Guideline
For
Organizing a Data Submission Form and a Data Recording Form for a Designated Building in accordance with Forms BorPorAor.1 and BorPorAor.2

In accordance with the Ministerial Regulation regarding criteria, procedure and schedule for submission and recording of data on energy conservation B.E. 2547 (2004)

Energy Consumption and Energy Conservation for a Designated Building according to Forms BorPorAor.1 and BorPorAor.2

Department of Alternative Energy Development and Efficiency (DEDE)
Ministry of Energy

April B.E. 2548 (2005)

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1. Background

Organizing a data submission form and a data recording form is a step in energy conservation that the owner of a designated building must comply with the Energy Conservation and Promotion Act B.E.2535 (1992) in accordance with the scope as prescribed by the Ministerial Regulations. The Ministerial Regulation regarding criteria, procedure and schedule for submission and recording of data on energy conservation B.E. 2547 (2004), issued by the virtue of section 6 paragraph two, section 11(2) and (3), and section 22 of the Energy Conservation and Promotion Act B.E.2535 (1992), which became enforceable on the 29th day of April B.E. 2548 (2005), states that:

The owner of a designated building shall submit information on building utilization, energy consumption, and energy conservation to Department of Alternative Energy Development and Efficiency (DEDE) according to Form BorPorAor.1. Additionally, he shall keep records of information on energy consumption, installation or modification of machinery or equipment that affects energy consumption and energy conservation according to Form BorPorAor.2.

Department of Alternative Energy Development and Efficiency (DEDE) therefore sets up the guideline for organizing a data submission form and a data recording form for a designated building to facilitate and clarify the step in organizing such forms so the owner of a designated building can use the data as database for energy conservation in its business and to comply with the law.

2. Operating procedure for data submission and data recording

2.1 Data recording

The owner of a designated building must keep records of information in the forms BorPorAor.1 and BorPorAor.2. Form BorPorAor.2 must be recorded in monthly basis.

Any building becoming a designated building on the day or after the Royal Decree on designated building coming into effect, information shall be kept according to form BorPorAor.2 since the date becoming a designated building. For a new building which has already become a designated building under the Royal Decree yet has not operated and therefore no energy consumption, information shall be kept since the commencing date of a building and shall be submitted according to form BorPorAor.1 within schedule of data submission.

2.2 Data verification: data verification shall be as follows:

Data recording form (Form BorPorAor.2): the personnel responsible for energy of a designated building shall verify and endorse the information being recorded monthly in form BorPorAor.2.

Data submission form (Form BorPorAor.1): the personnel responsible for energy of a designated building shall verify and endorse the information being recorded semiannually in form BorPorAor.1 and the owner of a designated building shall endorse a record of data according to such form.

2.3 Schedule for data submission

The owner of a designated building shall submit information according to forms BorPorAor.1 semiannually as follows:

First: submit monthly data of the first six months, from January to June, within the month of July of the same year.

Second: submit monthly data of the last six months, from July to December, within the month of January of the next year.

Any building becoming a designated building on the day or after the Royal Decree on designated building coming into effect, information shall be submitted according to form BorPorAor.1 as previously mentioned schedule. For instance, a building becoming a designated building on August 1st, B.E.2548 (2005) shall submit the first information of the month of August to December of B.E.2548 (2005) by January 31st, B.E. 2549 (2006).

For a new building which has already become a designated building under the Royal Decree yet has not operated and therefore no energy consumption, information shall be submitted according to form BorPorAor.1 as previously mentioned schedule. For instance, a building becoming a designated building on January 1st, B.E.2548 (2005) which commenced its business and has consumed energy for the first time on February 1st, B.E.2548 (2005) shall submit the first information of the month of February to June of B.E.2548 (2005) by July 31st, B.E. 2548 (2005).

2.4 Procedure for data submission

The owner of a designated building shall submit information according to form BorPorAor.1 to Department of Alternative Energy Development and Efficiency (DEDE) by the following means:

1) Submit in person: a person can submit the form BorPorAor.1 directly to DEDE and DEDE shall issue a receipt to a person. The date stamped on the receipt shall be considered as the date of submission.

2) Submit via certified mail: the date of certified mail shall be considered as the date of submission.

3) Submit via facsimile: the date of sending facsimile shall be considered as the date of submission. However, submission via facsimile is considered accomplished only when DEDE has received the original form BorPorAor.1 within seven days from the deadline of data submission as prescribed in 2.3, otherwise it shall be considered the form has not been submitted.

4) Submit via electronic mail with password: DEDE has not announced this method as a formal mean in submitting the form; however, the information can be submitted using electronic data submission system (E-form) as a practice before the announcement. Detail information can be requested at customer relation unit or can be founded at www.dede.go.th.

3. Direction for filing data in data submission form (Form BorPorAor.1)

3.1 Part 1: General data

No. 1.1: specify the name of a designated building

No. 1.2: specify the location of a designated building

No. 1.3: specify type of a designated building

No. 1.4: specify the year of completing construction and commencing a building

No. 1.5: specify operating hours of a building; in case that a designated building has several facilities or has several purpose of utilization, please indicate the working hours for main activity.

Example: A designated building has its utilization purpose as shopping mall and office where shopping mall operates 11 hours a day, 300 days a year and office operates 9 hours a day, 288 days a year. If shopping mall is the main activity of the building, data of operating hour should be filled as follows:

No. 1.5: Operating hour of the building ...11...hours/day....300...days/year.

No. 1.6: specify number of rooms if a designated building is a hotel and number of patient bed if it is a hospital.

No. 1.7: specify total area of a building, for all types of designated building, including hotel and hospital. Total working area of a building means all utilized area plus indoor parking space. Total area of a building means all utilized area and parking space.

(1) All utilized area: utilized area in the building, excluding indoor parking space, consisting of both air-conditioned and non air-conditioned area.
(2) Parking space: area of parking building.
(3) Actual use of area in each month, for the utilized area.

Column 1: specify month/year that a designated building is utilized in the order of calendar month, that is for submission of monthly data in the first six month of the year which is from January to June, data should be filled in following order: January, February, March, April, May, June, respectively.

Column 2: specify number of operating hour for each month. The value can be obtained from combining operating hours in each day of such month from the first day of the month till the last day of the month. For example, a hospital operates everyday in January 2005; hence, the operating hours of January is 31 days × 24 hours/day which is 744 hours/month.

Column 3: specify actual use of area for each month excluding parking space area for all type of designated building that is shopping mall, hotel, hospital, educational institute and others.

Air-conditioned area: area with air-conditioning system and ready to be used.

Non air-conditioned area: area without air-conditioning system and ready to be used.

Column 4: specify percentage of occupied room per month for a designated building having its uses as a hotel or a designated building doing similar business as hotel, using the following calculation:

Percentage of occupied room per month

$$= \frac{\text{number of occupied room in such month} \times 100}{\text{Total number of room}}$$

Number of occupied room in such month means total number of room being occupied each day from the first day till the last day of the month in a unit of room-day.

Total number of room means number of room available for service multiplied with total days of such month in a unit of room-day.

Example: For the period 1-31 January 2005, a hotel of 400 rooms had room in service 7,440 room-days.

Calculation:

Number of occupied room = 7,440 room-days

Total number of room = 400 rooms × 31 days

= 12,440 room-days

Percentage of occupied room per month = $\frac{7{,}440 \times 100}{12{,}440}$

= 60

Column 5: specify number of patient in each month for a designated building having its uses as a hospital, both admitted patient and walk-in patient, as follows:

1. Number of admitted patient in each month means summation of number of admitted patient multiplied with number of day a patient being admitted in a hospital for such month from the first day till the last day of the month. A unit is bed-day.

Example: Determine number of admitted patient in unit of bed-day.

A hospital with 30 patient beds has number of admitted patient and number of day that patient being admitted for the month of April 2005 as follows:

Patient	8	beds being admitted for	4	days
Patient	10	beds being admitted for	5	days
Patient	15	beds being admitted for	8	days

Calculation:

Number of admitted patient = $(8 \times 4) + (10 \times 5) + (15 \times 8)$ bed-day

= $32 + 50 + 120$ bed-day

= 202 bed-day

Thus, number of admitted patient for April 2005 = 202 bed-day

2. Number of walk-in patient in each month means summation of number of walk-in patient each day from the first day till the last day of the month. A unit is person.

Example: Filling out data of actual use of area in each month for the case of hotel

(3) Actual use of area in each month

(1) Month/year	(2) Operating hour (hour)	(3) Type of designated building (excluding parking space)		(4) Hotel	(5) Hospital	
		air-conditioning area (square meter)	non air-conditioning area (square meter)	Percentage of occupied room per month	Number of admitted patient (bed-day)	Number of walk-in patient (person)
January 2005	744	9,000	2,250	55	-	-
February 2005	672	9,000	2,250	57	-	-
March 2005	744	9,000	2,250	65	-	-
April 2005	720	9,000	2,250	50	-	-
May 2005	744	9,000	2,250	48	-	-
June 2005	720	9,000	2,250	52	-	-

3.2 Part 2: Energy consumption data

2.1: Energy consumption

Column 1: specify type of energy used in a designated building. If other types of energy are used, other than those specified in the table No.1 to No.3, specify such type of energy following those in No.3, respectively.

Electricity consumption cases

No.1 Maximum electrical power (kilowatt): fill out maximum electrical power data as shown in electricity bill issued by electricity supplier for a particular month. For some electricity users, there probably are maximum electrical power data at different time period such as user type TOD and TOU. Maximum electrical power data for all three period should be filled out. For TOD case, should fill out On peak, Partial peak, and Off peak. For TOU case, should fill out Peak, Off peak1, and Off peak2, respectively.

No.2 Purchased energy (Kilowatt-hour): fill out electricity data as shown in electricity bill issued by electricity supplier for a particular month. For user types TOD and TOU, should fill out total value of electricity for all three periods in the table.

In case a designated building uses more than one electricity meters, data should be filed out separately for each meter, one table for one meter.

Example: For a designated building that is a TOD-type user, should fill out data as follows:

2.1 Energy consumption

(1) Type of energy	(2) Unit	(3) Consumption quantity		
		Month 1 Jan or Jul	Month 2 Feb or Aug	Month 3 Mar or Sep
1.Maximum Electrical Power				
On peak	Kilowatt	820	832	810
Partial peak	Kilowatt	1,460	1,470	1,450
Off peak	Kilowatt	1,210	1,320	1,260
2.Purchased electricity	Kilowatt - Hour	692,770	661,850	698,610

Case of Heat energy consumption

No. 3 Heat energy: A designated building using bunker oil or gasoline should specify type of bunker oil or type of gasoline (type of bunker oil such as grade A, grade C and grade D; type of gasoline such as gasoline-95 and gasoline 91). If a factory using more than one type of bunker oil or gasoline should fill out data additionally under bunker oil or gasoline, as the case may be.

Example: For a designated building using several types of bunker oil, for instance, a building using grade A bunker oil and grade C bunker oil should fill out data as follows:

2.1 Energy consumption

(1) Type of energy	(2) Unit	(3) Consumption quantity		
		Month 1 Jan or Jul	Month 2 Feb or Aug	Month 3 Mar or Sep
3. Heat energy				
Grade A bunker oil	Liter	1,200	1,115	1,050
Grade C bunker oil	Liter	1,150	1,120	1,125
Diesel	Liter			
Gasoline	Liter			
Kerosene	Liter			
LPG	Kilogram			
Natural Gas	Million BTU			
Imported coal	Ton			
Lignite	Ton			
Other (specify)	unit (specify)			
	Total heat energy consumption from non-renewable energy			

A designated building using renewable energy should specify type of renewable energy in the column for renewable energy. Renewable energy includes energy obtained from sources such as wood, firewood, paddy husk, bagasse, biomass, hydro power, solar power, geothermal power, wind power, waves and tides.

Column 2: specify unit for each type of consumed energy. If other types of energy are used, other than those specified in the table, specify unit of such energy as well.

Column 3: specify consumption quantity for each type of energy for 6-month period of monthly data submission in such following order. Data submission for the first 6-month period of the year, that is data from January to June, shall be as following order: Month 1 is January, Month 2 is February, ..., Month 6 is June, respectively. Data submission for the last 6-month period of the year shall be as following order: Month 1 is July, Month 2 is August, ..., Month 6 is December, respectively.

Remark:

- Energy consumption for each month should start counting from the first day of the month until the last day of such month.
- Amount of purchased electricity for column 3 No. 1 and No. 2 of Month 1 to Month 6 should use the electricity consumption quantity indicated in electricity bill for such month, but excluding the amount of electricity generated by the user which shall be filled out in the table No.2.2.
- Amount of heat energy consumption for column 3 No.3 shall not include energy used for transportation.

Column 4: specify heating value for each type of energy in unit of mega Jules per unit of such energy using low heating value obtained from the supplier. In case a designated factory do not have low heating value obtained from the supplier, average heating value specified by Department of Alternative Energy Development and Efficiency (DEDE) should be used. The heating value specified by DEDE shall be as that in reference to Thailand annual report for fuel, of the most recent year published by DEDE (see more detail in www.dede.go.th).

Column 5: specify total heating value for each type of energy for 6-month period in unit of Mega Jules by converting total amount of energy consumption in 6 month period from the original unit to heating value. It can be done by taking summation of energy consumption in column 3 and multiplied it with low heating value obtained from the supplier or multiplied it with average heating value specified by DEDE in column 4 as the case may be.

Remark: Calculation of total heating value in column 5 for each type of energy should be heating value in unit of Mega Jules to allow comparison of energy consumption ratio among each type of energy in such designated building.

Example: Filling out part 2 data – energy consumption data

2.1 Energy consumption

(1) Type of energy	(2) Unit	(3) Consumption quantity							(4) [1/] average heating value (Mega Jules/unit)	(5) Total heating value (Mega Jules)
		Month 1 Jan or Jul	Month 2 Feb or Aug	Month 3 Mar or Sep	Month 4 Apr or Oct	Month 5 May or Nov	Month 6 Jun or Dec	Total		
1. Maximum electrical power	(TOD rate)									
On peak	kilowatt	820	832	810	822	828	815	-	-	
Partial peak	kilowatt	1,460	1,470	1,450	1,465	1,456	1,440	-	-	
Off peak	kilowatt	1,210	1,320	1,260	1,250	1,245	1,236	-	-	
2. Purchased electricity	kilowatt-hour	692,770	661,850	698,610	694,520	697,460	695,870	4,141,080	3.60[2/]	14,907,888
3. Heat energy										
Grade A bunker oil	Liter	1,200	1,115	1,050	1,020	1,010	1,005	6,400	39.77	254,528
Grade C bunker oil	Liter	1,100	1,120	1,125	1,080	1,060	1,050	6,535	40.11	262,119
Diesel	Liter									
Gasoline	Liter									
Kerosene	Liter									
LPG	Kilogarm	1,000	1,100	900	1,000	1,200	1,100	6,300	49.3	310,590
Natural Gas	Million BTU									
Imported coal	Ton									
Lignite	Ton									
Other (specify)	Unit (specify)									
	Total energy consumption									
Renewable energy (specify)	Unit (specify)									

Remark: 1/ In case there is no low heating value from the supplier, average heating value specified by Department of Alternative Energy Development and Efficiency should be used.
2/ converting from kilowatt-hour unit to Mega Jules unit.

2.2: Fuel consumption for electricity generation

A designated building generating electricity from its own generator should fill out data as follows:

Column 1: specify month/year that fuel is used in generating electricity in 6-month period of monthly data submission in such monthly order as same as that in part 2: section 2.1: column 3.

Column 2: specify installed production capacity of electricity generator in unit of kilowatt. The value can be obtained from guideline or specification of such generator or from the name plate.

Column 3: specify consumption quantity of principal fuel used in electricity generation for each month in sub-column (principal fuel means fuel that is used in large quantity comparing to other type of fuel in the same generator. A generator using two types of fuel generally is large in size and uses bunker oil as principal fuel and diesel as secondary fuel. A secondary fuel is only used during startup period.) as follows:

- Type of principal fuel used in electricity generation such as diesel, grade C bunker oil, etc.
- Quantity of principal fuel used in electricity generation.
- Unit of principal fuel used in electricity generation such as liter.

Energy consumption for each month should start counting from the first day of the month until the last day of such month.

Column 4: specify operating hour of generator in each month, start counting from the first day of the month until the last day of such month.

Column 5: specify amount of electricity generating in each month in unit of kilowatt-hour, start counting from the first day of the month until the last day of such month. In case electricity is also generated for sale, the quantity should be separately identified between those for consumption and those for sale (if any).

In case a designated building installing generator as a back up during electricity blackout that may operate generator each month for warm-up, even there is no electricity blackout in such month, and operate generator with no electricity distributed, should fill out only consumed energy data and generator operating hour in columns 3 and 4, respectively. Amount of electricity generated in column 5 should remark “warm-up without electricity generating”.

Column 6: For remark column, specify other additional data (if any).

Remark: In case a designated building having more than one generator, data should be filed out separately for each generator, one table for one generator.

3.3 Part 3: Energy conservation data and the result of an audit and analysis on operation in compliance with targets and plans

It is a table for filling in energy conservation data of a designated building for the measure being implemented in the past 6 month which can be either measure implemented in compliance with targets and plans or other measures that are not specified in energy conservation targets and plan.

Measure title: specify title of energy conservation measure being implemented in the 6-month period of monthly data submission, either from January to June or from July to December, as the cases may be.

Mark ✓ in ☐ for measure implemented in compliance with targets and plans if it is a measure implemented in compliance with targets and plans which a factory has submitted a report on energy conservation targets and plans to Department of Alternative Energy Development and Efficiency (DEDE) or

Mark ✓ in ☐ for measure not included in targets and plans if it is a measure other than those implemented in compliance with targets and plans.

Column 1: Implementation period can be divided into 2 sub-columns as follows:

Sub-column: as planned – specify day/month/year of plan scheduling for implementation of energy conservation measure such as 1 July B.E.2548 (2005) to 30 July B.E.2548 (2005).

Sub-column: as implemented – specify day/month/year of actual implementation period of energy conservation measure such as 20 July B.E.2548 (2005) to 10 August B.E.2548 (2005) or specify the anticipated time for completion if it still has been in progress.

Column 2: specify implementing status of energy conservation measure that sill has been in progress such as it has been 60% completed or equipment has been installed and is in the process of test run.

Column 3: Investment can be divided into 2 sub-columns as follows:

Sub-column: as planned – specify invested money for such measure as estimated prior to implementation.

Sub-column: as invested – specify actual amount of money invested after accomplishing implementation of such measure.

Column 4: Energy conservation result can be divided into 2 sub-columns as follows:

Sub-column: as target – specify energy conservation result from such measure as anticipated prior to implementation as follows:

For heat-related measure: specify type of fuel used, annual amount of fuel conserved and annual saving value.

For electricity-related measure: specify maximum electrical power (kW) that can be saved, annual amount of electricity (kWh) conserved and annual saving value.

Sub-column: as existing – specify actual result of energy conservation after accomplishing implementation of such as existing measure. The detail should be as same as that in sub-column: as target.

Column 5: specify problem/obstacle encountered during implementing energy conservation measure (if any).

Column 6: specify comment and suggestion for improving energy conservation procedure of a factory (if any).

Column 7: specify other additional data (if any).

Example: Part 3 - Filling out energy conservation data and the result of an audit and analysis on operation in compliance with targets and plans

Measure title: .....Use of electronic ballast .....
Measure order no.[1] ……1..….. from total of……3…….. measures

☑ measure implemented in compliance with targets and plans
☐ measure not included in targets and plans

.

(1) Implementation period[2]		(2) Implementing status[3]	(3) Investment[4]		(4) Result of energy conservation[5]	
As plan	As implemented		As plan	As invested	As plan	As existing
1 Jul 05 to 20 Jul 05	5 Jul 05 to 25 Jul 05		66,000 Baht	64,000 Baht	Electricity 2 kW 6,000 kWh/year 16,800 kWh/year	Electricity 1.8 kW 5,700 kWh/year 15,960 kWh/year
(5) Problem/obstacle encountered		(6) Comment and suggestion[6]			(7) Remark 1. Actual result of energy conservation is determined from saving result achieved during the period from September to December 2005 and then converted to annual saving value. 2. Existing result of energy conservation is less than the value as anticipated due to the fact that the number of electrical bulb used and the time that they are in operation are less than the planned value.	

Explanation

1) Specify measures as in order of implementation and fill out one sheet per one measure.
2) Specify month/year beginning and end of implementation period.
3) Specify implementing status if sill has been in progress.
4) Specify an estimated investment and actual invested money.
5) Specify type of fuel used, annual amount of fuel conserved and annual saving value. For electricity saving, specify in both units of kW and kWh.
6) Specify comment and suggestion for improving energy conservation procedure of a building and government.

Certified true copy …….. copies

Signed ……..…….. Personnel responsible for energy
(…….....)
Registration number ……

Signed …….. Building owner
(…….……)

4. Direction for filling data in data recording form (Form BorPorAor.2) for a designated building

4.1 Part 1: General data

No. 1.1: specify the name of a designated building

No. 1.2: specify the location of a designated building

No. 1.3: specify type of designated building

No. 1.4: specify operating hours of a building; in case that a designated building has several facilities or has several purpose of utilization, please indicate the working hours for main activity.

Example: A designated building has its utilization purpose as shopping mall and office where shopping mall operates 11 hours a day, 300 days a year and office operates 9 hours a day, 288 days a year. If shopping mall is the main activity of the building, data of operating hour should be filled as follows:

No. 1.5: Operating hour of the building ...11...hours/day....300...days/year.

No. 1.5: specify number of rooms if a designated building is a hotel and number of patient bed if it is a hospital.

No. 1.6: specify actual use of area in each month.

Column 1: specify number of operating hour for each month. The value can be obtained from combining operating hours in each day of such month from the first day of the month till the last day of the month. For example, a hospital operates everyday in January 1994; hence, the operating hours of January is 31 days × 24 hours/day which is 744 hours/month.

Column 2: specify actual use of area for each month excluding parking space area for all type of designated building that is shopping mall, hotel, hospital, educational institute and others.

Air-conditioned area: area with air-conditioning system and ready to be used.

Non air-conditioned area: area without air-conditioning system and ready to be used.

Column 3: specify percentage of occupied room per month for a designated building having its uses as a hotel or a designated building doing similar business as hotel, using the following calculation:

Percentage of occupied room per month

$$= \frac{\text{number of occupied room in such month} \times 100}{\text{Total number of room}}$$

Number of occupied room in such month means total number of room being occupied each day from the first day till the last day of the month in a unit of room-day.

Total number of room means number of room available for service multiplied with total days of such month in a unit of room-day.

Example: For the period 1-31 January 2005, a hotel of 400 rooms had room in service 7,440 room-days.

Calculation:

Number of occupied room	=	7,440 room-days
Total number of room	=	400 rooms × 31 days
	=	12,440 room-days
Percentage of occupied room per month	=	$\frac{7{,}440 \times 100}{12{,}440}$
	=	60

Column 4: specify number of patient in each month for a designated building having its uses as a hospital, both admitted patient and walk-in patient, as follows:

1. Number of admitted patient in each month means summation of number of admitted patient multiplied with number of day a patient being admitted in a hospital for such month from the first day till the last day of the month. A unit is bed-day.

Example: Determine number of admitted patient in unit of bed-day.

A hospital with 30 patient beds has number of admitted patient and number of day that patient being admitted for the month of April 2005 as follows:

Patient	8	beds being admitted for	4	days
Patient	10	beds being admitted for	5	days
Patient	15	beds being admitted for	8	days

Calculation:

Number of admitted patient = $(8 \times 4) + (10 \times 5) + (15 \times 8)$ bed-day

= $32 + 50 + 120$ bed-day

= 202 bed-day

Thus, number of admitted patient for April 2005 = 202 bed-day

2. Number of walk-in patient in each month means summation of number of walk-in patient each day from the first day till the last day of the month. A unit is person.

Example: Filling out data of actual use of area in each month for the case of hotel for a month of January 2005.

(3) Actual use of area in each month

(1) Operating hour (hour)	(2) Type of designated building (excluding parking space)		(3) Hotel	(4) Hospital	
	air-conditioning area (square meter)	non air-conditioning area (square meter)	Percentage of occupied room per month	Number of admitted patient (bed-day)	Number of walk-in patient (person)
744	9,000	2,250	55	-	-

No. 1.7: For personnel responsible for energy, specify information of personnel responsible for energy of a designated building as follows:

Column 1: specify order of personnel responsible for energy, in case a designated building has more than one person responsible for energy.

Column 2: specify name and surname of personnel responsible for energy of a designated building.

Column 3: specify registration number of personnel responsible for energy of a designated building which is a number that is issued by Department of Alternative Energy Development and Efficiency (DEDE).

Column 4: specify working period of personnel responsible for energy as being designated as personnel responsible for energy of a designated building.

Example: Filling out information of personnel responsible for energy of a designated building.

(1) Order number	(2) Name-Surname	(3) Registration number	(4) Working period	
			Start (day/month/year)	End (day/month/year)
1	Mr. Prayad Jingjai	PRE. 0975	5 January 1996	-
2	Mr. Anurak Koomkha	PRE. 2415	25 March 2005	-

4.2 Part 2: Building condition data

2.1 Building area: for a building with many facilities, specify data for each building separately.

Column 1: specify name of each building.

Column 2: specify number of floor for such building.

Column 3: specify height of each floor of such building.

Column 4: specify parking area in such building (if any).

Column 5: specify total utilized area of a building. Total utilized area is utilized area in the building, excluding indoor parking space, consisting of both air-conditioned and non air-conditioned area.

Air-conditioned area: area with installation of air-conditioning system and ready to be used.

Non air-conditioned area: area without installation of air-conditioning system and ready to be used.

Column 6: specify air-conditioned area.

Column 7: specify percentage of mirrored exterior surface to total exterior surface of a building.

Column 8: specify the time that a building has been in service.

Total area of a building means all utilized area and parking space.

2.2 Schematic of building location: specify plan of every facilitated within a designated building.

2.3 Record of building modification or newly constructed building: specify plan of every facilitated within a designated building in case there are modification of a building or newly constructed building.

Example: Filling out building condition data

(1) Name of building	(2) Number of floor	(3) Floor height (m.)	(4) parking area (m^2)	(5) Total utilized area (m^2)	(6) Air-conditioned area (m^2)	(7) mirrored area to total area (%)	(8) time in service of a building (year)
Building 1	6	3	-	2,700	2,160	30	8
Building 2	15	3	3,000	9,000	7,200	32	3
Total			3,000	11,700	9,360		

Total area of a designated building ……14,700…… square meter

Air-conditioned area……..……9,360…… square meter

4.3 Part 3: Energy consumption data

No. 3.1 Electricity purchase

(1) Mark ✓in ☐ according to type of electricity user and fill out quantity of consumed electricity (kilowatt-hour) for each month in column for electricity quantity by specifying electricity data as shown in electricity bill issued by electricity supplier for a particular month. For user types TOD and TOU, should fill out summation value of electricity of all three periods.

(2) Maximum electrical power (kilowatt): fill out maximum electrical power data as shown in electricity bill issued by electricity supplier for a particular month. Normal rate user and TOD and TOU users should fill out separately by marking ✓ in ☐ according to type of electricity user and fill out maximum electrical power data in the table as follows:

For TOD case, should fill out On peak, Partial peak, and Off peak into 1), 2) and 3), respectively.

For TOU case, should fill out Peak, Off peak1, and Off peak2, into 1), 2) and 3), respectively.

In case a designated building uses more than one electricity meters, data should be filed out separately for each meter.

Example 1: Filling out data of maximum demand electrical power for normal rate user.
- For normal rate user ……420……Kilowatts.

Example 2: Filling out data of maximum demand electrical power for TOD rate user.
☑ TOD Tariff ☐ TOU Tariff

Period	Kilowatt
1) ……On peak ……	820
2) ……Partial peak ……..…	1,460
3) ……Off peak ……	1,210

No. 3.2 Electricity consumption for each system

Specify quantity of electricity consumption for a particular month by indicating each equipment system being employed in a designated building separately as follows:

Column 1: specify name of equipment system being employed in a building such as air-conditioning system, lighting system and others. If there is system other than indicating in the table, should specify it as well.

Column 2: specify quantity of electricity consumption for each system being employed in a building according to those specified in column 1. Quantity of electricity consumption may be obtained from reading meter installed for each system (if any) or estimating from installed capacity of electrical equipment in a building. The estimation should be done as nearly as real condition as possible, that is, it shall consider proportion of electrical equipment in each system being operated a day, number of hour in operation per day, number of day in operation per month, etc.

Column 3: specify percentage of electricity consumption quantity for each system comparing to total electricity consumption of a designated building.

Column 4: For remark column, specify other additional data (if any).

Example: Filling out data of electricity consumption for each system

(1) System	(2) Electricity consumption (Kilowatt-hour)		(3) Percentage	(4) Remark
	From meter	From estimation		
Air-conditioning	170,000	-	68	
Lighting	-	62,500	25	
Other	-	17,500	7	
Total	170,000	80,000	100	

No. 3.3 Fuel consumption

Specify quantity of fuel consumption for a particular month by a designated building as follows:

Column 1: specify type of fuel used in a building such as bunker oil, diesel, gasoline or other fuel as specified in a table; specify additionally if such type is not indicated in the table.

A designated building using bunker oil or gasoline should specify type of bunker oil or type of gasoline (type of bunker oil such as grade A, grade C and grade D; type of gasoline such as gasoline-95 and gasoline 91). If a building using more than one type of bunker oil or gasoline should fill out data additionally under bunker oil or gasoline, as the case may be.

Column 2: specify unit of energy used. Also specify unit if using energy other than those specified in the table.

Column 3: specify amount of energy consumed each month.

Column 4: specify unit price of each type of fuel consumed in each month.

Column 5: specify cost of each type of fuel consumed in each month.

Column 6: For remark column, specify other additional data (if any).

Example...: Filling out fuel consumption data.

(1) Type of fuel	(2) unit	(3) Consumption quantity	(4) Price (Baht/unit)	(5) Fuel cost (Baht)	(6) Remark
1. Grade A bunker oil	Liter	1,200	11.00	13,200	
Grade C bunker oil	Liter	1,100	10.36	11,396	
2. Diesel	Liter				
3. Gasoline	Liter				
4. Kerosene	Liter				
5. LPG	Kilogram				
6. Natural Gas	Million BTU				
7. Other (specify)	unit (specify)				
……					
……					
……					
Total					

No. 3.4 Fuel consumption in machinery

Specify quantity of fuel consumption for machinery being employed in a designated building as follows:

Column 1: specify type of machinery being employed in a building such as boiler, autoclave, water heater and others. Specify additionally if there is machinery other than those specified in the table.

Column 2: specify amount of fuel consumed for a particular month by each machine as follows:

Type: specify type of fuel used in machinery.

Quantity: specify amount of fuel consumed for a particular month by each machine.

Unit: specify unit of energy used.

Column 3: specify unit price of each type of fuel consumed.

Column 4: specify cost of each type of fuel consumed.

Column 5: For remark column, specify other additional data (if any).

Example...: Filling out fuel consumption data for machinery.

(1) Machinery	(2) Consumption quantity			(3) Price (Baht/unit)	(4) Fuel cost (Baht)	(5) Remark
	Type	Quantity	Unit			
Boiler	Grade A bunker oil	1,200	Liter	11.00	13,200	
	Grade C bunker oil	1,100	Liter	10.36	11,396	
Other (specify)						
Total						

No. 3.5 Fuel consumption for electricity generation

A designated building generating electricity from its own generator should fill out data as follows:

Column 1: specify order of generators.

Column 2: specify installed production capacity of electricity generator in unit of kilowatt. The value can be obtained from guideline or specification of such generator or from the name plate.

Column 3: specify consumption quantity of principal fuel used in electricity generation for each month in sub-column (principal fuel means fuel that is used in large quantity comparing to other type of fuel in the same generator. A generator using two types of fuel generally is large in size and uses bunker oil as principal fuel and diesel as secondary fuel. A secondary fuel is only used during startup period.) as follows:

- Type of principal fuel used in electricity generation such as diesel, grade C bunker oil, etc.
- Quantity of principal fuel used in electricity generation.
- Unit of principal fuel used in electricity generation such as liter.

Energy consumption for each month should start counting from the first day of the month until the last day of such month.

Column 4: specify operating hour of generator in each month, start counting from the first day of the month until the last day of such month.

Column 5: specify amount of electricity generating in each month in unit of kilowatt-hour, start counting from the first day of the month until the last day of such month. In case electricity is also generated for sale, the quantity should be separately identified between those for consumption and those for sale (if any).

In case a designated building installing generator as a back up during electricity blackout that may operate generator each month for warm-up, even there is no electricity blackout in such month, and operate generator with no electricity distributed, should fill out only consumed energy data and generator operating hour in columns 3 and 4, respectively. Amount of electricity generated in column 5 should remark “warm-up without electricity generating”.

No. 3.6 Summary of energy consumption

It is a summary table for total energy consumption; both electricity and fuel consumption in a building which summarizes form data in No. 3.1 (1) and from data in table of No. 3.3 as follows:

Column 1: specify type of energy used in a designated building. If other types of energy are used, other than those specified in No.1 to No.8, specify such type of energy additionally following No.8.

Column 2: specify unit for each type of consumed energy. If other types of energy are used, other than those specified in the table, specify unit of such energy as well.

Column 3: specify consumption quantity for each type of energy for a particular month.

Column 4: specify heating value for each type of energy in unit of mega Jules per unit of such energy using low heating value obtained from the supplier. In case a designated building do not have low heating value obtained from the supplier, average heating value specified by Department of Alternative Energy Development and Efficiency (DEDE) should be used. The heating value specified by DEDE shall be as that in reference to Thailand annual report for fuel, of the most recent year published by DEDE (see more detail in www.dede.go.th).

Column 5: specify total heating value for each type of energy for a particular month in unit of Mega Jules by converting total amount of energy consumption from the original unit to heating value. It can be done by taking summation of energy consumption in column 3 and multiplied it with low heating value obtained from the supplier or multiplied it with average heating value specified by DEDE in column 4 as the case may be.

Remark: Calculation of total heating value in column 5 for each type of energy should be heating value in unit of Mega Jules to allow comparison of energy consumption ratio among each type of energy in such designated factory.

4.4 Part 4: Installation or modification of machinery or equipment that affects energy consumption and energy conservation

No. 4.1 Installation or modification of machinery or equipment that affects energy consumption and energy conservation

(1) Transformer: specify type, size and quantity of transformer installed in a designated building. The value can be obtained from guideline or specification of such transformer or from the name plate as follows:

Type of transformer: mark ✓ in □ for either oil type or dry type transformer.

Capacity: specify capacity of transformer.

High voltage: specify primary voltage of transformer.

Low voltage: specify secondary voltage of transformer.

Ventilation system: specify characteristic of heat ventilation system such as ventilating using ambient air or using fan.

Manufacturer: specify brand name or manufacturer of transformer.

Month/year of installation: specify month and year that transformer is installed.

Location: specify area or facility to which transformer distributes electricity.

Remark column: specify other additional data (if any).

(2) Unitary air conditioning system: specify type, size and quantity of small air conditioner installed in a designated factory, either split type or window type. The value can be obtained from guideline or specification of such air conditioner or from the name plate as follows:

Type of air conditioner: specify type of air conditioner such as split type, window type, etc.

Chilling capacity: specify capacity of air conditioner in unit of "watt". If unit of an air conditioner is "BTU/hour", it should be converted to "watt" with the conversion factor that 1 watt equals 3.412 BTU/hour.

Electrical power capacity: specify total capacity of electrical power of air conditioner, including hot coil unit and cool coil unit.

Manufacturer: specify brand name of air conditioner.

Month/year of installation: specify month and year that air conditioner is installed.

Location: specify area or room installing air conditioner.

Remark column: specify other additional data (if any).

(3) Central air conditioning system: specify type, size and quantity of central air conditioning system installed in a designated building. The value can be obtained from guideline or specification of such air conditioner or from the name plate as follows:

Type of water cooler: select type of water cooler by marking ✓ in □ according to type of water cooler being installed.

Type of compressor: specify type of compressor such as centrifuge type, screw type, etc.

Chilling capacity: specify capacity of water cooler in unit "ton/hour".

Size of compressor: specify electrical power capacity of compressor motor.

Size of auxiliary unit of water chiller system: specify as follows:

- Cool water pump: specify electrical power capacity of motor of the water pump and pump flow rate.
- Cooling water pump: specify electrical power capacity of motor of the cooling water pump and pump flow rate.
- Cooling tower: specify electrical power capacity of electrical fan motor of the cooling water tower.

Size of auxiliary unit of air chiller system: specify as follows:

- Cool water pump: specify electrical power capacity of motor of the water pump and pump flow rate.
- Heat ventilating fan: specify electrical power capacity of electrical fan motor for heat ventilation of condensers.

Manufacturer: specify brand name of water cooler.

Month/year of installation: specify month and year that water cooler is installed.

Location: specify area, facility or room installing water cooler.

Remark column: specify other additional data (if any).

(4) Lighting system: specify type, size, and quantity of electrical bulb being installed in a building as follows:

(4.1) Normal fluorescent bulb

Column 1: indicate type of normal fluorescent bulb of various sizes.

Column 2: mark ✓ in □ to select type of electrical lamp as shown in a table, specify it additionally if not found in a table.

Column 3: mark ✓ in □ to select type of shielding plate of electrical lamp as shown in a table, specify it additionally if not found in a table.

Column 4: mark ✓ in □ to select size of electrical power of the bulb and specify numbers of bulb used per lamp.

Column 5: mark ✓ in □ to select size of electrical power of the bulb and specify numbers of lamp used.

Column 6: specify size of electrical power of the bulb in watt/lamp and specify size of electrical power of the lamp for each size.

Column 7: specify size of power loss in ballast in watt/lamp and that of the lamp for each size.

Column 8: specify size of total electrical power of the bulb and ballast in watt/lamp and that of the lamp for each size.

Column 9: specify numbers of hour that electrical lamp is in operation.

(4.2) Other bulbs

Column 1: indicate type of bulb and its electric power capacity being used.

Column 2: specify number of bulb for each type being used.

Column 3: specify electrical power capacity of the bulb in watt/bulb for each type of bulb being used.

Column 4: specify size of power loss in ballast in watt/bulb for each type of bulb being used (if any).

Column 5: specify size of total electrical power of the bulb and ballast for each type of bulb.

Column 6: specify numbers of hour that each bulb is in operation.

(5) Other machinery or electrical equipment with size of 5 kilowatt or more: specify type, size and quantity of other machinery or electrical equipment installed in a designated building as follows:

Name of machinery or equipment: specify name of machinery or equipment being installed in a building.

Installed capacity: specify capacity of machinery or equipment.

Electrical voltage: specify electrical voltage capacity of machinery or equipment.

Electrical current: specify electrical current capacity of machinery or equipment.

Number of phase: specify number of phase of machinery or equipment such as one phase, three phases, etc.

Power factor: specify power factor of machinery or equipment.

Efficiency: specify efficiency of machinery or equipment.

Month/year of installation: specify month and year that machinery or equipment is installed.

Location: specify area, location or room installing machinery or equipment.

Remark column: specify other additional data (if any).

(6) Boiler: specify type, size and quantity of boiler installed in a building as follows:

Type of boiler: specify type of boiler such as water-tube or fire-tube or others.

Designed size: specify capacity of a boiler as designed as follows:

- Steam pressure: specify steam pressure capacity as designed.
- Evaporization rate: specify steam producing capacity of a boiler as designed.

Exterior condition: specify physical condition of a boiler such as width, length, height, and diameter of a boiler.

Heat transmission surface area: specify surface area for heat transmission between fire side and water side of a boiler.

Type of fuel used: specify type of fuel used such as grade A bunker oil, grade C bunker oil, natural gas, paddy husk, bagasses, etc.

Fuel consumption rate: specify fuel consumption rate such as liter/hour, kilogram/hour, etc.

Efficiency: specify efficiency of a boiler (calculating from output of produced steam).

Manufacturer: specify brand name or manufacturer of a boiler.

Month/year of installation: specify month and year that a boiler is installed.

Location: specify area, location or room installing electrical motor.

Remark column: specify other additional data (if any).

(7) Machinery or equipment employed in heat recovery system: specify following information about machinery or equipment employed in heat recovery system being installed in a building such as recovery of hot water from condensation process, recovery of hot water from cooling process or other heat recovery system.

Name of machinery or equipment: specify name of machinery or equipment employed in heat recovery system.

Model/type: specify model or type of machine.

Quantity: specify number of machinery or equipment of each model being installed.

Recovery temperature: specify temperature of heat being recovered.

Percentage of recovery: specify percentage of heat being recovered.

Manufacturer: specify brand name or manufacturer of machinery or equipment for heat recovery system.

Month/year of installation: specify month and year that machinery or equipment for heat recovery system is installed.

Remark column: specify other additional data (if any).

(8) Steam-utilizing machinery or equipment: specify following information about steam-utilizing machinery or equipment being installed in a building such as autoclave, water heater, cloth dryer, cloth ironing and other equipment.

Model/type: specify model or type of steam-utilizing machinery or equipment.

Quantity: specify number of steam-utilizing machinery or equipment of each model being installed.

Working pressure: specify working steam pressure for steam-utilizing machinery or equipment.

Steam utilization quantity: specify steam utilization quantity for steam-utilizing machinery or equipment.

Manufacturer: specify brand name or manufacturer of steam-utilizing machinery or equipment.

Month/year of installation: specify month and year that steam-utilizing machinery or equipment is installed.

Remark column: specify other additional data (if any).

(9 Electricity generation systems: specify type, size and quantity of electricity generation system being installed in a building as follows

(9.1) Prime mover: specify data as follows:

Type: specify type of prime mover of electricity generation system such as motor engine, steam engine, gas turbine, steam turbine, etc.

Horse power: specify capacity of primer mover in horse power.

Velocity: specify rpm (revolution per minute) of a prime mover use to drive a generator.

Type of fuel used: specify type of fuel use in a prime mover such as bunker oil, diesel, etc.

Number of stage: specify number of cylinder or stage of a primer mover.

Manufacturer: specify brand name or manufacturer of prime mover.

Month/year of installation: specify month and year that prime mover and generator is installed.

Location: specify area, location or room installing such prime mover and generator.

Remark column: specify other additional data (if any).

(9.2) Electricity generator: specify detail data of electricity generator as follows:

Installed capacity: specify installed capacity of a generator.

Rate voltage: specify rate voltage of a generator.

Rate current: specify rate current of a generator.

Power factor: specify power factor of a generator.

Angle velocity (rpm): specify rpm (revolution per minute) of a generator.

Manufacturer: specify brand name or manufacturer of a generator.

Month/year of installation: specify month and year that prime mover and generator is installed.

Location: specify area, location or room installing such prime mover and generator.

Remark column: specify other additional data (if any).

(10) Machinery or equipment using other type of fuel: specify data of machinery or equipment using other type of fuel which is installed in a factory, such as autoclave, water heater, water distiller, cloth dryer and other equipment, as follows:

Model/type: specify model or type of machinery or major equipment using other type of fuel.

Quantity: specify number of machinery or equipment of each model being installed.

Type of fuel used: specify type of fuel used in machinery or major equipment.

Fuel consumption quantity: specify fuel consumption quantity of machinery or major equipment.

Manufacturer: specify brand name or manufacturer of machinery or equipment.

Month/year of installation: specify month and year that machinery or equipment is installed.

Remark column: specify other additional data (if any).

No. 4.2 Improvement or modification of machinery or equipment and energy conservation measures

Specify data about improvement or modification of machinery or equipment and energy conservation measures being implemented in a building as follows:

Column 1: specify order of implementation in the list of improvement or modification of machinery or equipment and energy conservation measures.

Column 2: specify detail information about improvement or modification of machinery or equipment and energy conservation measures.

Column 3: specify implementation period of improvement or modification of machinery or equipment and energy conservation measures, by indicating starting time and completing time.

Column 4: specify amount of money invested in improvement or modification of machinery or equipment and energy conservation measures.

Column 5: specify energy saving as a result of improvement or modification of machinery or equipment and energy conservation measures, by indicating type of energy, amount and value of energy that are saved per year (annual saving energy can be estimated from multiplying monthly saving with 12).

Column 6: For remark column: specify other additional data (if any).

Once the form BorPorAor.2 has been completed, a person responsible for energy of a designated building shall endorse data for its validity and keep record of the form at a designated factory.

Annex A

The Ministerial Regulation regarding criteria, procedure and schedule for submission and recording of data on energy conservation B.E. 2547 (2004)

The Ministerial Regulation

Re: Criteria, procedure and schedule for submission
and recording of data on energy conservation
B.E. 2547 (2004)

By the virtue of section 6 paragraph two, section 11 (2) and (3), and section 22 of the Energy Conservation Promotion Act B.E. 2535 (1992), which contains some provisions concerning the limitation of the people rights and liberties that is permissible by the provisions of section 29 together with section 35, section 48 and section 50 of the Constitution of the Kingdom of Thailand, the Minister of Energy, with the recommendation of the National Energy Policy Council, hereby issues the Ministerial Regulation as follows:

Clause 1 The following regulation shall be annulled:

(1) The Ministerial Regulation No.2 (B.E. 2538 (1995)) issued pursuant to Energy Conservation Promotion Act B.E. 2535 (1992).

(2) The Ministerial Regulation No.5 (B.E. 2540 (1997)) issued pursuant to Energy Conservation Promotion Act B.E. 2535 (1992).

Clause 2 In this Ministerial Regulation,

"Designated factory" shall mean a factory being designated by the Royal Decree under the provision of the Energy Conservation Promotion Act B.E. 2535 (1992).

"The owner of a designated factory" shall mean a person who is responsible for the management of a designated factory.

"Designated building" shall mean a building being designated by the Royal Decree under the provision of the Energy Conservation Promotion Act B.E. 2535 (1992).

"The owner of a designated building" shall mean a person who possesses a designated building.

Clause 3 The owner of a designated factory shall submit information about production, energy consumption and energy conservation to Department of Alternative Energy Development and Efficiency using the form BorPorRor.1 annexed to this Ministerial Regulation.

The owner of a designated building shall submit information about building utilization data, energy consumption and energy conservation to Department of Alternative Energy Development and Efficiency using the form BorPorAor. 1 annexed to this Ministerial Regulation.

Clause 4 Monthly data of January to June shall be submitted by July of such year and those of July to December shall be submitted by January of the next year. The data shall be endorsed for validity by personnel responsible for energy.

If data of paragraph one are submitted via post, it shall be through certified mail and the date of certified mail shall be considered as the date of submission. If submit via facsimile, the date of sending facsimile shall be considered as the date of submission. However, submission via facsimile is considered accomplished only when the owner of a designated factory or the owner of a designated building has submitted the original form (Form BorPorRor.1 or Form BorPorAor. 1) within seven days from the deadline of data submission. If submit via electronic mail with password, it shall be in accordance with the law governing electronic business. The effective date and criteria for submission date shall be as announced by Department of Alternative Energy Development and Efficiency.

The announcement in paragraph two may prescribe procedural step in submitting data via electronic mail with password so far as it is not contrary to the law governing electronic business.

Clause 5 The owner of a designated factory or the owner of a designated building shall keep and maintain record of energy consumption data and installation or modification of machinery that may affect energy consumption and energy conservation using Form BorPorRor.2 or Form BorPorAor. 2 as annexed to this Ministerial Regulation.

The data in paragraph one shall be recoded in monthly basis and shall be endorsed for validity by personnel responsible for energy.

Clause 6 This Ministerial Regulation shall come into effect one hundred and twenty days after its publication in the Government Gazette.

Given on the 27th day of December B.E. 2547 (2004)

Signed Prommin Lertsuriyadej
(Mr. Prommin Lertsuriyadej)
Minister of Energy

Remark: The reason for the enactment of this ministerial regulation is that the existing forms for submission of data on production, energy consumption and energy conservation of a designated factory or a designated building (Form BorPorRor.1 or Form BorPorAor. 1) are not clear and there is several energy units used. It therefore deems appropriate to revise for the easiness of data recording and to resolve confusion on energy unit. Also it deems appropriate to combine the provisions under the Ministerial Regulation No.2 (B.E. 2538 (1995)) and the Ministerial Regulation No.5 (B.E. 2540 (1995)), issued pursuant to the Energy Conservation Promotion Act B.E. 2535 (1992),which are enacted on the same principle, for the reference and assessment purpose; it is therefore necessary to issue this ministerial regulation.

Annex B

Submission Form for Data on Building Utilization, Energy Consumption and Energy Conservation for a Designated Building

(Form BorPorAor.1)

Submission Form for Data on Building Utilization, Energy Consumption and Energy Conservation
(For a Designated Factory)

For the months of ..... Year ..... to ..... Year .....

Part 1: General data

1.1 Name of a building: …… (If any)

1.2 Location of a building:
Street number ……Soi ……..Road……Tambon ……
District ……Province ……..Postal code ……
Telephone ……Fax…….

1.3 Type of building: [ ] Office [ ] Hotel [ ] Hospital
[ ] Shopping mall [ ] Educational institute [ ] Other (specify) .....

1.4 A building construction was completed in the year .....

1.5 Operating hour of a building: ..... hours/day ..... days/year

1.6 Total number of room or bed:
(1) For hotel, total number of room ..... rooms
(2) For hospital, total number of patient bed ..... beds

1.7 Total area of a building ..... square meter
(1) Total utilized area ..... square meter (excluding parking area)
(2) Parking area ..... square meter
(3) Actual utilized area in each month, specify as follows:

(1) Month/year	(2) Operating hour (hour)	(3) All type of designated building (excluding parking area)		(4) Hotel	(5) Hospital	
		Air-conditioned area (square meter)	Non air-conditioned area (square meter)	Percentage of occupied room per month	Number of admitted patient (bed-day)	Number of walk-in patient (person)

Part 2: Energy consumption data

2.1 Energy consumption (Name of product/Total)

(1) Type of energy	(2) Unit	(3) Consumption quantity							(4) Average heating value[1/] (Mega Jules/unit)	**(5) Total heating value** Total (3) x (4) (Mega Jules)
		Month 1 Jan or Jul	Month 2 Feb or Aug	Month 3 Mar or Sep	Month 4 Apr or Oct	Month 5 May or Nov	Month 6 Jun or Dec	Total (3) Month 1 to 6		
1. Maximum electrical power	Kilowatt									
2. Purchased energy	Kilowatt-hour								3.6[2/]	(6)
3. Heat energy										
Bunker oil	Liter									
Diesel	Liter									
Gasoline	Liter									
Kerosene	Liter									
LPG	Kilogram									
Natural gas	Million BTU									
Imported coal	Ton									
Lignite	Ton									
Other (specify)	Unit (specify)									
	Total heat energy consumption from non-renewable energy									(7)
Renewable energy (specify)	Unit (specify)									
Total energy consumption										

Remark: 1/ In case there is no low heating value from the supplier, average heating value specified by Department of Alternative Energy Development and Efficiency should be used.
2/ converting from kilowatt-hour unit to Mega Jules unit.

2.2 Fuel consumption for electricity generation

[ ] Electricity generation only [ ] Cogeneration of electricity and heat

(1) Month/Year	(2) Installed production capacity (Kilowatt)	(3) Principal fuel consumption			(4) Hours in operation (Hour)	(5) Quantity of generated electricity (Kilowatt-hour)		(6) Remark
		Type	Quantity	Unit		For own use	For sale	

Part 3: Energy conservation data and the result of an audit and analysis on operation in compliance with targets and plans

Measure title: ..... □ Measure implemented in compliance with targets and plans

Measure order no.[1] …….. from total of…….. measures □ Measure not included in targets and plans

(1) Implementation period[2]		(2) Implementing status[3]	(3) Investment[4]		(4) Result of energy conservation[5]	
As plan	As implemented		As plan	As invested	As plan	As existing
(5) Problem/obstacle encountered		(6) Comment and suggestion[6]		(7) Remark		

Explanation

1) Specify measures as in order of implementation and fill out one sheet per one measure.
2) Specify month/year beginning and end of implementation period.
3) Specify implementing status if sill has been in progress.
4) Specify an estimated investment and actual invested money.
5) Specify type of fuel used, annual amount of fuel conserved and annual saving value. For electricity saving, specify in both units of kW and kWh.
6) Specify comment and suggestion for improving energy conservation procedure of a building and government.

Certified true copy …….. copies

Signed ……...…….. Personnel responsible for energy
(…….....)
Registration number ……

Signed …….. Building owner
(…….……)

Annex C

Recording Form for Data on Energy Consumption and Installation or Modification of Machinery or Equipment Affecting Energy consumption and Energy Conservation for a Designated Building

(Form BorPorAor.2)

Recording Form for Data on Energy Consumption and Installation or Modification of Machinery or Equipment Affecting Energy consumption and Energy Conservation

(For a Designated Building)

For the months of ..... Year .....

Part 1: General data

1.1 Name of a building: …… (If any)

1.2 Location of a building:
Street number ……Soi ……Road……Tambon ……
District ……Province ……Postal code ……
Telephone ……Fax…….

1.3 Type of building: [ ] Office [ ] Hotel [ ] Hospital
[ ] Shopping mall [ ] Educational institute [ ] Other (specify) .....

1.4 Operating hour of a building: ..... hours/day ..... days/year

1.5 Total number of room or bed:
(1) For hotel, total number of room ..... rooms
(2) For hospital, total number of patient bed ..... beds

1.6 Actual utilized area in each month:

(1) Operating hour (hour)	(2) All type of designated building (excluding parking area)		(3) Hotel	(4) Hospital	
	Air-conditioned area (square meter)	Non air-conditioned area (square meter)	Percentage of occupied room per month	Number of admitted patient (bed-day)	Number of walk-in patient (person)

1.7 Personnel responsible for energy

(1) Order number	(2) Name-Surname	(3) Registration number	(4) Working period	
			Start (day/month/year)	End (day/month/year)

Part 2: Building condition data

2.1 Building area data

If there are many facilities in a designated building, data should be filled out separately for each facility.

(1) Name of building	(2) Number of floor	(3) Floor height (m.)	(4) parking area (m^2)	(5) Total utilized area (m^2)	(6) Air-conditioned area (m^2)	(7) mirrored area to total area (%)	(8) time in service of a building (year)

Total area of a designated building …… square meter

Air-conditioned area……..…… square meter

2.2 Schematic of building location:

2.3 Record of building modification or newly constructed building:

Part 3: Energy Consumption Data

3.1 Electricity Purchase

(1) Quantity of electricity being purchased

[ ] Normal rate [ ] TOD Tariff

[ ] TOU Tariff

- Quantity of electricity ..... Kilowatt-hour

(2) Maximum electricity demand

- For normal rate user ……Kilowatt
- For electricity user type:

[ ] TOD Tariff [ ] TOU Tariff

Period	**Kilowatt**
1) …… 2) …… 3) ……	

3.2 Electricity consumption for each system

(1) System	(2) Electricity consumption (Kilowatt-hour)		(3) Percentage	(4) Remark
	From meter	From estimation		
Air-conditioning				
Lighting				
Other				
Total			100	

3.3 Fuel consumption

(1) Type of fuel	(2) unit	(3) Consumption quantity	(4) Price (Baht/unit)	(5) Fuel cost (Baht)	(6) Remark
1. Bunker oil	Thousand liter				
2. Diesel	Thousand liter				
3. Gasoline	Thousand liter				
4. Kerosene	Thousand liter				
5. LPG	Ton				
6. Natural Gas	Million BTU				
7. Other (specify)	unit (specify)				
.....					
.....					
.....					
Total					

3.4 Fuel consumption in machinery or equipment

(1) Machinery	(2) Consumption quantity			(3) Price (Baht/unit)	(4) Fuel cost (Baht)	(5) Remark
	Type	Quantity	Unit			
Boiler						
Autoclave						
Water heater						
Water distiller						
Cloth dryer						
Other (specify)						
Total						

3.5 Fuel consumption for electricity generation

[ ] Electricity generation only [ ] Cogeneration of electricity and heat

(1) Order number	(2) Installed production capacity (Kilowatt)	(3) Consumption quantity of principal fuel			(4) Hour in operation (Hour)	(5) Quantity of electricity being generated (Megawatt-hour)	
		Type	Quantity	Unit		For own use	For sale
Total							

3.6 Summary of energy consumption

(1) Type of energy	(2) Original unit	(3) Consumption quantity	(4) Average heating value (Mega Jules/original unit)	(5) Total heating value (Mega Jules)
1. Purchased electricity	Kilowatt-hour			
2. Bunker oil	Liter			
3. Diesel	Liter			
4. Gasoline	Liter			
5. Kerosene	Liter			
6. LPG	Kilogram			
7. Natural Gas	Million BTU			
8. Other (specify)	Unit (specify)			
Total energy consumption				

Part 4: Installation or modification of machinery or equipment affecting energy consumption and energy conservation

4.1 Installed machinery or equipment affecting energy consumption and energy conservation

(1) Transformer

Description	Unit 1	Unit 2	Unit 3	Unit 4
Type of transformer	[ ] dry type [ ] oil type	[ ] dry type [ ] oil type	[ ] dry type [ ] oil type	[ ] dry type [ ] oil type
Capacity (Kilovolt-ampere)				
High voltage (Kilovolt)				
Low voltage(volt)				
Heat ventilation system				
Manufacturer				
Month/year of installation				
Location of installation				
Remark				

(2) Unitary air conditioning system

Description	Unit 1	Unit 2	Unit 3	Unit 4
Type of air conditioner				
Chilling capacity (Watt)[1)]				
Electrical power capacity (Kilowatt)				
Manufacturer				
Month/year of installation				
Location of installation				
Remark				

Explanation

[1)] Chilling capacity: 1 watt equals 3.412 BTU/hour

(3) Central air conditioning system

Description			
Type of air conditioner			[ ] water cooler using water chiller [ ] water cooler using air chiller
Type of compressor			
Chilling capacity		Ton/hour	
Compressor capacity		Kilowatt	
Size of auxiliary unit of water chiller system	Water pump	Kilowatt	
		Liter/hour	
	Cooling water pump	Kilowatt	
		Liter/hour	
	Cooling tower	Kilowatt	
Size of auxiliary unit of air chiller system	Water pump	Kilowatt	
		Liter/hour	
	Ventilating fan	Kilowatt	
Manufacturer of water cooler			
Month/year of installation			
Location of installation			
Remark			

(4) Lighting system

(4.1) Normal fluorescent bulb

(1) Type of electrical bulb	(2) Type of electrical lamp	(3) type of shielding plate of electrical lamp	(4) numbers of bulb per lamp (bulb/lamp)	(5) numbers of lamp (lamp)	(6) electrical power of the lamp (watt-lamp)	(7) power loss in ballast (watt/lamp)	(8) total watt (watt)	(9) hours in operation (hours/day)
Fluorescent bulb: 58-watt size	[ ]hanging lamp [ ]embedded lamp [ ]Other (specify) ……	[ ] opened [ ] off white [ ] prismatic [ ] Other (specify) ……						
Fluorescent bulb: 36-watt and 40-watt size	[ ]hanging lamp [ ]embedded lamp [ ]Other (specify) ……	[ ] opened [ ] off white [ ] prismatic [ ] Other (specify) ……	[ ] 36 watt …… [ ] 40 watt ……	[ ] 36 watt …… [ ] 40 watt ……				
Fluorescent bulb: 32-watt size	[ ]hanging lamp [ ]embedded lamp [ ]Other (specify) ……	[ ] opened [ ] off white [ ] prismatic [ ] Other (specify) ……						
Fluorescent bulb: 18-watt and 20-watt size	[ ]hanging lamp [ ]embedded lamp [ ]Other (specify) ……	[ ] opened [ ] off white [ ] prismatic [ ] Other (specify) ……	[ ] 18 watt [ ] 20 watt	[ ] 18 watt [ ] 20 watt				

(4.2) <u>other bulb type</u>

(1) Type of electrical bulb	(2) number of bulb	(3) electrical power of the lamp (watt/bulb)	(4) power loss in ballast (watt/bulb)	(5) total watt (watt)	(6) hours in operation (hours/day)
Incandescent bulb size …… watt size …… watt Tungsten Halogen bulb size …… watt size …… watt Complex fluorescent bulb size …… watt size …… watt Fluorescent bulb: high pressure mercury vapor size …… watt size …… watt Metal halide bulb size …… watt size …… watt High pressure sodium vapor bulb size …… watt size …… watt Low pressure sodium vapor bulb size …… watt size …… watt					

(5) Other machinery or electrical equipment with size of 5 kilowatt or more

Description	Unit 1	Unit 2	Unit 3	Unit 4
Name of machinery and equipment				
Electrical power capacity (Kilowatt)				
Electrical pressure (volt)				
Electrical current (ampere)				
number of phasing				
Power factor (%)				
Efficiency (%)				
Manufacturer				
Month/year of installation				
Location of installation				
Remark				

(6) Boiler

Description		**Unit 1**	**Unit 2**	**Unit 3**
Type of boiler (water-type, fire-type, or others)				
Designed size	Steam pressure (kg/cm^2)			
	Evaporization rate (ton/hour)			
Exterior condition	Width (meter)			
	Length (meter)			
	Height (meter)			
	Diameter (meter)			
Heat transmission surface area (square meter)				
Type of fuel used				
Fuel consumption rate (Specify unit such as liter/hour, kilogram/hour, etc.)				
Efficiency (%)				
Manufacturer				
Month/year of installation				
Location of installation				
Remark				

(7) Machinery or equipment employed in heat recovery system

Heat recovery system	Condensate recovery	Recovery of heat/hot gas from			Other heat recovery system (specify)
		condenser	indoor	Stack	
Name of machinery or equipment					
Model/Type					
Quantity					
Recovery temperature (°C)					
Percentage of recovery (%)					
Manufacturer					
Month/year of installation					
Location of installation					
Remark					

(8) Steam-utilizing machinery or equipment

Name of machinery or major equipment	Autoclave	Water heater	Water distiller	Cloth dryer	Cloth Roller-ironing	Other equipment (specify)
Model/Type						
Quantity						
Working pressure (kg/cm^2)						
Steam utilization rate (kg/hour)						
Manufacturer						
Month/year of installation						
Remark						

(9) Electricity generating system

(9.1) Prime mover

Description	Unit 1	Unit 2	Unit 3	Unit 4
Type (such as motor engine, steam engine, gas turbine, steam turbine, etc.)				
Horsepower				
Angle velocity (rpm)				
Type of fuel used (such as diesel, bunker oil, natural gas, etc.)				
Numbers of cylinder or stage				
Manufacturer				
Month/year of installation				
Location of installation				
Remark				

(9.2) Electricity generator

Description	Unit 1	Unit 2	Unit 3	Unit 4
Installed capacity (Kilowatt)				
Rate voltage(volt)				
Rate current (ampere)				
Power factor (%)				
Angle velocity of generator (rpm)				
Manufacturer				
Month/year of installation				
Location of installation				
Remark				

(10) Machinery or equipment using other type of fuel

Description	Autoclave	Water heater	Water distiller	Cloth dryer	Other equipment (specify)
Model/type					
Quantity					
Type of fuel used					
Fuel consumption quantity (specify unit)					
Manufacturer					
Month/year of installation					
Remark					

4.2 Improvement or modification of machinery or equipment and energy conservation measures

(1) Order number	(2) Description of Improvement or modification of machinery or equipment and energy conservation measures	(3) Implementing period		(4) Investment (Baht)	(5) Energy saving outcome			(6) Remark
		Start (Month/year)	Completed (Month/year)		Type of energy	Quantity 1/ (Unit)	Value (Baht)	
Total								

1/ Energy saving in terms of electricity should specify quantity both in unit, kilowatt and kilowatt-hour.

Certified true copy …….. Copies

Signed …….....…….. Personnel responsible for energy
(……)