone within the hospital, in effectively reducing the

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Energy Conservation KPI; 10% reduction

Phyathai 2 Hospital adopted the development of 3 important aspects; People ware, Hardware and System ware, in aiming to succeed in energy conservation. Through wide range publicity and constant motivation, the mission is to illustrate energy conservation prototype for the hospital group and general public who may be interested in a visit.

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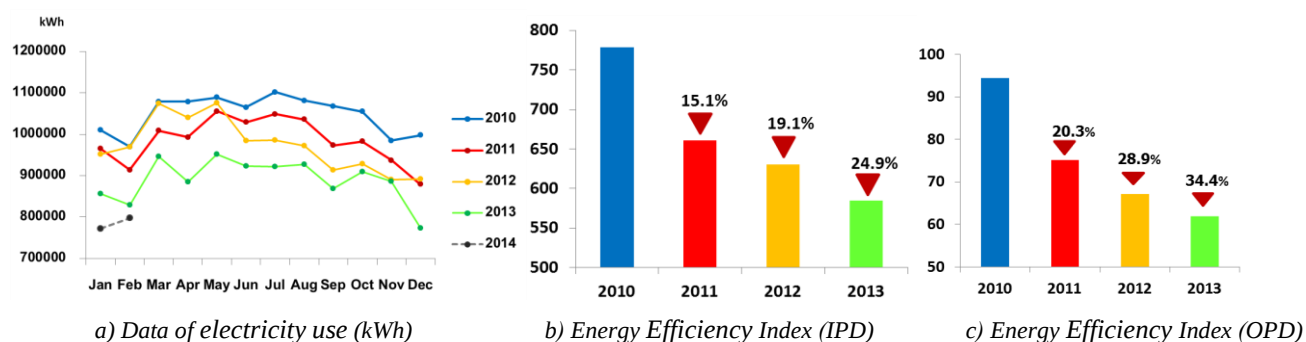
Energy Conservation Planning and Activities 2014-2016

No.	Energy Conservation Activities	Period	Annual energy conservation goals					Invest. (THB)	Payback Period (year)	
			Electric			Fuel(LPG)				
			(kW)	(kWh)	(THB)	kg	(THB)			
Year : 2014										
1. Development of engaging and educating employees.										
1.1	LEAN training to minimize loss and reduce energy consumption.	Jul – Nov 2014	-	-	-	-	-	60,000	-	
1.2	Workshop activities according to a leak and Energy Innovation Contest.	Sep - Nov 2014	-	-	-	-	-	50,000	-	
1.3	Training personnel in energy conservation with DEDE.	Jun 2014	-	-	-	-	-	-	-	
2. Technology and the development of machine performance.										
2.1	Replace to High-Eff. chiller 400Ton.	Sep 2014	84	367,920	1,398,096	-	-	6,000,000	4.29	
2.2	Install LED tube 1,000 set in 24 Hr. Area	Sep 2014	26	170,820	649,116	-	-	1,300,000	1.9	
2.3	Reuse rejected water from RO	Sep 2014	-	-	-	-	-	80,000	-	
3. System development to achieve sustainability.										
3.1	Development of knowledge management systems to conserve energy. (Energy Sharing)	Jun – Dec 2014	-	-	-	-	-	-	-	
3.2	Develop work procedures to ensure compliance with energy conservation.	Jun – Dec 2014	-	-	-	-	-	-	-	
3.3	Performed studying standard system ISO14001&50001 for hospital.	Oct – Dec 2014	-	-	-	-	-	-	-	
Year : 2015										
1. Development of engaging and educating employees.										
1.1	LEAN training to minimize loss and reduce energy consumption.	May – Jun 2015	-	-	-	-	-	60,000	-	
1.2	Seminar on energy conservation	Sep – Oct2015	-	-	-	-	-	-	-	
2.1	Install Centralized Temperature Control System with Electronic Thermostat	Feb – Dec 2015	-	-	-	-	-	-	-	
2.2	Replacing and balancing valves in a HVAC System	Feb – Dec 2015	-	-	-	-	-	2,000,000	-	
2.3	Extend system of solar hot water	Feb – Dec 2015	-	-	-	504	54,000	300,000	5.55	
3. System development to achieve sustainability.										
3.1	ISO14001&50001	Feb – Oct 2015	-	-	-	-	-	-	-	
3.2	A revolution energy saving design contest	Feb – Oct 2015	-	-	-	-	-	-	-	
Year : 2016										
1. Development of engaging and educating employees.										
1.1	Energy exhibition of Phyathai Group	-	-	-	-	-	-	-	-	
1.2	Extend success to other hospital	-	-	-	-	-	-	-	-	
1.3	Energy conservation for Organization development activity	-	-	-	-	-	-	-	-	
2. Technology and the development of machine performance.										
2.1	Developed to Green Building	-	-	-	-	-	-	-	-	
2.2	Temperature control system using a computer	-	-	-	-	-	-	-	-	
2.3	Development of monitoring system and demand control	-	-	-	-	-	-	-	-	
3. System development to achieve sustainability.										
3.1	Promoting Corporate Social Responsibility through energy conservation	-	-	-	-	-	-	-	-	
3.2	Development of Best Practice for model sustainable development	-	-	-	-	-	-	-	-	
3.3	Continuous improvement to become the low carbon hospital	-	-	-	-	-	-	-	-	
Total			110	538,740	2,047,212	504	54,000	9,850,000	4.69	

2.Completeness

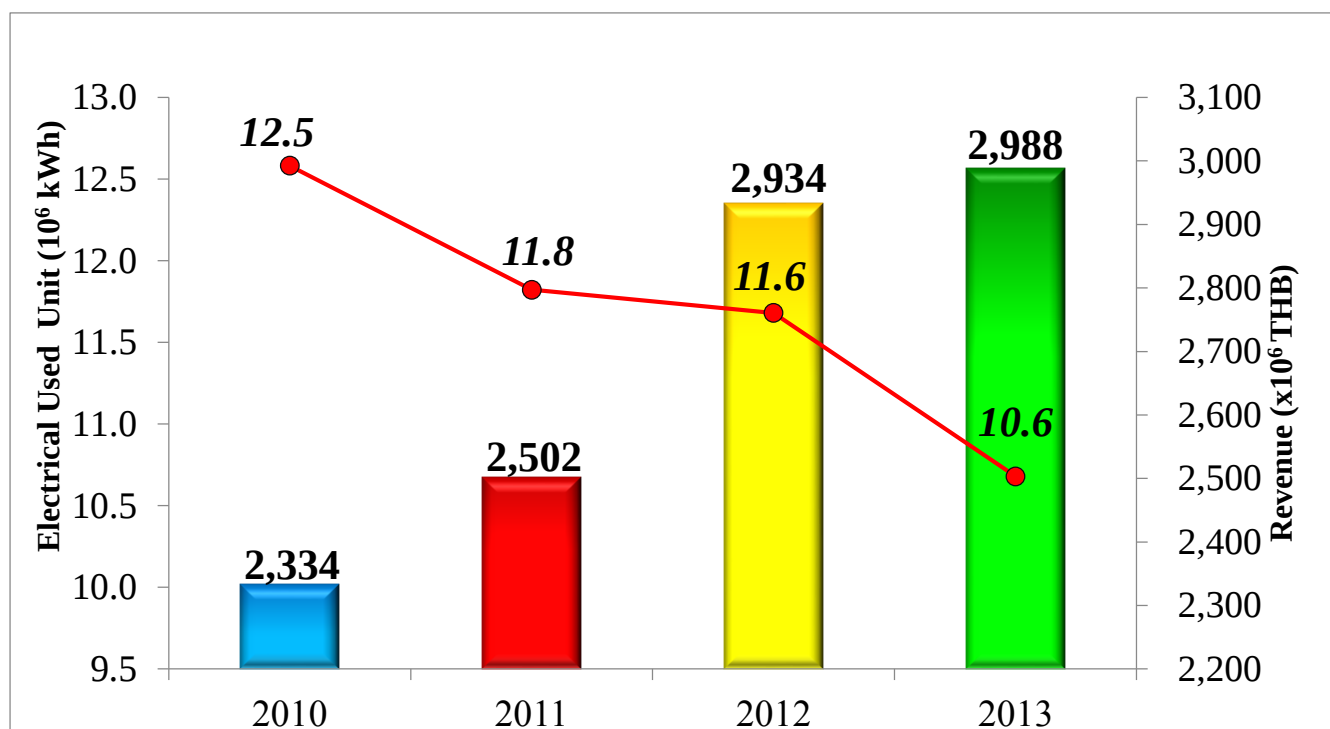
2.1 Energy Saving

During the past three years, since the energy conservation campaign has started, the administration has allocated funds of around **26.96 MB** budget to develop and improve all three important aspects, People ware, Hardware and System ware, to best achieve the results. Investment projects, such as the applications of efficiency and appropriate technology have been implemented; i.e. the combined of Chiller Plants that used in both buildings, a replacement of the more efficient water-cooled chillers, installation of Chiller Plant Manager System (CPMS), Variable Speed Drive (VSD) for all the motors in the HVAC system of both buildings. Moreover, even in some other systems, such as lighting; replacement of T8 with the LED fluorescent tubes and also installed the motion sensor in some areas, the use of renewable energy such as solar-collector to produce hot water with an average payback period of only 2.14 years. The result of energy management proved to help generate the saving of up to **12.57 million THB**.



Statistical Energy Conservation Data 2010 - 2013

Electrical used VS Revenue Prior 2010-2013

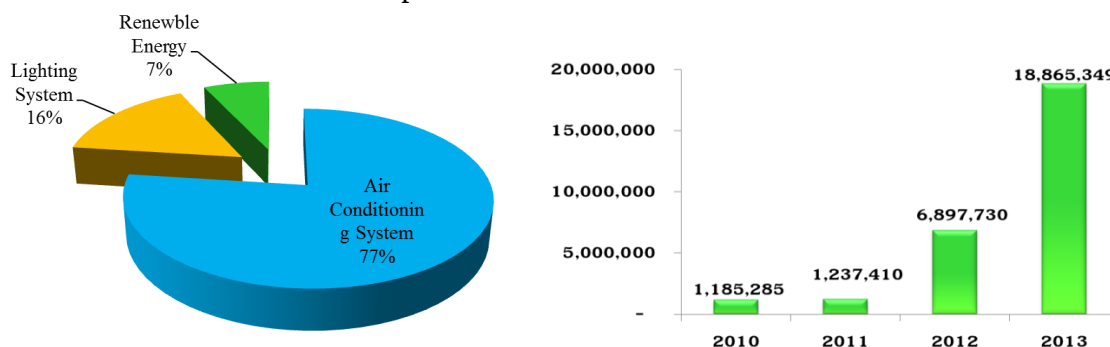


2.2 Economic Effect

2.2.1 Investment

2.2.2 Payback period

In energy conservation investment projects, Phyathai 2 concentrate on high power consumption equipment, and found that the air-conditioning and lighting are the highest ratio of all major components in facility. That brought about the replacement of water-cooled chiller and LED light tubes, started from 2011, and continue the investment in more efficiency technology up until the present. In term of these investments, besides the saving it'll gain, another major focus point is on the reduction of the environmental impact.



Ratio of investment in different types of technology

This brought about the idea of cleaner energy like the solar street lighting around the buildings and solar collector to produce hot water. These projects were actually still too costly in term of return investment, however Phyathai 2 considered the opportunity to promote the use of cleaner energy and help reducing the environmental impact and become *“the Low-Carbon Hospital”*. As once mentioned by the top management, *“Rather than saving benefits we’ll gain, it is the consciousness in energy conservation we need”*

Energy Conservation Activity		Conservation per year						Invest. (THB)	Payback Period (year)
		Electricity			Fuel				
		(kWh)	(THB)	CO ₂ Reduced (TON)	(MJ)	(THB)	CO ₂ Reduced (TON)		
Year : 2011	Measures from non-investment								
	Adjust to optimized chilled water temperature.	143,664	465,471	104.4	-	-	-	-	-
	Measures from investment								
	Replace Fluorescent light bulbs from 36W (T8) to 28 W(T5)862 set.	120,818	391,450	87.8	-	-	-	821,715	0.85
	Replace Fluorescent light bulbs from 28W (T8) to 15W(T5)1,564 set	178,108	577,070	129.4					
	Replace Halogen 50 W. toLED 3W.	175,267	567,867	127.3	-	-	-	415,695	0.73
	Total for 2011	617,857	2,001,858	449	-	-	-	1,237,410	0.62
Year : 2012	Measures from non-investment								
	Reducing electric power heater use to soft towel box for retain heat	12,045	46,735	8.8	-	-	-	-	-
	Reduce time, process and energy in preparing meeting room.	53,541	207,739	38.9	-	-	-	-	-
	Installed Timer control Air-Cond. Conveyor room.	60,917	236,358	44.3	-	-	-	-	-
	Adjust to optimized chilled set point.	143,664	557,416	104.4	-	-	-	-	-
	Measures from investment								
	Replacement to High-Eff. Chiller water cool.	602,434	2,337,444	437.7	-	-	-	6,000,000	2.57
	Installed VSD for HVAC plant.	277,648	1,077,274					897,730	0.83
	Total for 2012	1,150,249	4,462,966	634	-	-	-	6,897,730	1.55

Energy Conservation Activity		Conservation per year						Invest. (THB)	Payback Period (year)
		Electricity			Fuel				
		(kWh)	(THB)	CO ₂ Reduced (TON)	(MJ)	(THB)	CO ₂ Reduced (TON)		
Year : 2013	Measures from non-investment								
	Reducing electric power heater use and using STERILE water for prepare infant milk	5,076	19,694	3.7	-	-	-	-	-
	Measures from investment								
	Reusing RO Reject water	-	-		-	46,165		174,196	3.77
	Contest and promotion of energy conservation.	-	-	-	-	-	-	1,000,204	-
	Installed VSD for AHU(OPD Area)	38,106	137,181	27.7	-	-	-	323,400	2.19
	Combined chiller plant and use high efficiency chiller	1,285,756	4,988,734	934.1	-	-	-	12,700,000	2.55
	Replaced Flu. lamp 36 W to LED tube	300,188	1,164,728	218.1	-	-	-	2,240,600	1.92
	Installed dimmer ballast with motion sensor for Fluorescent lamp 36 W	245,465	952,404	178.3	-	-	-	1,000,000	1.05
	Installation of lighting for around the building by 1 kW solar power	2,350.60	9,120	1.7	-	-	-	650,000	19.8
	Installed Solar collector system	18,697	67,309	13.6	206,478	74,006	13	467,000	3.19
	Installed electronics Thermostat	11,753	45,601	8.5	-	-	-	50,000	1.1
	Installed "LOSSNAY"	21,310	82,683	15.5	-	-	-	216,000	2.61
	Total for 2013	1,928,702	7,467,454	1,401	206,478	74,006	13	18,821,400	2.48

2.3 Energy Efficiency Index (kWh/m²/year, GJ/ton/year, etc.)

The hospital has been implanting a systematic energy conservation procedure since 2011, the overall energy consumption has been decreased consistently both from electric and thermo fuel energy. By calculating the ratio between the overall energy usage and the amount of patients visited. The index for energy consumption has decreased in **IPD (In-patient) and OPD (Out-patient), 24.9% and 34.4% respectively, while the overall electricity usage also has dropped by 15.12% compare to baseline of past 6 years.** By becoming more effective without affecting the services proved to help reduce unnecessary losses while performing much more effectively.

Hospital's EEI during 2010 - 2013

Year	(1) Electricity (kWh/Year)	(2) Fuel (MJ/Year)	(3) Total Energy Used (MJ/ŋ) [(3) = (1)*3.6 + (2)]	Energy Efficiency Index			
				IPD		OPD	
				(4) (MJ/Bed-day)	(5) Save(%)	(6) (MJ/Person)	(7) Save(%)
2010	12,582,000	15,066.00	45,310,266.00	778.8	-	94.4	-
2011	11,822,750	15,066.00	42,576,966.00	661.1	15.11	75.2	20.4
2012	11,957,000	16,673.04	43,061,873.04	630.3	19.07	67.1	28.9
2013	11,264,348	11,399.94	40,563,052.74	584.5	24.94	61.9	34.4
Sum.	46,764,967	58,204.98	171,512,157.78	-	-	-	-
Avg.	11,691,242	14,551.25	42,878,039.45	663.7	-	74.6	-

"Out-patient is also the key factor that many overlook, even though they only visit the facility for a short period of time, however they are using the facility. So it is essential to add this figure into the overall energy consumption calculation (EEI)."

2.4 Environmental Effect

Presently, we are facing with a crisis of controlling carbon dioxide produced from the energy production. CO₂ is a GHG (Green House Gases), it is one of the major cause for Global Warming. At Phyathai 2 Hospital, the hospital has committed to make sure everyone to know about carbon footprint and understand the environmental effects from the energy usage in their daily life. Throughout the hospital can manage to reduce the energy consumption in a total of **3,696,808 kWh**, which can be translated to the reduction of CO₂emission by **2,497 tons CO₂**.

Waste and Pollution Management

Hospital management has been acting accordingly to the regulation of Waste and Pollution Management laws of Ministry of Environment and Natural Resources of Thailand, as well as under the JCI (Joint Commission International) and the occupational health and safety “SHE” (Safety, Health, and Environment) rules. All these standards required the hospital to provide policy and take action seriously in all procedures; i.e. a measurement of the pollution level in waste water must be monitored and measured monthly by the requirement of Bangkok City waste water management law, the waste management procedure for different types of waste which can be categorized into 6 different types; Household Waste, Toxic waste, Infectious waste, Hazardous waste, Chemotherapy waste and Recycle Waste. Currently the revenue from the recycle materials is about **THB 280,000 / year** with the total weight of **72,000 kg/year**.

Infectious Waste	Hazardous Waste	Toxic Waste	Cytotoxic Waste	Recycle Waste	General Waste
Red	Gray	Gray	Purple	White	Black
 ขยะติดเชื้อ Infectious Waste	 ขยะอันตราย Hazardous Waste	 ขยะพิษ Toxic Waste	 ขยะเคมีบำบัด Cytotoxic Waste	 ขยะรีไซเคิล Recycle Waste	 ขยะทั่วไป General Waste



Waste Management for different types of waste.

Reuse of recycle materials

Some of the recyclable materials can be brought back for a reuse through 3R Policy. At Phyathai 2 hospital, the Best Innovation for P2 Green Hospital contest is organized periodically, to promote the innovative idea of the reuse materials; i.e. the reuse of the file folders that can be used on both side in the Medical Registration Department, a medical tablet box made from reused paper, a reused of some of the plastic bags, and the application of EMR (Electronic Medical Record) to help reduce the use of old fashion keeping medical record on note-paper.



Recycle medical box to use for tablets



Reuse of rejected water from RO Water.



Reuse form and curtain material keep Soft towel

3. Practicability

3.1 Management Practices and Measures

The energy policy strived to become an excellence energy conservation building, and a display center for other organizations. The project management initiated to build **central KM (Knowledge Management)** of the award winning case studies from the contest and event. These practical procedures are proved not to affect the workflow and can be shared to the corporation group companies and those who may be interested. Moreover, Phyathai 2 also organized the seminar “the importance of energy conservation and the status of the energy supply in Thailand” by the special guest speaker from MEA, and “How business should adjust to cope with Thailand’s future energy crisis”. During these events, the suppliers and end users would have the opportunity to share important information and ideas to pursue the successful energy conservation.



Energy Day Events



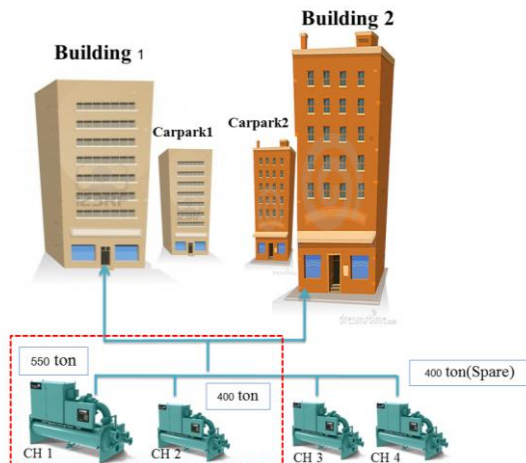
“How business should adjust to cope with Thailand’s future energy crisis” Seminar



KM (Knowledge Management) on P2 Website to be publicly shared

3.2 Technology

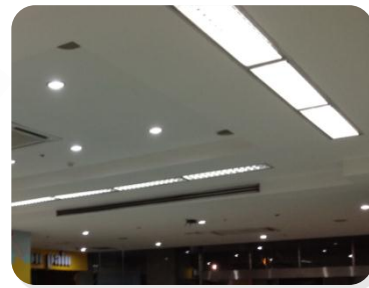
Combined Chiller Plants and High Efficiency Water-Cooled Chillers replacement



After a full survey of air conditioning system found that all six chillers (3 chillers in each building) are over 18 years old, where one of each building would be operating 24 hours daily, from the operation data also found that one chiller often stopped working (shutdown) during the night especially when the load is under 30%. Besides the high maintenance costs especially these chillers are range between 18-28 years old, and routinely operated 3 of 400 ton chillers during the day. This brought about the project to combined two chiller plants together and replacement of ***Solid Stage Starter 400 ton Water-Cooled Chillers and 550 ton Water-Cooled Centrifugal VSD Starter Chillers*** in both buildings. After completion of the project, the energy consumption reduced by ***1,285,756 kWh/year and reduced the carbon emission by about 721 Ton CO₂, where the return investment period is only about 2.55 years.*** Moreover, in the past the hospital had operated 6 chillers, after the project completed, it was able to reduce down to only 4 chillers, while the space gained can be further used for the future installation of the backup generator.

Replace 36 W Fluorescent tube with 20 W LED tube and Motion Sensor

Lighting is also one of major energy usage in the hospital, where most of the areas required having the light turn on 24 hours a day. An existing 36W Fluorescent tube was too old and deteriorating. 20W LED tube was proposed to replace old fluorescent tube mostly in the 24 hours usage areas (about 60% of all the lighting in the hospital), even though the LED is more expensive but the lifetime of usage is about three times longer with the better saving on the electricity. After the replacement of 1,318 bulbs took place, ***the energy consumption is reduced by 300,188 kWh/year translate to about 1,164,728.20 THB/year, with the payback period of 1.92 years and lower the CO₂ Emission by 168 ton CO₂.***



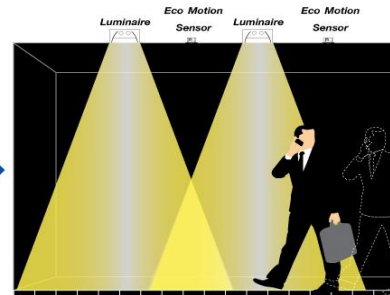
Replace the T8 and T5 tubes with LED Tube

Together with the LED installation, motion sensor was also installed into some areas like the hallways and utility room. Motion Sensor can automatically dim the light when the area is

unoccupied. *Energy saving is 245,465 kWh/year translate to about 952,404 THB/year, where the payback period is only 1.05 years and reduced CO₂ emission by 142 ton CO₂.*

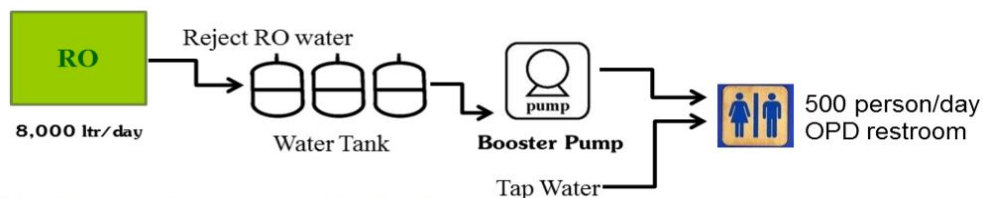


Motion sensor



3.3 The Best innovation for PYT2 Green Hospital

Reuse of the rejected water from the Reverse Osmosis



Water is a precious resource for the living and the need to use water used in medical procedures, the medical need is high purity, and through the process, which makes the RO Reject to **8,000 liters / day**, which can be utilized.

In the past 26 years, we lost more than **76 million liters of water!**

That's equivalent to **57 Olympic swimming pool**. and lose money to more than 1.2 million baht.



Energy Conservation Technician Program



Benefits

- Increase their knowledge and experience in the field of energy conservation
- Capable of operate and control the equipment as target (Peak-demand and kWh)
- Improve their performance at work

Phyatha 2 recognized the importance of personal development, intensive training for technician is part of improvement both personal and organization.

The best innovation for P2 Green Hospital



Benefits and Saving

- Continue developing the new innovative ideas
- Raise the energy awareness and rapport in workplace
- Through the practice and activities help saving 905,854 THB (non-investment) in energy cost
- Proven innovative practice can be transfer to KM and share to others

Involvement of staff is the key factor in successful campaign, their innovative ideas and input is essential for the organization to achieve the target set.

Solar Collector for Hot water to reduce LPG usage



Saving

- LPG 4,111 kg/year
- LPG cost 74,006 THB/year
- Electricity 18,697.1 kWh/year
- Electric cost 725,544 THB/year
- Investment 467,000 THB
- Payback 3.19 years



also replace the use of hot water kettle.

Implementation of Solar Collector helps reducing LPG and Electricity



Reuse of foam from medical box and old curtain to make a towel warmer container.



Reuse of future board from medical box to make a medicine tablet box.



Create KM on the Hospital Website to be shared with Group Companies and Public.

Combined Chiller Plant and High Efficiency Chillers Replacement



Before

400 ton

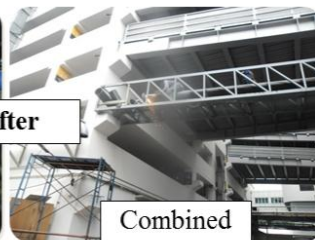


400 ton



After

550 ton



Combined

Saving

- Electricity 1,285,756 kWh/year
- 4,988,734 THB/year
- Investment 12,700,000 THB
- Payback period 2.55 years

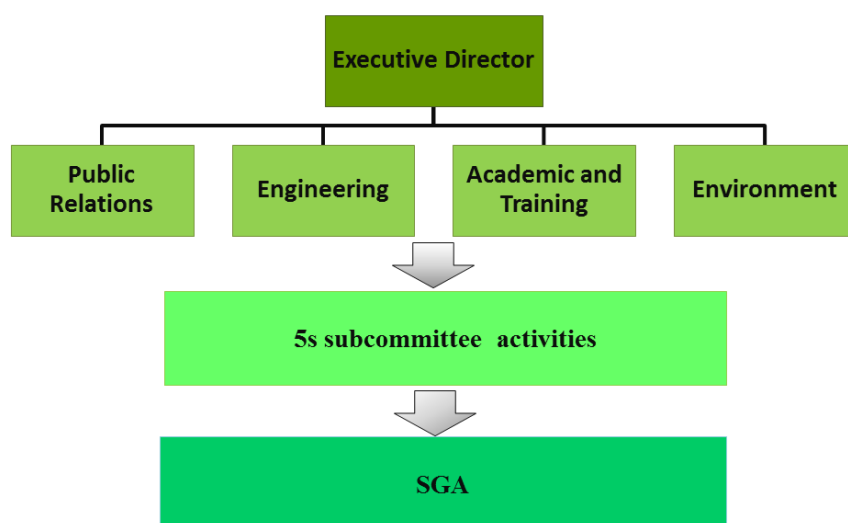
Benefit

- Reduce the maintenance cost
- Increase free space for back up generator

4.1 Contribution

4.4.1 Establishment of Organization of Energy Management

Since 2011, the management has appointed to form a responsible working group as known as the Energy Committees to overlook the energy conservation campaign. The Energy Committees is responsible for deciding on strategic planning and implementation of activity to meet the set goal. The plans and progress should be reviewed and improved yearly. Presently, Dr. Anantasak Apairatana, Hospital Managing Director is acting the chief of the Energy Committees; the committees are comprised of executive directors and managers from all departments, while Mr. Att Thongtang, CEO of Corporate Group is acting as honorary advisor.



Energy management committee is responsible for strategic planning, set up a policy, measurement and follow up with frequent audition, which comply to the business of the hospital, where the procedure should not affect the services and still can improve the performance.

5s subcommittee activities is responsible for complying with the energy conservation policy, implement the plans, oversee the progress in a larger section of workplace. Then report the progress to the energy management committees.

SGA (Small Group Activity for energy conservation) is responsible for all activities in the plan, implement while acting as a coach in smaller unit and report the progress to the 5S subcommittees.

Energy Conservation Organize Chart

4.2 Capacity building

4.2.1 Activities

Projects / activities applied both internal and external of organization.

Energy conservation activities are actively carried out both inside and outside the organization. The main aim is to, *“Encourage with activities for the staff to be aware and easily to get involved, while perform with efficiency and effectiveness in energy conservation.”* See below for some of the award winning energy measurement activities below;



Seek for the Leakage Workshop



Adjudge the winner for Innovation for P2 Green Hospital Contest



Green Princess Contest during the New Year Party



Green Day: Green Hospital to raise the energy awareness

4.2.2 Educational Training

Internally, Phythai 2 has been focused on providing energy training to personal in all levels, so that the energy policy can be realistically utilized into action. The energy training and workshop are provided yearly, where everyone will be updated with up to date energy knowledge and learn to create better fit energy measurement in their actual workplace, while the audit team will follow up with the result, progress and consultation. Externally, the hospital often sends out the responsible personal to attend seminars or energy events especially from Ministry of Energy, and all other agencies to gain new knowledge and extend the energy network.

Name of course	Day/Month/Year	Quantity (people)	Quantity of Training (Time)
Internal training			
Executive meeting on energy policy	2011	80	1
Energy conservation awareness	2012	60	1
Energy saving techniques for engineer	2012	12	1
Participatory energy conservation for employees (100%)	2012	1,313	12
Energy conservation techniques for practice(Look for energy leaks)	1/10/2012	1,166	12
Energy conservation awareness for executive	24/04/2013	60	1
New employee orientation for energy conservation	2013	250	24
Seminar on energy conservation	18/9/2013	130	1
Internal audit of energy management	02/2013	22	1
Announce energy conservation policy by CEO	10/05/2013	1,313	1
External training			
Study tour for energy conservation in Phyathai-Sriracha hospital	2013	14	1
Development of energy management in building	25/07/2012	2	2
Opening ceremony of the seminar on Thailand Energy Awards 2013	2013	4	1
Energy saving in Hybrid solar water heater	10/05/2013	2	1
The seminar on save energy for our beloved King	14/02/2013	1	1
Waste management in Hospital	11/09/2013	3	1
Building an environmental management system	20/09/2013	3	1
Promoting energy efficiency in buildings	30/10/2013	1	1
Safety, health and environment at workplace	9/04/2013	7	1
Opening ceremony of the seminar on Thailand Energy Awards 2014	2014	4	1



Joining “Energy Project Development of personal and management” by Ministry of Energy at CCIT.

“The advantage of implementing energy conservation is not only the reduction of the operation cost (energy cost), and all other benefits we’ll gain. The most important of all, is that we are consistently developing and doing the right thing as part of the society and for the world.”

Phyathai 2 International Hospital



“Proceed forward with innovative idea toward sustainability”