

# Central Chest Institute of Thailand (CCIT)



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# SB-1: LOW ENERGY BUILDINGS NETWORK

## Basic Information

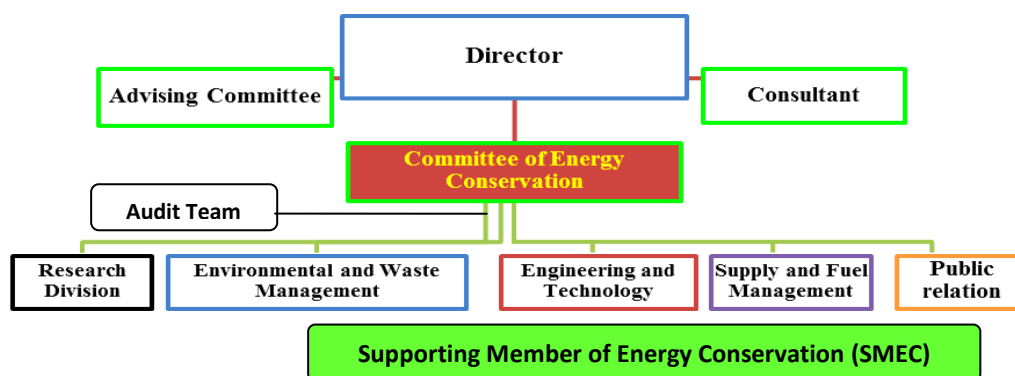
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### Project title:

Comprehensive Energy Management for Building

### Managing Organization: Central Chest Institute of Thailand (CCIT)

In operating of energy conservation, the committee of energy conservation has been established, comprising of the director of CCIT as the chairman and SMEC no.1, Mrs. Pornpan Boonyakiat as the chairman of the committee of energy conservation, which their duty is to operate and control the energy saving, consistent with the policy of energy conservation. This mission could be done by means of 8 steps-energy management. To fulfill the theme mentioned above, it is necessary to form-up the auditor team in order to inspect/validate the operation of officers in energy conservation program. The pre-committee was formed as working team, which could be categorized in five divisions: 1) Research division, 2) Environment and waste administration division, 3) Engineering and Technology, 4) Fuel management, and 5) Public relation (PR), altogether, the supporting member of energy conservation (SMEC) are joined as the *working hands*.

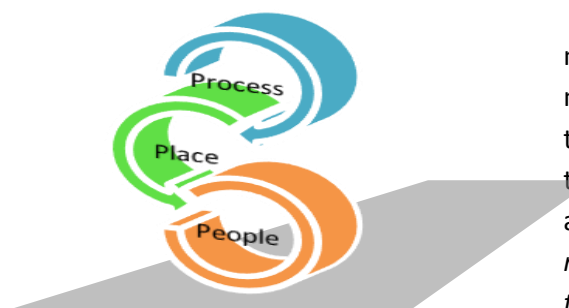


### Project Description:

Central Chest Institute of Thailand (CCIT) is located in Nonthaburi District; Nonthaburi Province covered the area of 81,609.2 square meters. CCIT is the regional (center) hospital owned by Department of Medical Services. Because of the overflow of patients and according to the slogan “We will always take care of your heart and your health” for regional hospital, so in present day, we have expanded and constructed our institute into the size (total: 15 buildings) and service space to eventually become 400-beds regional hospital. The major energy resources of CCIT are composed of three types: 1) Electricity, 2) Diesel Oil and, 3) LPG, with the average of total energy consumption of 21,351,926.27 MJ/Year, In specific, old record also reveals that the major division, influencing the most on the highest consumption of energy, was an in-patients services together with an average increasing. Such data are sufficient and has revived interest in the energy conservation at CCIT. This program has, been conducted in order to receive



the highest saving of energy consumptions/ expenditures with remains of the best services. Through the vision of the CCIT director and CCIT lead team, the Energy Conservation Committee (ECC) was to manage energy conservation in the CCIT, which consists of. With the active ECC team, energy specialist and engineer consultants, supporting member of energy conservation (SMEC) and employees serve as the operating team to drive the “always ready to take care” organization with the full support of CEOs’ which led us to energy efficiency index reduce 12.76% (2009-2011) This achievement was brought about by 3P; Place, People and, Process, concomitantly with the 8 steps for energy conservation set forth by the Ministry of Energy of Thailand.



**Process**: the policy of energy conservation, monitoring/audit/ controlling system including the necessary techniques for energy conservation. All these components are set-up in order to minimize the leak-spots of energy, and to do it right away, or as soon as possible. *In addition, the top-level board must be review the policy and consider the new techniques/technologies for energy conservation, simultaneously*

**Place**: is similar to *Hard Ware* (i.e. place, instrument/equipment) such as buildings, Chiller, air conditioners, boiler and/or generator and so on. The point is that we have to survey and evaluate them, solidly under supervision of consultant along with the working team (SMEC). Once we have done the evaluation, we must figure the way out to solve the places having problem. Note that such a way must be the potential way (i.e. effective + possible). Furthermore, they (places) must have the maintenance program with schedule surplus the suggestion manual to perform correctly. In the case of investment, the return period should not be over than 3 years.

**People**: it could be named that this P is the most significant factors to achieve the goal of energy conservation. At CCIT, we have a concentrate program to give the variety knowledge/ up-to-date technology/ techniques for energy conservation and also parallel with the knowledge in environmental point of view. Accept from the auditorium (major training), we also have the close-up activities; **small group meeting** under the code name: **Process Analysis (PA)** and project **“Carbon footprint”** in the division (giving knowledge about the relationship between energy using in each forms (e.g. electricity, fuel oil/LPG, water supply, chemicals, wastes) and their impact on environment in terms of greenhouse gases emission). All these activities are forcefully support the strength of energy conservation program. In addition, the problem solving techniques from each division must be represented as the energy board in order to spread the results to the visitors, or even to the relative patients that lead them to apply it at their houses, which in a way help to reduce the average of energy cost of the country.



## APEC Economy:

- Australia
- Brunei
- Canada
- Chile
- China
- Chinese Taipei
- Hong Kong
- Indonesia
- Japan
- Korea
- Malaysia
- Mexico
- New Zealand
- Non-APEC Economy
- Papua New Guinea
- Peru
- Philippines
- Russia
- Singapore
- Thailand**
- United States
- Viet Nam

## Estimated Savings

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### Savings Narrative

The energy conservation campaign in the CCIT has been initiated since April 2010 until now. CCIT is categorized as “controlled-building” that means CCIT must be value the use of energy, according to the Promotion Act (2009, 2<sup>nd</sup> edition). In the light of this, CCIT accelerates the performance of the project by created the concentrate-training program to give officers firstly the **awareness** of energy saving “*How crucial to reduce the use of energy*” (through 100% training of officers and employees), and then to multiply knowledge of energy conservation (performed as small group under code name: Process Analysis project; PA). These activities were performed in order to make officers to understanding in-deep the sustainable development in energy conservation from sub-division→each building→all of CCIT→distribute knowledge/techniques to society. From the willing operation of officers in the project, the result shown that the average of total energy consumption is **21,351,926.27 MJ/Year (saving money: 3,211,396 baht/year)** and the reduction of the index of total energy consumption is clearly observed, with in opposite increasing of in-patients quantity.

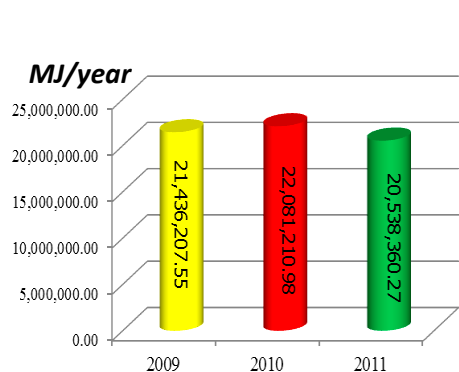


### The relationship between Energy Consumption and In-Patients quantity of CCIT Table

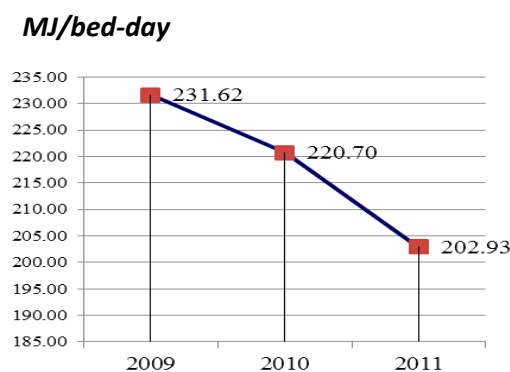
Year	Electricity (kWh/year) (1)	Thermal (MJ/year) (2)	Total Energy (MJ/year) (3) [(3)=(1)×3.6 +(2)]	In-Patients (Bed-Day/year) (4)	(5) Index of total energy consumption (MJ/bed-day) [(5)=(3)/(4)]
2009	5,655,116.00	1,077,789.95	21,436,207.55	92,551.00	231.62
2010	5,871,417.80	944,106.90	22,081,210.98	100,053.00	220.70
2011	5,527,090.85	640,833.19	20,538,360.27	101,210.00	202.93
<b>Total</b>	<b>17,053,624.65</b>	<b>2,662,730.04</b>	<b>64,055,778.80</b>	<b>293,814.00</b>	<b>655.24</b>
<b>Average</b>	<b>5,684,541.55</b>	<b>887,576.68</b>	<b>21,351,926.27</b>	<b>97,938.00</b>	<b>218.41</b>

### Energy Efficiency Index

In the section of hospital building, there is an estimation of energy value as energy efficiency index (EEI), representing by the energy used per unit of inside-patient (bed-day). CCIT contains 400 beds with an average-increasing at the rate of 4.63% of inside-patients (as bed-day/year). However, the energy efficiency index was reduced continuously, especially in 2011, having the EEI: 202.93 MJ/bed-day, or 12.38% reduction, compared to the year: 2009. Another two interesting points are: 1) the energy cost (electricity + thermal) per inside-patients decreased by 30.79 baht/bed-day, or 14.32% reduction, and 2) the energy index in terms of kWh/bed-day decreased by 19.68%.



**Total Energy Consumption in 2009-2011**



**Energy efficiency index in 2009-2011**

### Environmental Effects

- Evaluation of the reduction of carbon dioxide emission from the result of the energy conservation in CCIT

An unplanned-an unprepared plus the lack of awareness in using energy in any facilities are the major causes on increasing of the severity of global warming effects. In case of electricity, the true is that electricity production in Thailand is relied very much on the combustion of fossil fuels i.e. coal, fuel oil and natural gas and. The major by-product emitted from complete combustion is Carbon Dioxide (CO<sub>2</sub>). Look back at CCIT, the results obtained from the project of energy conservation (during 2009-2011), demonstrates that total reduction of CO<sub>2</sub> emission is 1,009.91 TonCO<sub>2</sub>, especially the highest reduction in year 2011 (893.93 TonCO<sub>2</sub>/year).



- *The management of wastes and pollutants toward recycle project*

CCIT has been planned and determined the policy/standard of wastes (i.e. infected waste, hazardous waste) disposal, in accordance with an occupational health and safety principle and with sanitation/environment principle of HA (Hospital Accredited). At the same time, the valuable-wastes (recycle wastes; glass bottle, plastic bottle/bag, papers, saline bottle, cloth, etc.) could be either sold out, or manipulating them to the artificial object (innovation derived from recycling products) that has highly useful to use it to take care of in-patients. One of the programs that support the higher of recycling wastes is **8Rs**: *Reduce-Reuse-Recycle-Refuse-Replenish-Repair-Remain and Replace*. This program is strongly involved in the higher collection of recycle wastes of CCIT; (during 2007-2011, it is found that the quantity of recycle wastes increased by 216%). This means that we can reduce the massive of CO<sub>2</sub> emission from destruction process (e.g. CO<sub>2</sub> formation from oil used in waste incinerator), which according to the **Carbon Footprint** (CF) project of CCIT.



**Example of the Winning Awards of Innovation from recycle products:** The staff of CCIT has been modified the recycling waste (saline bottle) to the "safety grove" and put it on hands of in-patients that useful to increase safety to in-patients (protect the slip of cure lines), or to protect in-patients who are not cooperate with the nurse/doctor in healing process e.g. try to remove the Indwelling catheter.



Increasing dramatically of recycle wastes during 2007-2011 derived from 8Rs program of CCIT and a "charitable spirit" of officers (e.g. nurse, accounting etc.) in wastes separation process

CCIT is one of the government-based organizations, earning the income from the patient services so. The big investment in energy conservation, are rather difficult, unless the return period is fast. In this way, CCIT determines the condition of return period within 3 years only (except in case of air conditioner; 3-4 years). In detail, the operations are emphasized on the participation of officers, which according to the phrase of CCIT director once said; "if we have to change the **place** (i.e. place and/or heavy instrument-equipment), the **people** must already be attained of **knowledge/optimum using (process)** of that place, and the most important thing is: the discipline and the continuous in operation of energy saving"

**Innovation/ Creativity**

The energy committees and mechanic team of CCIT invented U.V. Fan ever since 2009, in order to use it to kill the airborne (e.g. virus, flu, etc.). U.V. fan was designed to not bulky (light, portable), and the most important thing is low energy consumption (72 W of total energy consumption). In detail, U.V. fan is composed of the *low energy consumption-components*, which comprises: U.V. Lamp (20W), Low-loss ballast (6W), 6 inch ventilation fan (43W), and display light (LED; 3W). This U.V. Fan is the CCIT copyright and we produced it for any organizations needed it. At present, many places use it in their own organization such as Ministry of Public Health of Thailand, Suvarnabhumi International Airport, Sirindhorn International Institute of Technology, Thammasat University, Children Hospital, Bamrasnaradura Hospital, etc.



**U.V. Fan of CCIT**

# Additional Project Details

Image:



**Color Sport campaign: (energy & environment conservation)**

**The competition of logo – meaningful wording – shirt design**

**Senegal Republic authority visited CCIT wastewater treatment**

**Samutprakarn Hospital visited CCIT**

**Power Meter connected with LCD showing energy consumption in CCIT (middle) and CCIT 8R sign Campaign (right)**

**Observing Activities: Energy Conservation Building in Honor of His Majesty the King and Phyathai Sriracha General Hospital**

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- [CCIT.pdf](#)

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