

Energy Conservation Virtue at Huachiew Chalermprakiet University

Thailand



Introduction video

Full Paper

Project Abstract

Huachiew Chalermprakiet University opened in 1992. The university has 886 staff many of whom have been working with the university from its early days. The university working days are from Monday to Saturday (3,744 hours per year). Aside from maintaining full-teaching operations, the university also strives to have impeccable green credentials through a low energy consumption profile.

From 2012 to 2015, the university has engaged in an energy saving program and this has resulted in reduced energy consumption. To achieve the goal of energy efficiency, Huachiew Chalermprakiet University has created a culture of energy saving in all levels of university operations. We have encouraged employees to be personally involved in energy conservation activities. There are team members, who lead the campaign to reduce the carbon footprint. It started with energy conservation training for every staff so they could guide others and apply their know-how and skills in their working routines. We also encourage students to join the campaign by using energy economically, during student activities within the university. Then there are also ongoing outreaches to the community. Activities are conducted to educate students about energy saving as part of our corporate social responsibility program.

For the past four years through energy conservation activities (both investment and non-investment), we have reduced energy consumption by more than 2,620,435 kWh, which is equal to 1,903.79 tons of CO₂ emissions. The reduction of energy consumption gave us a total savings of over 10.99 million baht with the average ROI of 3.37 per year. Recently, Huachiew Chalermprakiet University was awarded the **Best Energy Saving Building of MEA 2015 from the Metropolitan Electricity Authority of Thailand with prize money of 2**

million baht. Also we were honored at the Thailand Energy Awards 2016 and ASEAN Energy Award 2016.

A culture of energy saving was not easy to create but at Huachiew Chalermprakiet University, **WE CAN**. It is our firm belief that our success story is driven by our staff, who is committed to the energy conservation program.

Strategy

Inspiration

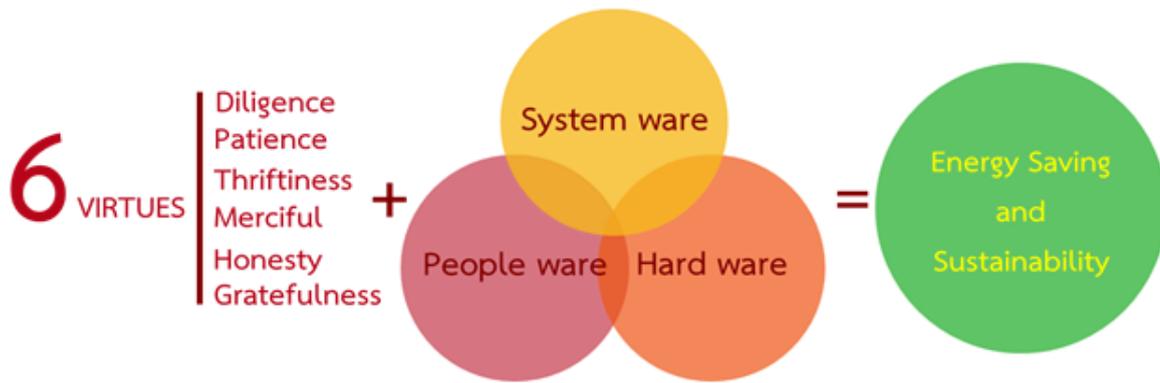
From H.M.King Bhumibhol Adulyadej's words in June 24, 1994, "May you manage the university along the path of righteousness.", we reminded ourselves in thinking, speaking and doing to follow our King's words. We aimed to apply his words in conducting our energy conservation projects.



“May you manage the university along the path of righteousness.”

Clearness to Sustainable Energy Saving

Participation is the heart of success at Huachiew Chalermprakiet University. Our energy conservation achievement originated from our directors and managers, joined by our staffs, students and other organizations. These various parties have driven energy conservation policies and activities, and then eventually became Huachiew Chalermprakiet University's culture in energy conservation. We also established policy committees, energy management committees and energy audit committees. We have many energy conservation activities which were succeeded by participations from every level of Huachiew Chalermprakiet University's people. Some of these projects are the "Bike, Grow, Save" and R2I Project.



Huachiew Chalermprakiet University is guided by Assoc. Prof. Dr. Prachak Poomvises who committed to “RUN THIS UNIVERSITY WELL” and the “6 Huachiew Chalermprakiet University virtues”. This eventually became our “VIRTUE ENERGY CONSERVATION”. We also have concrete policies and clear goal in mind. Along with our staff, continuous funding and evaluation, we can accomplish energy conservation activities. Together with a systemic energy management, Huachiew Chalermprakiet University has been successful in attaining sustainable energy conservation.

ENERGY CONSERVATION VIRTUE



In order to reach our energy conservation goal, Huachiew Chalermprakiet University had announced energy conservation policies and established organizations to drive these policies and do actions in energy conservation. These organizations were established from every level of Huachiew’s staffs, supported by sufficient funding from the university with continuous evaluation and development. Not only we focused on finding appropriate energy saving policies and actions, but we also created a culture of organization in energy conservation by encouraging teamwork, educating and training. Thus, our people can apply energy conservation to their works and lives.

MEA Energy Saving Building Awards 2015

2012 Baseline

2013- 2014

- Reducing 10% of our energy consumption.

2015 – 2017

- Reducing 15% of our consumption from year 2012.
- Becoming a role model university in virtuous. energy conservation.
- Becoming a national energy saving university role model.

Innovativeness

<h3>1. Classroom Energy Monitoring</h3> <p>Huachiew Chalermprakiet University has installed energy monitoring device in our classrooms which will enable us to manage our classrooms more efficiently. In the near future, we will be able to adjust our classrooms and the number of students in those class to optimize energy consumption.</p>	
<h3>2. Green Bus Station and Energy Saving Security Point</h3> <p>Aiming to elevate scenery in Huachiew Chalermprakiet University, we have planted many trees and plants in our campus. These trees and plants do not only make our university livelier, but also reduce solar heat transfer to our facilities.</p>	
<h3>3. Loss Nay Installation</h3> <p>Indoor Air Quality is a crucial factor for our students learning capacity. Hence, we have installed Loss Nays or Air Exchange Machine in our classrooms. These machines do not only increase our</p>	<p style="text-align: center;">Total-Heat-Exchange Concept</p> <p>operation in Winter</p> <ul style="list-style-type: none"> 15.4c Fresh warm air (indoor supply air) 20c Stale warm air (indoor air) 4.6c Stale hot air (exhaust) 0c Fresh cool air (outdoor air) <p>operation in Summer</p> <ul style="list-style-type: none"> 24.2c Fresh cool air (indoor supply air) 21c Stale cool air (indoor air) 31.8c Stale hot air (exhaust) 35c Fresh hot air (outdoor air) <p><small>-Heat-exchange calculating equation Indoor supply air = (Indoor - Outdoor temperature) × temperature × (1 - efficiency) + (Indoor - Outdoor temperature) × efficiency Calculation example: 15.4°C = (20°C - 15°C) × 77% + 15°C (see table)</small></p> <p><small>-Heat-exchange calculating equation Indoor supply air = (Indoor - Outdoor temperature) × temperature × (1 - efficiency) + (Indoor - Outdoor temperature) × efficiency Calculation example: 24.2°C = (21°C - 35°C) × 77% + 35°C (see table)</small></p>

classrooms' indoor air quality, but they also reduce energy consumption in those classrooms.

4. Student Scholarship from energy saving

In doing energy conservation, we believe that these benefits will, at last, be given to the next generations. At Huachiew Chalermprakiet University, those money savings from our energy conservation projects will be given as scholarships to our students.



For over 5 years of energy conservation, we have funded more than 34.15M Baht investment in peopeware, systemware and hardware. These have resulted in a total energy saving of over 2,620,434 kWh.



Measures investments in 2013-2015

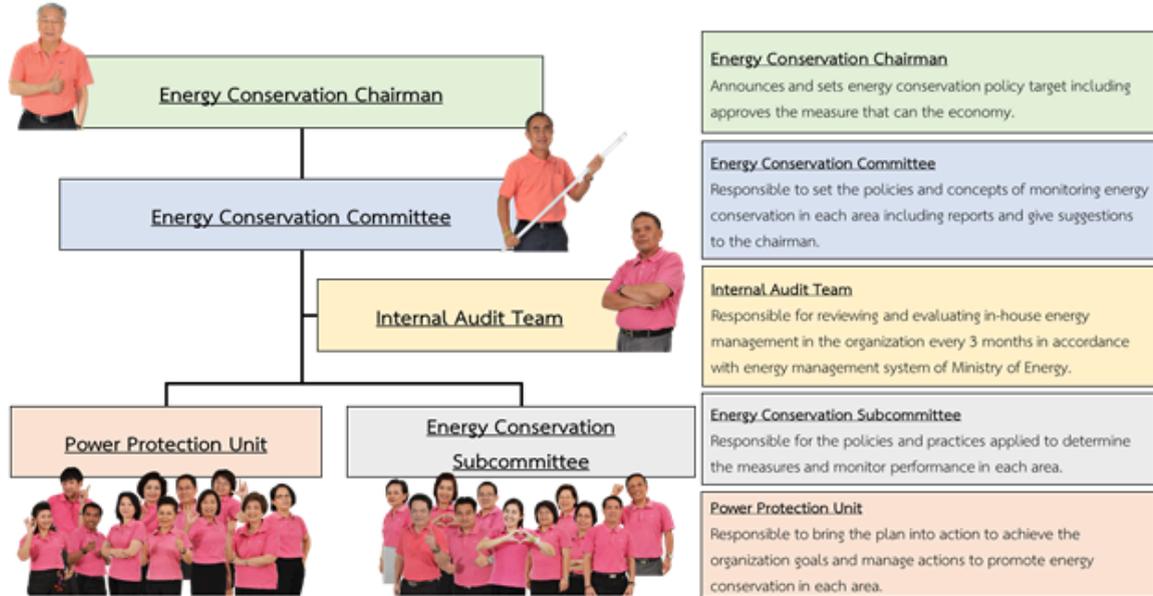
Measure

Replicability

Establishment of Organization of Energy Management

Huachiew Chalermprakiet University has established an energy management organization since 2011, in order to succeed in its sustainable energy conservation goal. The organization consists of the Chairman of Energy Management who is Assoc. Prof. Dr. Prachak Poomvises himself, the Board of Committees who apply policies into everyday works, sub-committees who analyze and develop energy saving projects and a working group which is consists of various people from each department.

Organization of Energy Management



Employee Development and Educational Training

At Huachiew Chalermprakiet University, we have continuously educated our people in energy conservation. Focusing on every level of our staffs and students, our people had a clear understanding about energy conservation which will lead to firm energy conservation awareness. In order to do so, we invited specialists in energy conservation from the Ministry of Energy and energy consultant firms to educate and train our people in energy conservation. We also observed and learned from other successful organizations, and brought and applied those knowledge to our organization; some of them can even be applied at our staff's house.



Phayathai Sriraja Hospital



Ayutthaya Hospital



King Mongkut's University



Richmond Hotel



Phayathai 2 Hospital



Energy Saving of Chalemprakiet Building

Table 1: Energy Conservation Training Courses

Name of Course	Day / Month / Year	Quantity (People)	Quantity of Training (Time)
Internal Training			
New Staff Orientation in Energy Conservation	16 Oct. 2013	60	1
Energy and Environment Seminar	21 Oct. 2013	24	1
Energy Awareness Seminar I	11 Nov. 2013	39	1
Basic Energy Saving Seminar	16 Nov. 2013	55	1
Energy Management Training	21 Nov. 2013	27	1
Basic Energy Saving Seminar	26 May. 2014	32	1

New Staff Orientation in Energy Conservation	29 Jun. 2014	69	1
New Staff Orientation in Energy Conservation	6 Aug. 2014	18	1
Energy Awareness Seminar II	17 Dec. 2014	55	1
New Staff Orientation in Energy Conservation	1 Jul. 2015	63	1
New Staff Orientation in Energy Conservation	8 Jul. 2015	13	1
Basic Energy Saving Training	17 Jul. 2015	26	1
Collaborative Energy Conservation Training	13 Aug. 2015	52	1
Collaborative Energy Conservation Training	13 Aug. 2015	46	1
R2I : Routine To innovative changed to "Routine to Innovative"	18 Sep. 2015	66	1
New Staff Orientation in Energy Conservation	14 Dec. 2015	45	1
New Staff Orientation in Energy Conservation	14 Dec. 2015	71	1
New Staff Orientation in Energy Conservation II	18 Dec. 2015	74	1

External Training			
Learning Energy Conservation at Phayathai Sriraja Hospital	24 Feb. 2013	84	1
Learning Energy Conservation at Ayutthaya Hospital	20 Jan. 2013	88	1
Technology Demonstration Seminar	25 Oct. 2013	5	1
7 th Energy saving for H.M. King Bhumibol Adulyadej	6-7 Mar. 2014	16	1
Electrical system maintenance to increase energy efficiency	27 Jun. 2014	2	1
Preparing for EnMR (ISO 50001)	26 Nov. 2014	1	1
Preparing for ISO 50001	14-15 Aug. 2014	2	1
Senior energy manager training: Practice of electrical system	17- 21 Nov 2014	1	1
Senior energy manager training: Theory of electrical system	12-16 Jan. 2015	1	1
8 th Energy saving for H.M. King Bhumibol Adulyadej	5-6 Mar. 2015	10	2
Learning Energy Conservation at King Mongkut's University of Technology Thonburi (Thailand)	10 Jul. 2015	54	1

Learning Energy Conservation at Phayathai 2 Hospital	10 Jul. 2015	54	1
Learning Energy Conservation at Energy Saving Building of H.M. King Bhumibol Adulyadej	15 Jul. 2015	49	1
Learning Energy Conservation at Richmond Hotel (Thailand)	15 Jul. 2015	49	1

Applicabilities and Knowledge Management

To succeed in energy conservation and make it applicable with everyday works, we conducted innovative energy saving contests (R2I: Routine to Innovative for Energy Saving) to encourage our staffs and students to apply energy conservation ideas in their lives.



These projects resulted in reduction in energy costs, work processes, man-hour and energy consumptions. In order to enlarge the sphere of impact from this knowledge, Huachiew Chalermprakiet University conducted a seminar to present and discuss each of the ideas, with Miss Laksawan Wongworrakan, the director of Richmond Hotel as the guest speaker on “Energy Saving Success in a Hotel Facility. We also received honor from Mr. Sanit Ungsusint, the Vice-President of Metropolitan Electricity Authority to open the seminar, which was participated by more than 50 organizations.



Innovative energy saving contest (R2I: Routine to Innovative for Energy Saving)

Public Relation about Energy Management through Various Channels

Aiming For other organizations to have opportunities to learn from our success in energy conservation, we told our stories through various channels including magazines, websites, Facebook and TV channels.



Magazine Energy Saving



MONO29 TV Channel and Spring News

Activities: Projects / activities applied for internal and external of organization

With our “Virtuous Energy Saving” campaign, we wholeheartedly applied our motto and energy saving ideas to serve our society through various activities such as sports day, and energy conservation trip in Huachiew’s campus. The activities and projects were conducted

in more than 100 communities by our staffs and students who are determined to serve our society using our virtuous energy conservation project.



Social healthcare services



3P Activities



Energy Day 2013-2015



Planting mangroves

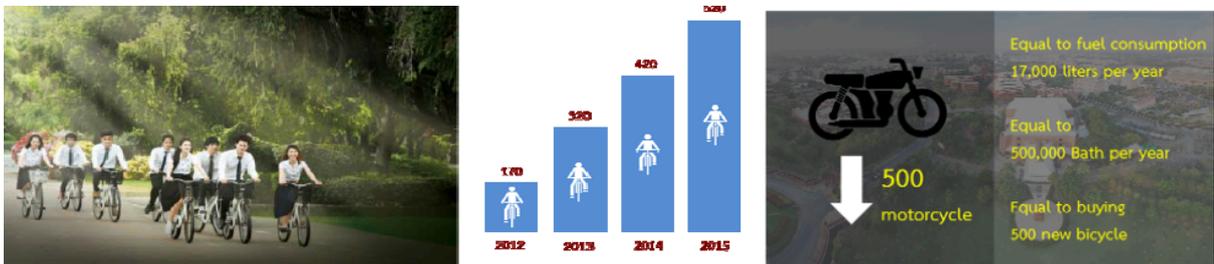


Walking to promote the energy activities



Walking to stimulate energy saving activities

Our energy conservation activities were participated by both internal and external organizations. These activities were aimed to educate our staffs and students about energy conservation through the various aspects of the activities. From 2013-2015, Huachiew Chalermprakiet University has conducted more than 27 energy conservation activities. We also have a PR-Board, a website and a Facebook with more than 15,000 followers, in order to let other organizations learn what we do.



The White Bicycle Project



A cigarette factory
Use more than
60,000 MWh a year.

Remark : Data from CE100 ENERGY SOLUTION COMPANY

Local Non-smoking Campaign



Facebook and website releases

Encouraging bikers to wear helmet

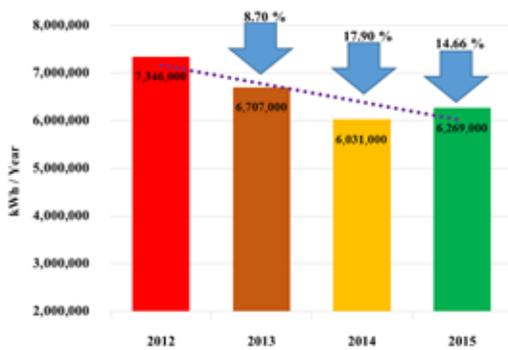
Huachiew Chalermprakiet University, Bangchalong District and Bangplee Police District formed a team to launch a project to encourage bikers to wear helmet, in order to reduce risk from accidents.

Safe, low energy consumption

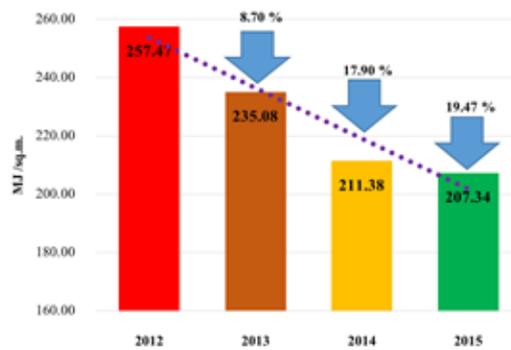


Practicability

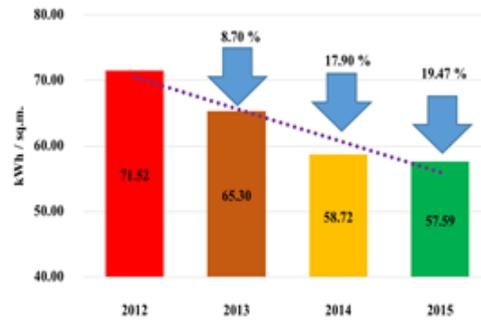
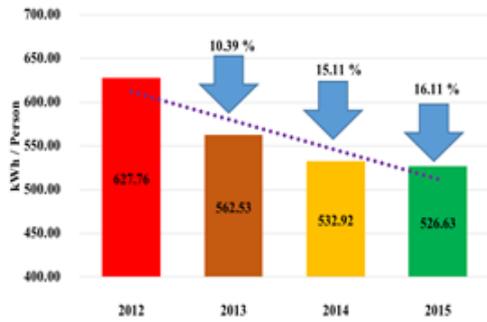
In evaluating the results in energy conservation, apart from the total energy saving, Huachiew Chalermprakiet University evaluated the Specific Energy Consumption Index (SEC Index). This indexes consist of (1) Total Heat Energy (MJ)/Area (sq.m.), (2) Total Electricity (kWh)/ Staffs and Students (Person), and (3) Total Electricity (kWh)/ Area (sq.m.). Due to our energy conservation policies and projects, Huachiew Chalermprakiet University's energy conservation and SEC Index have continuously reduced since 2012.



Energy Consumption from 2012 - 2015



Energy Efficiency Index 2012-2015 (MJ/sq.m.)



Energy Efficiency Index 2012-2015 (kWh /person) Energy Efficiency Index 2012-2015 (kWh/sq.m.)

Cost-effectiveness

Huachiew Chalermprakiet University has done various energy conservation activities, both non-investment and investment projects. In non-investment projects, we focused on creating energy conservation awareness. Thus, our staffs and students can practice and pass on these ideas to the society. For investment projects, we considered three aspects: (1) RESULTS (Sustainable and Consistency), (2) ROI (Return on Investment) around 3-5 years, and (3) SUBSIDY from the government.

From 2013-2015, Huachiew Chalermprakiet University reduced energy consumption by more than 10.99M Baht with an average ROI of 3.11 years, and with subsidy from DEDE Subsidy 80:20 Project. Huachiew Chalermprakiet University also considered projects with ROI of over 5 years, but be able to become learning centers in energy conservation.

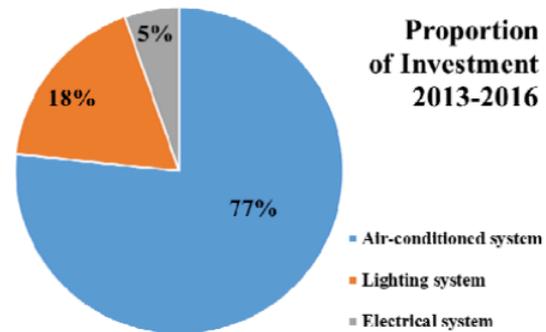
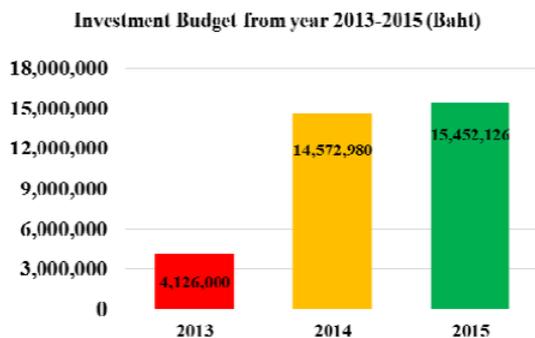


Table 2: Energy Conservation activities during 2013-2015

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 (staff participation)								
	Uninstall light bulb in over necessary areas	100,740	423,108	73.19	–	–	–	–	–
	Cafeteria's 1 st floor lighting zoning	44,712	187,790	32.48	–	–	–	–	–
	Seasonal timer for lighting on University wall	1,169	4,912	0.85	–	–	–	–	–
	Library Building lighting zoning	14,904	62,597	10.83	–	–	–	–	–
	Library Building HVAC control system	56,700	238,140	41.19	–	–	–	–	–
	Measures from investment								
	Installing rope switch for lighting	4,968	20,369	3.61	–	–	–	30,000	1.47

	Replaced to chiller 200 Ton (auditorium Phase1)	127,296	521,914	92.48	–	–	–	3,100,000	5.94
	Replaced to inverter air-conditioner bookstore areas	43,143	181,201	31.34	–	–	–	950,000	5.24
	Replaced to LED in bookstore areas	3,629	15,241	2.64	–	–	–	46,000	3.02
	Total for 2013	397,261	1,655,271	288.62	0	0	0	4,126,000	2.49
Year : 2014	Measures from non-investment (staff participation)								
	Library Building Chiller Timer	84,000	344,400	61.03	–	–	–	–	–
	Energy Saving Awareness in lighting	24,090	98,769	17.50	–	–	–	–	–
	Turn off PC Monitor when not in-use	32,120	131,692	23.34	–	–	–	–	–

Turn off Lighting in Staff Zone when not in-use	13,365	54,797	9.71	-	-	-	-	-
Time schedule for cleaning conference hall	18,720	76,752	13.60	-	-	-	-	-
Remove cooling drinking water tank	23,652	96,973	17.18	-	-	-	-	-
Re-wire switch in classroom	25,436	104,288	18.48	-	-	-	-	-
Reduce boiler usage in office area	56,064	235,469	40.73	-	-	-	-	-
Reduce turn on time for lighting in stadium	8,760	36,792	6.36	-	-	-	-	-
Lighting zoning in indoor stadium	30,240	127,008	21.97	-	-	-	-	-
Measures from investment								

Replaced to VRF air-conditioner	303,928	1,276,498	220.81	-	-	-	8,585,000	6.73
Replaced to chiller 200 T (auditorium Phase 2)	127,296	521,914	92.48	-	-	-	3,100,000	5.94
Replaced to chiller 150 T (library)	112,320	471,744	81.60	-	-	-	2,887,980	6.12
Total for 2014	859,991	3,577,095	624.80	0	0	0	14,572,980	4.07

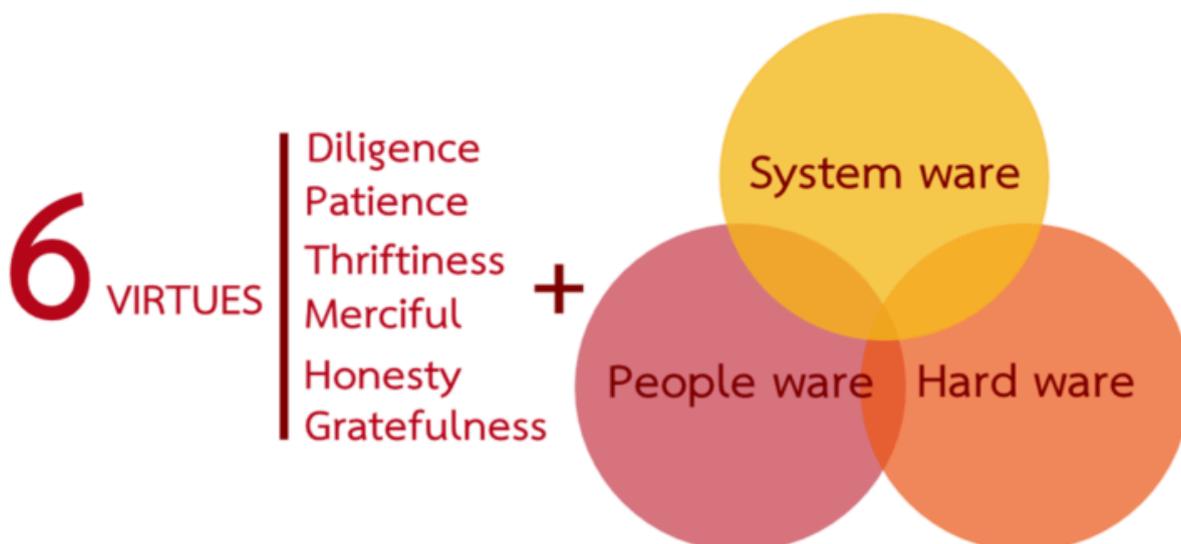
Year : 2015	Measures from non-investment (staff participation)								
	Turn off UPS after worktime	28,105	116,917	20.42	-	-	-	-	-
	Library Building Chiller Timer	81,000	332,100	58.85	-	-	-	-	-
	Reduce intensity of PC Monitors	13,070	54,372	9.50	-	-	-	-	-
	Lighting Timer at University Gate	14,600	60,736	10.61	-	-	-	-	-

Reduce boiler usage in student dormitories	100,740	423,108	73.19	-	-	-	-	-
Turn off Air-conditioners 15 minutes earlier in workdays	40,500	168,480	29.42	-	-	-	-	-
Measures from investment								
Replaced to inverter air-conditioner	184,270	766,563	133.88	-	-	-	7,500,000	9.78
Installed heat Condensing Unit	5,840	24,294	4.24	-	-	-	42,800	1.76
Installed VSD motor at CHP	27,144	112,919	19.72	-	-	-	446,640	3.96
Installed Smart Class Room System	11,753	48,892	8.54	-	-	-	132,400	2.71
Replaced to LED T8	674,983	2,807,929	490.39	-	-	-	4,723,688	1.68
Replaced external lighting to LED	10,512	43,730	7.64	-	-	-	240,108	5.49

Install lighting sensor and dimmer	141,662	589,314	102.92	–	–	–	1,108,288	1.88
Installed Chiller Management System	26,053	108,380	18.93	–	–	–	508,250	4.69
Installed solar cell	2,950	12,272	2.14	–	–	–	249,952	20.37
Total for 2015	1,363,182	5,760,043	990.37	–	–	–	15,452,126	2.68
Total 3 Year	1,620,724	2,620,434	0,992,408	1,903	0	0	0	14,151,106

Consistency

To encourage staff to participate in energy saving programs, Huachiew Chalermprakiet University has conducted various activities to develop three main drivers of energy saving, which consist of three distinct wares as follows:



Employee development (Peopleware): This part was developed through annual energy saving training and “**6 Virtues**” development activities. These six virtues comprised of diligence, patience, thriftiness, merciful, honesty and gratefulness.

System set-up (Systemware): Through staff collaboration, Huachiew Chalermprakiet University has planned to receive ISO50001-Energy management within this year, which has standardized our sustainable energy saving program.

Efficiency (Hardware): Systems were fine-tuned. It will ensure that energy, supplied, is efficiently consumed and machines and systems are correctly maintained. Along these processes, development plans are considered under the criteria of “ROI period of less than three years”



Table 3: Energy Conservation Planning and Activities 2016-2018

No.	Energy Conservation Activities	Period	Annual Energy Conservation Goals					Invest. (THB)	Payback Period (Year)
			Electric			Fuel (LPG)			
			(kW)	(kWh)	(THB)	(kg)	(THB)		
Year : 2016									
1. Employee development (Peopleware)									

1.1	Energy Saving Awareness Training	Jan – May 2016	–	–	–	–	–	500,000	–
1.2	Visit companies with successful energy saving buildings	Mar – May 2016	–	–	–	–	–	200,000	–
2. System set-up (Systemware)									
2.1	Apply ISO 50001 in university	Jan – Aug 2016	–	–	–	–	–	–	–
2.2	Apply for ISO 50001 Certification	Aug – Nov 2016	–	–	–	–	–	300,000	–
2.3	Innovation Contest R2I	Jun – Oct 2016	–	–	–	–	–	50,000	–
3. Efficiency (Hardware)									
3.1	Replaced to inverter air-conditioner (Phase 1)	Jul – Dec 2016	88	234,133	973,993	–	–	6,500,000	6.67
3.2	Replaced to LED T8 (Phase 1)	Jun – Sep 2016	78	167,400	696,384	–	–	1,000,000	1.44
3.3	Installer Meter (Phase 1)	Apr – Aug 2016	–	–	–	–	–	500,000	–

Year : 2017

1. Employee development (Peopleware)

1.1	Energy Saving Awareness Training	Jan – May 2017	–	–	–	–	–	500,000	–
1.2	Visit companies with successful energy saving buildings	Mar – May 2017	–	–	–	–	–	200,000	–

2. System set-up (Systemware)

2.1	Develop work procedure to comply with Energy Saving Program	Jan – Dec 2017	–	–	–	–	–	–	–
2.2	Study ISO 14001 system	Jan – Dec 2017	–	–	–	–	–	–	–
2.3	Innovation Contest R2I	Jun – Oct 2017	–	–	–	–	–	50,000	–

3. Efficiency (Hardware)

3.1	Replaced to inverter air-conditioner (Phase 2)	Jul – Dec 2017	88	234,133	973,993	–	–	6,500,000	6.67
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3.2	Replaced to LED T8 (Phase 2)	Jun – Sep 2017	47	100,440	417,830	–	–	600,000	1.44
3.3	Installer Meter (Phase 2)	Apr – Aug 2017	–	–	–	–	–	500,000	–
3.4	Install On-grid Solar Cell	Jul – Dec 2017	16	23,360	97,178	–	–	1,000,000	10.29
Year : 2018									
1. Employee development (Peopleware)									
1.1	Energy Saving Awareness Training	Jan – May 2018	–	–	–	–	–	500,000	–
1.2	Visit companies with successful energy saving buildings	Jan – May 2018	–	–	–	–	–	200,000	–
2. System set-up (Systemware)									
2.1	Continues development to a Green University	Jan – Jul 2018	–	–	–	–	–	–	–
2.2	Innovation Contest R2I	Jan – Oct 2018	–	–	–	–	–	50,000	–
3. Efficiency (Hardware)									

3.1	Replaced to inverter air-conditioner (Phase 3)	Jul – Dec 2017	88	234,133	973,993	–	–	6,500,000	6.67
3.2	Replaced to LED T8 (Phase 3)	Jun – Sep 2017	18.6	40,176	167,132	–	–	240,000	1.44
3.3	Installer Meter (Phase 3)	Apr – Aug 2017	–	–	–	–	–	500,000	–
Total				1,033,775	4,300,504	–	–	26,390,000	6.14

Performance

Verifiability and Impact

Energy Saving

For over 5 years, Huachiew Chalermprakiet University has continuously been conducting various energy saving projects. Huachiew Chalermprakiet University's Board of Directors also managed 34.15M Baht funding for educating our staffs and students (Peopleware), developing our working systems (Systemware) and replacing old machines with efficient ones (Hardware) to maximize efficiency of our energy consumption. Due to these developments Huachiew Chalermprakiet University can reduce energy consumption by more than 2,620,434 kWh.

Table 4: University Energy Efficiency Index during 2012-2015

Year	(1) Electricity (kWh/Year)	(2) Fuel (MJ/ Year)	(3) Total Energy Used (MJ/ Year) [(3) = (1)*3.6 + (2)]	(4) Areas (m ²)	(5) Energy Efficiency Index (MJ/m ²) [(5) = (3)/(4)]	Save [%]
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2012	7,346,000	–	26,445,600	102,712	257.47	–	
2013	6,707,000	–	24,145,200	102,712	235.08	8.70	
2014	6,031,000	–	21,711,600	102,712	211.38	17.90	
2015	6,269,000	–	22,568,400	108,847	207.34	19.47	
Sum.	26,353,000	–	94,870,800	–	–	–	
Avg.	6,588,250	–	23,717,700	–	227.82	–	

※Remarks: In 2014, due to a re-schedule to comply with AEC, semester term was 4 months longer.

Environmental Effect

Reduction of CO₂ Emission due to Energy Saving Plans

Since 2011, Huachiew Chalermprakiet University can reduce CO₂ emission by more than 1903 Tons of CO₂ from its total energy consumption. We also launched the “Clean Bicycle Project” which totally replaced motorcycle usage in our campus. The project was initially started with only 100 bicycles, given to Huachiew Chalermprakiet University by our alumni who graduated in that year. Now, there are over 500 bicycles available in every corner of Huachiew Chalermprakiet University’s campus. This project not only reduced CO₂ emission by motorcycles, but also pollution, sound and risks from accidents and crimes in our campus. Huachiew Chalermprakiet University also provided 6 electrical shuttle cars which our staffs and students board from building to building. These cars were named after the six virtues of Huachiew Chalermprakiet University to remind those who use them about what drives our organization.





Clean Bicycle Project

Waste and Pollution Management

Pollution and waste are by-products of human activities. Having this awareness, Huachiew Chalermprakiet University analyzed our activities to reduce these by-products. One of our achievements was 100% reduction of foam material in our cafeterias and replacing them with degradable ones. From this success, we initiated other activities in Huachiew Chalermprakiet University to reduce the consumption of foam as well. We were also awarded World Class Standard Mass Catering by the Food Institute (WHEN), Department of Industrial Works. This indicated our success in our waste management project, such as personal waste management and bacteria bank which can be used in cleansing processes. Huachiew Chalermprakiet University also aimed to reduce our paper consumption. Starting in 2010, we reduced our paper cost by more than 85.5% or equivalent to 2.3M Baht.



100% Foam Reduction and Decreased Paper Consumption



Changing the university's project to increase green space

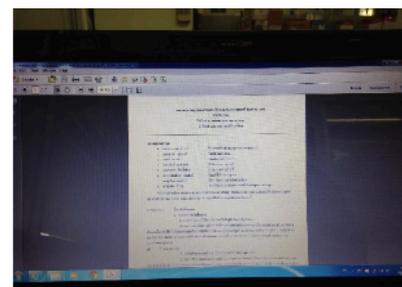


Bacteria Bank and Chemical-free Vegetables

Recycling

Huachiew Chalermprakiet University has applied the 3R processes in our waste management. These 3R consist of:

REDUCE – We encouraged our staffs and students to reduce paper consumption through various projects such as applying online system in booking and doing polls, and sharing meeting documents by e-mail instead of the printed-out version.



Reduce the use of paper within the university

REUSE – At Huachiew Chalermprakiet University, our people use both sides of the A4 paper. We also apply “REUSE” concept in other fields such as using left over materials in gardening and watering our plants by water from the canal in the campus.



Reuse Project within the University

RECYCLE – We have performed waste management in order to recycle our wastes into different kinds of usable materials and develop those wastes to become products. By doing so, we can reduce some of our material costs.



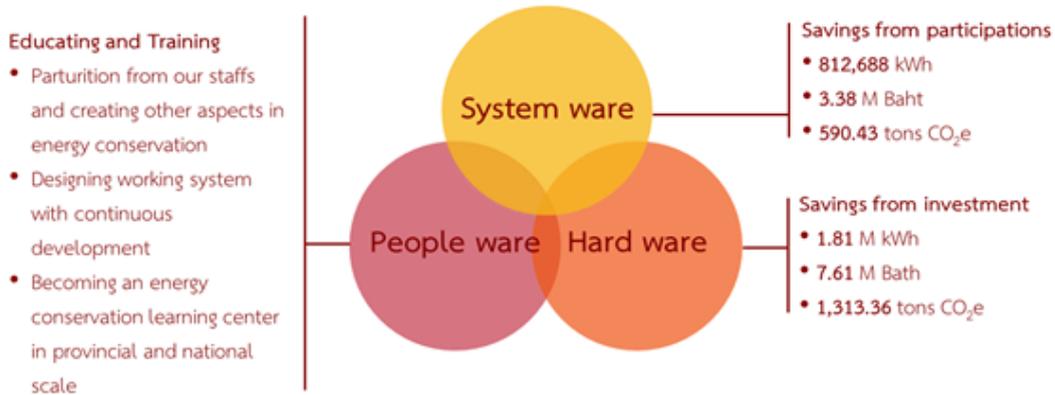
Recycling program within the University

Completeness

Success in energy saving was not made by a single person, but by collaboration and the efforts of all staff of Huachiew Chalermprakiet University. We owe our success to the teamwork and active education/training of our staff and students, which have eventually created a culture of energy saving at all levels of University operations.



Benefits



Save Energy (2.62 M kWh), Save Cost (10.99 M Baht), Reduce CO₂ (1,903.79 tons CO₂e)

An immediate benefit was the saving of 2,620,435 kWh in energy consumptions, which was equal to 1,903.79 tons of CO₂. This translated into a substantial financial savings of 10,990,409 baht. However, the most valuable long-term benefit has been the opportunity to inspire staff at all levels to adopt energy saving as their own campaign. This resulted in creativity at the individual and team levels that did not only increase daily energy saving, but also enhanced life quality for our personnel and students. We are ready to share what we learned and support other organizations on their journey to sustainable energy success. At Huachiew Chalermprakiet University, we are honored to contribute to Thailand's green initiatives. Our ultimate goal is to play our part to conserve energy and make the world a better place for the benefit of the next generation.