Forms of Energy Utilization Manual and Essential Particulars

I. Energy Users as Electricity Generation

i. Format

(i) The text of Energy Utilization Manual shall be written horizontally. Text, figures, and tables, shall be in clear fonts with proper spacing. The compilation shall be concise and truthful. A4 (21 cm x 29.7 cm) paper is required, and the contents shall be printed on both sides of the paper except graphs or tables of special sizes.

(ii) The sources of maps or photographs shall be properly cited. Colored maps and photographs shall be printed in colors. When the figures and tables exceed the size of paper, leaflets shall be used; the reduced or photocopied figures and tables shall be clear and easy to read.

(iii) The applicant shall submit one version of printed Energy Utilization Manual in 15 copies, and one CD of an electronic copy saved in Microsoft Word format and related electronic records, or kindly submit the Manual online.

ii. Basic Information

Date: / /

<table>
<tr><td colspan="7">(i) Basic Information of Applicant</td></tr>
<tr><td colspan="3">Plan Name</td><td colspan="4"></td></tr>
<tr><td colspan="3">Applicant (1)</td><td colspan="4"></td></tr>
<tr><td colspan="3">Responsible Person</td><td colspan="4"></td></tr>
<tr><td colspan="3">Address</td><td colspan="4"></td></tr>
<tr><td colspan="3">Contact</td><td colspan="4"></td></tr>
<tr><td colspan="3">Phone No.</td><td></td><td>Fax</td><td colspan="2"></td></tr>
<tr><td colspan="3">E-Mail</td><td colspan="4"></td></tr>
<tr><td colspan="3">Industrial Classification (2)</td><td colspan="4"></td></tr>
<tr><td colspan="7">(ii) Basic Information of Project</td></tr>
<tr><td rowspan="4">1. Plan Summary</td><td colspan="2">Plan Location (3)</td><td colspan="4"></td></tr>
<tr><td colspan="2">Plan Site (4)</td><td colspan="4">☐ Northern ☐ Central ☐ Southern ☐ Offshore islands</td></tr>
<tr><td colspan="2">Construction Period (5)</td><td colspan="4">From To</td></tr>
<tr><td colspan="2">Projected Commercialization Year/Month</td><td colspan="4">Year Month</td></tr>
<tr><td rowspan="4">2. Energy Consumption Category and Volume</td><td colspan="2" rowspan="2">Category</td><td rowspan="2">☐ Coal (Ton/Year)</td><td rowspan="2">☐ Natural Gas (1,000 m^3/Year)</td><td colspan="2">☐ Plant Power Consumption (kW)</td></tr>
<tr><td>☐Private-Produced</td><td>☐External Imported</td></tr>
<tr><td rowspan="2">Volume (6)</td><td>Completed</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Permit Application</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Category</td><td colspan="4">☐ Petroleum Products (7) (kL/Year)</td></tr>
</table>

			☐	☐	☐	☐
	Volume	Completed				
		Permit Application				
3. Rated thermal input [8] (MW_{th})						
4. Installed capacity (MW_e)						
5. Electrical efficiency [9] (%, LHV)			6. Fuel utilization [10] (%, LHV)			

(For other matters requiring further explanation, please attach additional spaces to the chart)

Note:

(1) If the applicant is the energy user of a massive investment and production plan, the applicant shall provide the name of the registered legal entity with the Ministry of Economic Affairs, as well as Tax ID Number; if the applicant is still in the preparatory stage, please indicate the name of preparatory office.

(2) Please indicate the industry in accordance with ROC Standard Industrial Classification.

(3) Plan location refers to the address of the new establishment or expansion of energy consumption facilities; projects without addresses may fill in land number.

(4) Plan site refers to the region of the project. Northern refers to the region north of Fongshan River and Heping River; Central refers to the region south of Fongshan River and norther of Jhuoshuei River, and Hualien County; Southern refers to the region south of Jhuoshuei River and Taitung County that is not included in the Northern or Central regions; Offshore islands refers to islands that are not connected with the power grid of the island of Taiwan.

(5) Please enter common date.

(6) In new establishment plans, volume refers to the maximum annual consumption after commercialization; in expansion plans, volume refers to the maximum additional annual consumption after commercialization.

(7) Please indicate the type of petroleum products, such as fuel oil, gasoline, diesel and so on.

(8) Rated thermal input: The rate at which fuel can be burned at the maximum continuous rating of the equipment multiplied by the total calorific value of the fuel and expressed as megawatts thermal.

(9) Electrical Efficiency Equation is as followed:

$$\eta_{net} = \frac{P_{el,net} * 860}{\dot{m}_{fuel} H_u} = \frac{\left(P_{el,gross} - P_{aux}\right) * 860}{\dot{m}_{fuel} H_u}$$

$P_{el,gross}$: Optimized maximum power output under design conditions (kW)

$P_{el,net}$: Net optimized maximum power output under design conditions (kW)

P_{aux}: Designed value for station service load (kW)

$\dot{m}_{fuel}$: Total fuel input per hour under design conditions (kg/h)

H_u: Fuel calorific value (kcal/kg), LHV

*1kW = 860kcal/h

(10) Fuel Utilization Equation is as followed:

$$\mathcal{E}_{net} = \frac{P_{el,net} * 860 + \dot{Q}_{net}}{\dot{m}_{fuel} H_u}$$

$P_{el,net}$: Net optimized maximum power output under design conditions (kW)

$\dot{Q}_{net}$: Net optimized thermal output per hour under design conditions (kcal/h)

$\dot{m}_{fuel}$: Total fuel input per hour under design conditions (kg/h)

H_u: Fuel calorific value (kcal/kg), LHV

*1kW = 860kcal/h

7. Site [11]

(11) Using a 1/5000 or 1/10000 scale basic figure or reduced size map of Taiwan to disclose the development site and transportation, rivers, urban plan, terrain, surface features, landform, schools, and communities in the surrounding areas within a 1- to 5-kilometer radius. Developments over 10 hectares (including) or linear developments stretching beyond 10 kilometers shall be indicated on a 1/25000 or 1/50000 scale map or topographic map.

8. Layout [12]

(12) The layout shall be clearly labeled, such as the relative positions of each venues (facilities), dimensions, and distances; the actual distances or scale shall also be indicated, as well as legends, orientation, and other necessary matters that benefit the assessment.

iii. Information Checklist

(i) Processing Techniques

Applicant Self-Checklist
☐ BATs shall be applied in Processing Techniques for Electricity Generation in Appendix 2 of Regulations Governing the Assessment of Energy Development and Utilization. In accordance with the version of EU Reference Document on Best Available Techniques for Large Combustion Plants: BREF (2021) ☐ BATs shall not be applied in Processing Techniques for Electricity Generation in Appendix 2 of Regulations Governing the Assessment of Energy Development and Utilization. Described as follows: (Please specify the reason why the BATs are not applicable, and the standards to be adapted)
1. LHV (1) Energy Category: _____; Combustion technology: _____
(2) Net electrical efficiency (%, LHV) of planning unit: _____ ☐ In accordance with net electrical efficiency of EU BAT ☐ Not in accordance with net electrical efficiency of EU BAT Described as follows: (Please elaborate how the efficiency value is estimated)
(3) Fuel utilization (%, LHV) of planning unit: _____ ☐ In accordance with fuel utilization of EU BAT ☐ Not in accordance with fuel utilization of EU BAT Described as follows: (Please elaborate how the efficiency value is estimated)
2. (The BAT of Processing Techniques) (1) (The BAT of Processing Techniques) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(For other BAT of Processing Techniques, please attach additional spaces to the chart)

(For other matters requiring further explanation, please attach additional spaces to the chart)

(ii) Utility Systems and Equipment [13]

Applicant Self-Checklist
BATs shall be applied in Utility Systems and Equipment in Appendix 1 of Regulations Governing the Assessment of Energy Development and Utilization. ☐ Yes. ☐ No. It isn't applicable in circumstances of being restricted by laws and regulations, patent right protection, international trade barriers, or other factors bot attributable to

Applicant Self-Checklist
the applicants, given evidence are submitted by the applicants. Described as follows: (Please specify the reason why the BATs are not applicable, and the standards to be adapted, for each system respectively)
1. The item is whether the combustion handling systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 23 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 23 below.)
(1) Lignite pre-drying ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Coal gasification ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Fuel drying ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Biomass gasification ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Bark pressing ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Expansion turbine to recover the energy content of pressurized gases ☐ Applicable ☐ Partially applicable ☐ Not applicable

Applicant Self-Checklist
Described as follows:
(7) Advanced computerised control of combustion conditions for emission reduction and boiler performance ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Using flue-gas heat to supply district heating system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Reducing excess air and make it reach the optimum air-fuel ratio ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Properly reducing the exhaust temperature to reduce heat loss ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Reducing the concentration of carbon monoxide in the exhaust gas and improving boiler efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(12) Heat accumulation ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(13) Cooling tower discharge ☐ Applicable

Applicant Self-Checklist
☐ Partially applicable ☐ Not applicable Described as follows:
(14) Different techniques for the cooling system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(15) Using waste heat to preheat gas fuels to improve thermal efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(16) Preheating combustion air to improve fuel efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(17) Installing recuperative or regenerative burners to recover burner waste heat ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(18) Controlling and optimizing combustion conditions by monitoring fuel, air flow rates, and oxygen content in flue gas ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(19) Fuel choice ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(20) Using oxygen-enriched combustion technology to improve energy efficiency

Applicant Self-Checklist
☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(21) Reducing heat loss by insulation ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(22) Reducing heat loss cause by frequent opening and closing or poor sealing of furnace doors ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(23) Fluidised bed combustion ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
2. The item is whether the heat recovery systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 2 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 2 below.)
(1) Monitoring the efficiency periodically ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Preventing or removing the internal scaling and external dust accumulation of equipment ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
3. The item is whether the steam handling systems would be installed:

Applicant Self-Checklist
☐ Yes. Provide further description in BAT Items 1 to 28 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 28 below.)
(1) Energy efficient design and installation of steam distribution pipework ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Throttling devices and the use of backpressure turbines: utilize backpressure turbines instead of PRVs ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Improve operating procedures and boiler controls ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Use sequential boiler controls (apply only to sites with more than one boiler) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Install flue-gas isolation dampers (applicable only to sites with more than one boiler) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) For feed water preheating, the following methods are available: <1>process waste heat recovery <2>recovery of heat energy from combustion air by economizer <3>heating condensate with deoxygenated feed water <4>using heat exchangers to condense the steam used for degassing and feed water heating ☐ Applicable

Applicant Self-Checklist
☐ Partially applicable ☐ Not applicable Described as follows:
(7) Prevention and removal of scale deposits on heat transfer surfaces. (Clean boiler heat transfer surfaces) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Boiler blowdown is reduced by improving the water treatment system and installing automatic dissolved solids control equipment ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) It is necessary to check and attach/repair the boiler refractory material during regular inspection ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Maintaining optimal discharge rate of degassers ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Minimise boiler short cycling losses ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(12) Carrying out boiler maintenance ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(13) Optimizing the steam distribution system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(14) Isolate steam from unused lines ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(15) Regularly inspecting and confirming the heat insulation of steam pipes and condensate return pipes. (Confirming the proper heat insulation of the pipes, pipe fittings, valve bodies, and tanks) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(16) Implement a control and repair programme for steam traps ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(17) Collect and return condensate to the boiler for re-use. (Optimise condensate recovery) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(18) Re-use of flash-steam. (Use high pressure condensate to make low pressure steam) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(19) Recover energy from boiler blowdown

Applicant Self-Checklist
☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(20) Expansion turbine to recover the energy content of pressurised gases ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(21) Change turbine blades when repairing ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(22) Using advanced materials to meet high steam parameter requirements to improve efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(23) Supercritical steam parameters ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(24) Double reheat ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(25) Regenerative feed-water ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(26) Use of heat content of the flue-gas for district heating ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(27) Heat accumulation ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(28) Advanced computerised control of the gas turbine and subsequent recovery boilers ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
4. The item is whether the electric power supply systems would be installed [(14)]: ☐ Yes. Provide further description in BAT Items 1 to 8 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 8 below.)
(1) Installing capacitors in the AC circuits to decrease the magnitude of reactive power ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Minimising the operation of idling or lightly loaded motors ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Avoiding the operation of equipment above its rated voltage ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(4) When a new or replacement motor is installed, a high efficiency motor (≥ IE3) should be used ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Ensure power cables have the correct dimensions for the power demand ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Keep online transformer(s) operating at a load above 40 ~50 % of the rated power ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Use high efficiency/low loss transformers ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Place equipment with a high current demand as close as possible to the power source (e.g. transformer) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
5. The item is whether the electric motor drive subsystems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 7 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 7 below.)
(1) Using energy efficient motors (EEMs) (≥ IE3) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(2) Proper motor sizing ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Installing high efficiency transmission/reducers ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Use: direct coupling where possible, synchronous belts or cogged V-belts in place of V belts, helical gears in place of worm gears ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Rewinding: avoid rewinding and replace with an EEM, or use a certified rewinding contractor (EEMR) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Power quality control ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Lubrication, adjustments, tuning ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
6. The item is whether the air compressor systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 13 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT

Applicant Self-Checklist
Items 1 to 13 below.)
(1) Overall system design, including multi-pressure systems ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Improve cooling, drying and filtering ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Reduce frictional pressure loss (for example by increasing pipe diameter) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Improvement of drives (high efficiency motors) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Improvement of drives (speed controller) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Use of sophisticated control systems ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Recover waste heat for use in other functions ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(8) Use external cool air as intake ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Storage of compressed air near highly-fluctuating uses ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Optimise certain end use devices ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Reduce compressed air leaks ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(12) More frequent filter replacement ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(13) Optimise working pressure ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
7. The item is whether the pump systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 11 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 11 below.)
(1) Avoid oversizing when selecting pumps and replace oversized pumps

Applicant Self-Checklist
☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Match the correct choice of pump to the correct motor for the duty ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Design of pipework system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Control and regulation system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Shut down unnecessary pumps ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Use of variable speed drives (VSDs) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Use of multiple pumps (number of units under control) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Regular maintenance. Where unplanned maintenance becomes excessive, check

Applicant Self-Checklist
for: cavitation, wear, wrong type of pump ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Minimise the number of valves and bends commensurate with keeping ease of operation and maintenance ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Avoid using too many bends (especially tight bends) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Ensuring the pipework diameter is not too small (correct pipework diameter) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
8. The item is whether the heating, ventilation, and air conditioning systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 11 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 11 below.)
(1) Overall system design. Identify and equip areas separately for: <1>general ventilation <2>specific ventilation <3>process ventilation ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Optimise the number, shape, and size of intakes ☐ Applicable ☐ Partially applicable

Applicant Self-Checklist
☐ Not applicable Described as follows:
(3) Use fans: <1>of high efficiency <2>designed to operate at optimal rate ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Managing the airflow, including considering of dual ventilation systems (indoor and outdoor ventilation and heat exchange) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Air system design: <1>ducts are of a sufficient size <2>circular ducts <3>avoid long runs and obstacles such as bends, narrow sections ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Optimise electric motors, and consider installing a VSD ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Use automatic control systems. Integrate with centralised technical management systems ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Integration of air filters into air duct system and heat recovery from exhaust air (heat exchangers)

Applicant Self-Checklist
☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Reduce heating/cooling needs by: <1>building insulation <2>energy-efficient glazing <3>air infiltration reduction <4>automatic closure of doors <5>destratification <6>lowering of temperature set point during non-production period (programmable regulation) <7>reduction of the set point for heating and raising it for cooling ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Improve the efficiency of heating systems through: <1>recovery or use of wasted heat <2>heat pumps <3>radiative and local heating systems coupled with reduced temperature set points in the non-occupied areas of the buildings ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Improve the efficiency of cooling systems through the use of free cooling ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
9. The item is whether the lighting systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 5 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 5 below.)
(1) Determining the lighting requirements based on the illuminance and spectral content (color temperature and color rendition) required by the predetermined task

Applicant Self-Checklist
☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Plan space and activities in order to optimise the use of natural light ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Selection of fixtures and lamps according to specific requirements for the intended use ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Use of lighting management control systems, including occupancy sensors, timers, etc. ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Train building occupants to utilise lighting equipment in the most efficient manner ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
10. The item is whether the drying, separation, and concentration processing systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 10 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 10 below.)
(1) Selecting the best separation technology or a combination of the following separation technologies to satisfy specific process equipment ☐ Applicable ☐ Partially applicable ☐ Not applicable

Applicant Self-Checklist
Described as follows:
(2) Use of surplus heat from other processes ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Use a combination of techniques ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Mechanical processes, e.g. filtration, membrane filtration ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Heat drying method: <1> directly heated dryers <2> indirectly heated dryers <3> using multiple effect ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Superheated steam ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Heat recovery (including MVR and heat pumps) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Optimise insulation of the drying system

Applicant Self-Checklist
☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Radiation processes ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Process automation in thermal drying processes ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
11. The item is whether the industrial cooling systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 4 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 4 below.)
(1) The overall system is designed based on the requirements of the manufacturing process and factory, and is categorized as: <1> closed type <2> open type ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) For the BAT of the design phase of the industrial cooling systems, the lowest energy consumption is achieved by the following combinations: <1> reducing pressure loss in water flow and airflow <2> adopting high efficiency and low energy consumption equipment <3> reducing the number of energy-demanding equipment <4> applying optimized cooling water treatment in water-cooled cooling systems to keep the heat transfer surfaces clean and avoid scaling, rusting, fouling, etc., so that in each individual case, the lowest energy consuming combination of the above factors must be achieved to operate the industrial cooling systems ☐ Applicable ☐ Partially applicable ☐ Not applicable

Applicant Self-Checklist
Described as follows:
(3) The methods to reduce direct energy consumption are provided as follows. Fans or pumps: <1> matching motors with high efficiency <2> designing for optimum pressure loss and flow rate <3> using speed variators ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Operating the industrial cooling systems according to process requirements: <1> water supply pressure <2> backwater pressure <3> temperature of water supply <4> temperature difference between the water supply and backwater <5> pump efficiency <6> fan motor efficiency <7> point-of-use pressure requirements ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

(For other matters requiring further explanation, please attach additional spaces to the chart)

(13) Public facilities include: combustionn handling systems; heat recovery systems; steam handling systems; electric power supply systems; electric motor drive subsystems; air compressor systems; pump systems; heating, ventilation and air conditioning systems; lighting systems; drying, separation, and concentration processing systems; industrial cooling systems. If the facility has the said public facilities, please select “Yes” and answer the following BAT items; if the facility does not have the said public facilities, answer “No” and explain why the facilities are not installed; no need to answer the BAT Items.

(14) This is the electric power supply system for station service load.

iv. Energy Management Measures

Item	Description
☐ Energy Management System	(Ex: Plan to install energy management computer control system, plan to deploy energy management staff…)
☐ Green Energy Introduction	(Ex: Plan to install solar PV panels, plan to install wind turbines, plan to install solar water heater…etc.)
☐ Plant Facility Optimization	(Ex: Plan to obtain Green Factory or Green Building Certifications)
☐ Others	

(For other matters requiring further explanation, please attach additional spaces to the chart)

v. Appendix: Required Related Information and Documents

(i) Fuel Sources: The source of supply of the required energy category of the generating equipment.

(ii) Other Related Information and Documents: Those adopting new processing techniques must provide qualitative or quantitative descriptions of efficiency greater than existing standards.

II. Energy Users as Cogeneration Systems

i. Format

(i) The text of Energy Utilization Manual shall be written horizontally. Text, figures, and tables, shall be in clear fonts with proper spacing. The compilation shall be concise and truthful. A4 (21 cm x 29.7 cm) paper is required, and the contents shall be printed on both sides of the paper except graphs or tables of special sizes.

(ii) The sources of maps or photographs shall be properly cited. Colored maps and photographs shall be printed in colors. When the figures and tables exceed the size of paper, leaflets shall be used; the reduced or photocopied figures and tables shall be clear and easy to read.

(iii) The applicant shall submit one version of printed Energy Utilization Manual in 15 copies, and one CD of an electronic copy saved in Microsoft Word format and related electronic records, or kindly submit the Manual online.

ii. Basic Information

Date: / /

<table>
<tr><td colspan="7">(i) Basic Information of Applicant</td></tr>
<tr><td colspan="3">Plan Name</td><td colspan="4"></td></tr>
<tr><td colspan="3">Applicant (1)</td><td colspan="4"></td></tr>
<tr><td colspan="3">Responsible Person</td><td colspan="4"></td></tr>
<tr><td colspan="3">Address</td><td colspan="4"></td></tr>
<tr><td colspan="3">Contact</td><td colspan="4"></td></tr>
<tr><td colspan="3">Phone No.</td><td></td><td>Fax</td><td colspan="2"></td></tr>
<tr><td colspan="3">E-Mail</td><td colspan="4"></td></tr>
<tr><td colspan="3">Industrial Classification (2)</td><td colspan="4"></td></tr>
<tr><td colspan="7">(ii) Basic Information of Project</td></tr>
<tr><td rowspan="4">1. Plan Summary</td><td colspan="2">Plan Location (3)</td><td colspan="4"></td></tr>
<tr><td colspan="2">Plan Site (4)</td><td colspan="4">☐ Northern ☐ Central ☐ Southern ☐ Offshore islands</td></tr>
<tr><td colspan="2">Construction Period (5)</td><td colspan="4">From To</td></tr>
<tr><td colspan="2">Projected Commercialization Year/Month</td><td colspan="4">Year Month</td></tr>
<tr><td colspan="6">☐Yes ☐No the Self-Use Power Generation Equipment is installed jointly by several applicants (6)</td></tr>
<tr><td rowspan="4">2. Energy Consumption Category and Volume</td><td colspan="2" rowspan="2">Category</td><td rowspan="2">☐ Coal (Ton/Year)</td><td rowspan="2">☐ Natural Gas (1,000 m^3/Year)</td><td colspan="2">☐ Plant Power Consumption (kW)</td></tr>
<tr><td>☐Private-Produced</td><td>☐External Imported</td></tr>
<tr><td rowspan="2">Volume (7)</td><td>Completed</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Permit Application</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Category</td><td colspan="4">☐ Petroleum Products (8) (kL/Year)</td></tr>
</table>

			□	□	□	□
	Volume	Completed				
		Permit Application				
3. Rated thermal input [9] (MW_{th})						
4. Installed capacity (MW_e)						
5. Effective thermal ratio (%) [10]						
6. Electrical efficiency [11] (%, LHV)			7. Fuel utilization [12] (%, LHV)			

(For other matters requiring further explanation, please attach additional spaces to the chart)

Note:

(1) If the applicant is the energy user of a massive investment and production plan, the applicant shall provide the name of the registered legal entity with the Ministry of Economic Affairs, as well as Tax ID Number; if the applicant is still in the preparatory stage, please indicate the name of preparatory office.

(2) Please indicate the industry in accordance with ROC Standard Industrial Classification.

(3) Plan location refers to the address of the new establishment or expansion of energy consumption facilities; projects without addresses may fill in land number.

(4) Plan site refers to the region of the project. Northern refers to the region north of Fongshan River and Heping River; Central refers to the region south of Fongshan River and norther of Jhuoshuei River, and Hualien County; Southern refers to the region south of Jhuoshuei River and Taitung County that is not included in the Northern or Central regions; Offshore islands refers to islands that are not connected with the power grid of the island of Taiwan.

(5) Please enter common date.

(6) If the Self-Use Power Generation Equipment is installed jointly by several applicants, a joint declaration is required.

(7) In new establishment plans, volume refers to the maximum annual consumption after commercialization; in expansion plans, volume refers to the maximum additional annual consumption after commercialization.

(8) Please indicate the type of petroleum products, such as fuel oil, gasoline, diesel and so on.

(9) Rated thermal input: The rate at which fuel can be burned at the maximum continuous rating of the equipment multiplied by the total calorific value of the fuel and expressed as megawatts thermal.

(10) The effective thermal ratio of Cogeneration System is defined in the Article 3 of the Regulation for the Implementation of Cogeneration System.

(11) Electrical Efficiency Equation is as followed:

$$\eta_{net} = \frac{P_{el,net} * 860}{\dot{m}_{fuel} H_u} = \frac{(P_{el,gross} - P_{aux}) * 860}{\dot{m}_{fuel} H_u}$$

$P_{el,gross}$: Optimized maximum power output under design conditions (kW)

$P_{el,net}$: Net optimized maximum power output under design conditions (kW)

P_{aux}: Designed value for station service load (kW)

$\dot{m}_{fuel}$: Total fuel input per hour under design conditions (kg/h)

H_u: Fuel calorific value (kcal/kg), LHV

*1kW = 860kcal/h

(12) Fuel Utilization Equation is as followed:

$$\mathcal{E}_{net} = \frac{P_{el,net} * 860 + \dot{Q}_{net}}{\dot{m}_{fuel} H_u}$$

$P_{el,net}$: Net optimized maximum power output under design conditions (kW)

$\dot{Q}_{net}$: Net optimized thermal output per hour under design conditions (kcal/h)

$\dot{m}_{fuel}$: Total fuel input per hour under design conditions (kg/h)

H_u: Fuel calorific value (kcal/kg), LHV

*1kW = 860kcal/h

8. Site [13]

(13) Using a 1/5000 or 1/10000 scale basic figure or reduced size map of Taiwan to disclose the development site and transportation, rivers, urban plan, terrain, surface features, landform, schools, and communities in the surrounding areas within a 1- to 5-kilometer radius. Developments over 10 hectares (including) or linear developments stretching beyond 10 kilometers shall be indicated on a 1/25000 or 1/50000 scale map or topographic map.

9. Layout (14)

(14) The layout shall be clearly labeled, such as the relative positions of each venues (facilities), dimensions, and distances; the actual distances or scale shall also be indicated, as well as legends, orientation, and other necessary matters that benefit the assessment.

iii. Information Checklist

(i) Processing Techniques

Applicant Self-Checklist
☐ BATs shall be applied in Processing Techniques for Cogeneration Systems in Appendix 2 of Regulations Governing the Assessment of Energy Development and Utilization. ☐ In accordance with the version of EU BREFs Industry: Industry: _____ Version: _____ ☐ In accordance with the version of EU Reference Document on Best Available Techniques for Large Combustion Plants: BREF 2021 (If the said BREFs are applicable, please fill in the following content in accordance with the BATs in Processing Techniques for Electricity Generation) ☐ BATs shall not be applied in Processing Techniques for Cogeneration Systems in Appendix 2 of Regulations Governing the Assessment of Energy Development and Utilization. Described as follows: (Please elaborate how the efficiency value is estimated)
1. LHV (1) Energy Category: _____; Combustion technology: _____
(2) Net electrical efficiency (%, LHV) of planning unit: _____ ☐ In accordance with net electrical efficiency of EU BAT ☐ Not in accordance with net electrical efficiency of EU BAT Described as follows:
(3) Fuel utilization (%, LHV) of planning unit: _____ ☐ In accordance with fuel utilization of EU BAT ☐ Not in accordance with fuel utilization of EU BAT Described as follows:
2. (The BAT of Processing Techniques) (1) (The BAT of Processing Techniques) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(For other BAT of Processing Techniques, please attach additional spaces to the chart)

(ii) Utility Systems and Equipment [15]

Applicant Self-Checklist
BATs shall be applied in Utility Systems and Equipment in Appendix 1 of Regulations Governing the Assessment of Energy Development and Utilization. ☐ Yes. ☐ No. It isn't applicable in circumstances of being restricted by laws and regulations, patent right protection, international trade barriers, or other factors bot attributable to the applicants, given evidence are submitted by the applicants. Described as follows: (Please specify the reason why the BATs are not applicable, and the standards to be adapted, for each system respectively)
1. The item is whether the combustion handling systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 23 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 23 below.)
(1) Lignite pre-drying ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Coal gasification ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Fuel drying ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Biomass gasification ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Bark pressing ☐ Applicable ☐ Partially applicable ☐ Not applicable

Applicant Self-Checklist
Described as follows:
(6) Expansion turbine to recover the energy content of pressurized gases ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Advanced computerised control of combustion conditions for emission reduction and boiler performance ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Using flue-gas heat to supply district heating system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Reducing excess air and make it reach the optimum air-fuel ratio ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Properly reducing the exhaust temperature to reduce heat loss ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Reducing the concentration of carbon monoxide in the exhaust gas and improving boiler efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(12) Heat accumulation ☐ Applicable

Applicant Self-Checklist
☐ Partially applicable ☐ Not applicable Described as follows:
(13) Cooling tower discharge ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(14) Different techniques for the cooling system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(15) Using waste heat to preheat gas fuels to improve thermal efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(16) Preheating combustion air to improve fuel efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(17) Installing recuperative or regenerative burners to recover burner waste heat ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(18) Controlling and optimizing combustion conditions by monitoring fuel, air flow rates, and oxygen content in flue gas ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(19) Fuel choice

Applicant Self-Checklist
☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(20) Using oxygen-enriched combustion technology to improve energy efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(21) Reducing heat loss by insulation ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(22) Reducing heat loss cause by frequent opening and closing or poor sealing of furnace doors ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(23) Fluidised bed combustion ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
2. The item is whether the heat recovery systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 2 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 2 below.)
(1) Monitoring the efficiency periodically ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Preventing or removing the internal scaling and external dust accumulation of equipment

Applicant Self-Checklist
☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
3. The item is whether the steam handling systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 28 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 28 below.)
(1) Energy efficient design and installation of steam distribution pipework ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Throttling devices and the use of backpressure turbines: utilize backpressure turbines instead of PRVs ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Improve operating procedures and boiler controls ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Use sequential boiler controls (apply only to sites with more than one boiler) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Install flue-gas isolation dampers (applicable only to sites with more than one boiler) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) For feed water preheating, the following methods are available:

Applicant Self-Checklist
<1>process waste heat recovery <2>recovery of heat energy from combustion air by economizer <3>heating condensate with deoxygenated feed water <4>using heat exchangers to condense the steam used for degassing and feed water heating ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Prevention and removal of scale deposits on heat transfer surfaces. (Clean boiler heat transfer surfaces) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Boiler blowdown is reduced by improving the water treatment system and installing automatic dissolved solids control equipment ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) It is necessary to check and attach/repair the boiler refractory material during regular inspection ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Maintaining optimal discharge rate of degassers ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Minimise boiler short cycling losses ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(12) Carrying out boiler maintenance ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(13) Optimizing steam from distribution system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(14) Isolate steam from unused lines ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(15) Regularly inspecting and confirming the heat insulation of steam pipes and condensate return pipes. (Confirming the proper heat insulation of the pipes, pipe fittings, valve bodies, and tanks) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(16) Implement a control and repair programme for steam traps ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(17) Collect and return condensate to the boiler for re-use. (Optimise condensate recovery) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(18) Re-use of flash-steam. (Use high pressure condensate to make low pressure steam)

Applicant Self-Checklist
☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(19) Recover energy from boiler blowdown ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(20) Expansion turbine to recover the energy content of pressurised gases ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(21) Change turbine blades when repairing ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(22) Using advanced materials to meet high steam parameter requirements to improve efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(23) Supercritical steam parameters ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(24) Double reheat ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(25) Regenerative feed-water ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(26) Use of heat content of the flue-gas for district heating ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(27) Heat accumulation ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(28) Advanced computerised control of the gas turbine and subsequent recovery boilers ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
4. The item is whether the electric power supply systems would be installed [14]: ☐ Yes. Provide further description in BAT Items 1 to 8 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 8 below.)
(1) Installing capacitors in the AC circuits to decrease the magnitude of reactive power ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Minimising the operation of idling or lightly loaded motors ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(3) Avoiding the operation of equipment above its rated voltage ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) When a new or replacement motor is installed, a high efficiency motor (≥ IE3) should be used ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Ensure power cables have the correct dimensions for the power demand ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Keep online transformer(s) operating at a load above 40 ~50 % of the rated power ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Use high efficiency/low loss transformers ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Place equipment with a high current demand as close as possible to the power source (e.g. transformer) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
5. The item is whether the electric motor driven subsystems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 7 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT

Applicant Self-Checklist
Items 1 to 7 below.)
(1) Using energy efficient motors (EEMs) (≥ IE3) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Proper motor sizing ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Installing high efficiency transmission/reducers ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Use: direct coupling where possible, synchronous belts or cogged V-belts in place of V belts, helical gears in place of worm gears ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Rewinding: avoid rewinding and replace with an EEM, or use a certified rewinding contractor (EEMR) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Power quality control ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Lubrication, adjustments, tuning ☐ Applicable ☐ Partially applicable

Applicant Self-Checklist
☐ Not applicable Described as follows:
6. The item is whether the air compressor systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 13 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 13 below.)
(1) Overall system design, including multi-pressure systems ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Improve cooling, drying and filtering ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Reduce frictional pressure loss (for example by increasing pipe diameter) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Improvement of drives (high efficiency motors) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Improvement of drives (speed controller) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Use of sophisticated control systems ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(7) Recover waste heat for use in other functions ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Use external cool air as intake ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Storage of compressed air near highly-fluctuating uses ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Optimise certain end use devices ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Reduce compressed air leaks ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(12) More frequent filter replacement ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(13) Optimise working pressure ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
7. The item is whether the pump systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 11 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 11 below.)
(1) Avoid oversizing when selecting pumps and replace oversized pumps ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Match the correct choice of pump to the correct motor for the duty ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Design of pipework system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Control and regulation system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Shut down unnecessary pumps ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Use of variable speed drives (VSDs) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Use of multiple pumps (number of units under control)

Applicant Self-Checklist
☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Regular maintenance. Where unplanned maintenance becomes excessive, check for: cavitation, wear, wrong type of pump ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Minimise the number of valves and bends commensurate with keeping ease of operation and maintenance ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Avoid using too many bends (especially tight bends) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Ensuring the pipework diameter is not too small (correct pipework diameter) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
8. The item is whether the heating, ventilation and air conditioning systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 11 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 11 below.)
(1) Overall system design. Identify and equip areas separately for: <1>general ventilation <2>specific ventilation <3>process ventilation ☐ Applicable ☐ Partially applicable

Applicant Self-Checklist
☐ Not applicable Described as follows:
(2) Optimise the number, shape, and size of intakes ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Use fans: <1>of high efficiency <2>designed to operate at optimal rate ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Manage airflow, including considering of dual ventilation systems (indoor and outdoor ventilation and heat exchange) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Air system design: <1>ducts are of a sufficient size <2>circular ducts <3>avoid long runs and obstacles such as bends, narrow sections ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Optimise electric motors, and consider installing a VSD ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Use automatic control systems. Integrate with centralised technical management systems ☐ Applicable

Applicant Self-Checklist
☐ Partially applicable ☐ Not applicable Described as follows:
(8) Integration of air filters into air duct system and heat recovery from exhaust air (heat exchangers) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Reduce heating/cooling needs by: <1>building insulation <2>energy-efficient glazing <3>air infiltration reduction <4>automatic closure of doors <5>destratification <6>lowering of temperature set point during non-production period (programmable regulation) <7>reduction of the set point for heating and raising it for cooling ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Improve the efficiency of heating systems through: <1>recovery or use of wasted heat <2>heat pumps <3>radiative and local heating systems coupled with reduced temperature set points in the non-occupied areas of the buildings ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Improve the efficiency of cooling systems through the use of free cooling ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
9. The item is whether the lighting systems would be installed:

Applicant Self-Checklist
☐ Yes. Provide further description in BAT Items 1 to 5 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 5 below.)
(1) Determining the lighting requirements based on the illuminance and spectral content (color temperature and color rendition) required by the predetermined task ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Plan space and activities in order to optimise the use of natural light ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Selection of fixtures and lamps according to specific requirements for the intended use ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Use of lighting management control systems, including occupancy sensors, timers, etc. ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Train building occupants to utilise lighting equipment in the most efficient manner ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
10. The item is whether the drying, separation, and concentration processing systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 10 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT

Applicant Self-Checklist
Items 1 to 10 below.)
(1) Selecting the best separation technology or a combination of the following separation technologies to satisfy specific process equipment ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Use of surplus heat from other processes ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Use a combination of techniques ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Mechanical processes, e.g. filtration, membrane filtration ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Heat drying method: <1> directly heated dryers <2> indirectly heated dryers <3> using multiple effect ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Superheated steam ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Heat recovery (including MVR and heat pumps)

Applicant Self-Checklist
☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Optimise insulation of the drying system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Radiation processes ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Process automation in thermal drying processes ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
11. The item is whether the industrial cooling systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 4 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 4 below.)
(1) The overall system is designed based on the requirements of the manufacturing process and factory and is categorized as: <1> closed type <2> open type ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) For the BAT of the design phase of the industrial cooling systems, the lowest energy consumption is achieved by the following combinations: <1> reducing pressure loss in water flow and airflow <2> adopting high efficiency and low energy consumption equipment <3> reducing the number of energy-demanding equipment <4> applying optimized cooling water treatment in water-cooled cooling systems

Applicant Self-Checklist
to keep the heat transfer surfaces clean and avoid scaling, rusting, fouling, etc., so that in each individual case, the lowest energy consuming combination of the above factors must be achieved to operate the industrial cooling systems ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) The methods to reduce direct energy consumption are provided as follows. Fans or pumps: <1> matching motors with high efficiency <2> designing for optimum pressure loss and flow rate <3> using speed variators ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Operating the industrial cooling systems according to process requirements: <1> water supply pressure <2> backwater pressure <3> temperature of water supply <4> temperature difference between the water supply and backwater <5> pump efficiency <6> fan motor efficiency <7> point-of-use pressure requirements ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

(For other matters requiring further explanation, please attach additional spaces to the chart)

(15) Public facilities include: combustion handling systems; heat recovery systems; steam handling systems; electric power supply systems; electric motor drive subsystems; air compressor systems; pump systems; heating, ventilation and air conditioning systems; lighting systems; drying, separation, and concentration processing systems; industrial cooling systems. If the facility has the said public facilities, please select “Yes” and answer the following BAT items; if the facility does not have the said public facilities,

answer “No” and explain why the facilities are not installed; no need to answer the BAT Items.

(16) This is the electric power supply system for station service load.

iv. Energy Management Measures

Item	Description
☐ Energy Management System	(Ex: Plan to install energy management computer control system, plan to deploy energy management staff…)
☐ Green Energy Introduction	(Ex: Plan to install solar PV panels, plan to install wind turbines, plan to install solar water heater…etc.)
☐ Plant Facility Optimization	(Ex: Plan to obtain Green Factory or Green Building Certifications)
☐ Others	

(For other matters requiring further explanation, please attach additional spaces to the chart)

v. Appendix: Required Related Information and Documents

(i) Fuel Sources: The source of supply of the required energy category of the generating equipment.

(ii) Other Related Information and Documents: Those adopting new processing techniques must provide qualitative or quantitative descriptions of efficiency greater than existing standards.

III. Energy Users as Petroleum Refineries

i. Format

(i) The text of Energy Utilization Manual shall be written horizontally. Text, figures, and tables, shall be in clear fonts with proper spacing. The compilation shall be concise and truthful. A4 (21 cm x 29.7 cm) paper is required, and the contents shall be printed on both sides of the paper except graphs or tables of special sizes.

(ii) The sources of maps or photographs shall be properly cited. Colored maps and photographs shall be printed in colors. When the figures and tables exceed the size of paper, leaflets shall be used; the reduced or photocopied figures and tables shall be clear and easy to read.

(iii) The applicant shall submit one version of printed Energy Utilization Manual in 15 copies, and one CD of an electronic copy saved in Microsoft Word format and related electronic records, or kindly submit the Manual online.

ii. Basic Information

Date: / /

<table>
<tr><td colspan="7">1. Basic Information of Applicant</td></tr>
<tr><td colspan="4">Plan Name</td><td colspan="3"></td></tr>
<tr><td colspan="4">Applicant (1)</td><td colspan="3"></td></tr>
<tr><td colspan="4">Responsible Person</td><td colspan="3"></td></tr>
<tr><td colspan="4">Address</td><td colspan="3"></td></tr>
<tr><td colspan="4">Contact</td><td colspan="3"></td></tr>
<tr><td colspan="4">Phone No.</td><td></td><td>Fax</td><td></td></tr>
<tr><td colspan="4">E-Mail</td><td colspan="3"></td></tr>
<tr><td colspan="4">Industrial Classification (2)</td><td colspan="3"></td></tr>
<tr><td colspan="7">2. Basic Information of Project</td></tr>
<tr><td rowspan="4">(1)Plan Summary</td><td colspan="3">Plan Location (3)</td><td colspan="3"></td></tr>
<tr><td colspan="3">Plan Site (4)</td><td colspan="3">☐ Northern ☐ Central ☐ Southern ☐ Offshore islands</td></tr>
<tr><td colspan="3">Construction Period (5)</td><td colspan="3">From To</td></tr>
<tr><td colspan="3">Projected Commercialization Year/Month</td><td colspan="3">Year Month</td></tr>
<tr><td rowspan="5">(2)Energy Consumption Category and Volume</td><td rowspan="5">A. Energy consumption facilities</td><td>Category</td><td></td><td>☐ Coal (Ton/Year)</td><td>☐ Natural Gas (1,000 m^3/Year)</td><td>☐ Plant Power Consumption (kW) (6)</td></tr>
<tr><td rowspan="2">Volume (7)</td><td>Completed</td><td></td><td></td><td></td></tr>
<tr><td>Permit Application</td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">Category</td><td colspan="3">☐ Petroleum Products (8) (kL/Year)</td></tr>
<tr><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr>
</table>

		Volume	Completed				
			Permit Application				
	B. Cogeneration System using Fossil Fuels			☐ Installed	☐ Coal-Fired Unit ☐ Gas-Fired Unit ☐ Oil-Fired Unit Rated thermal input [9]: _____ (MW_{th}) Installed capacity: _____ (MW_e) Effective thermal ratio [10]: _____ (%) Electrical efficiency [11]: _____ (%, LHV) Fuel utilization [12]: _____ (%, LHV)		
				☐ Not Installed			

Note:

(1) If the applicant is the energy user of a massive investment and production plan, the applicant shall provide the name of the registered legal entity with the Ministry of Economic Affairs, as well as Tax ID Number; if the applicant is still in the preparatory stage, please indicate the name of preparatory office.

(2) Please indicate the industry in accordance with ROC Standard Industrial Classification.

(3) Plan location refers to the address of the new establishment or expansion of energy consumption facilities; projects without addresses may fill in land number.

(4) Plan site refers to the region of the project. Northern refers to the region north of Fongshan River and Heping River; Central refers to the region south of Fongshan River and norther of Jhuoshuei River, and Hualien County; Southern refers to the region south of Jhuoshuei River and Taitung County that is not included in the Northern or Central regions; Offshore islands refers to islands that are not connected with the power grid of the island of Taiwan.

(5) Please enter common date.

(6) Refer to Utilities Supply Contract Capacity or Self-usage Power Generation Capacity.

(7) In new establishment plans, volume refers to the maximum annual consumption after commercial operation; in expansion plans, volume refers to the maximum additional annual consumption after the commercialization; for those with cogeneration system, volume should be the maximum sum of all energy used, combining both cogeneration system and other main energy-using facilities.

(8) Please indicate the type of petroleum products, such as fuel oil, gasoline, diesel and so on.

(9) Rated thermal input: The rate at which fuel can be burned at the maximum continuous rating of the equipment multiplied by the total calorific value of the fuel and expressed as megawatts thermal.

(10) The effective thermal ratio of Cogeneration System is defined in the Article 3 of the Regulation for the Implementation of Cogeneration System.

(11) Electrical Efficiency Equation is as followed:

$$\eta_{net} = \frac{P_{el,net} * 860}{\dot{m}_{fuel} H_u} = \frac{\left(P_{el,gross} - P_{aux}\right) * 860}{\dot{m}_{fuel} H_u}$$

$P_{el,gross}$: Optimized maximum power output under design conditions (kW)

$P_{el,net}$: Net optimized maximum power output under design conditions (kW)

P_{aux}: Designed value for station service load (kW)

$\dot{m}_{fuel}$: Total fuel input per hour under design conditions (kg/h)

H_u: Fuel calorific value (kcal/kg), LHV

*1kW = 860kcal/h

(12) Fuel Utilization Equation is as followed:

$$\mathcal{E}_{net} = \frac{P_{el,net} * 860 + \dot{Q}_{net}}{\dot{m}_{fuel} H_u}$$

$P_{el,net}$: Net optimized maximum power output under design conditions (kW)

$\dot{Q}_{net}$: Net optimized thermal output per hour under design conditions (kcal/h)

$\dot{m}_{fuel}$: Total fuel input per hour under design conditions (kg/h)

H_u: Fuel calorific value (kcal), LHV

*1kW = 860kcal/h

(3)Site [13]

(13) Using a 1/5000 or 1/10000 scale basic figure or reduced size map of Taiwan to disclose the development site and transportation, rivers, urban plan, terrain, surface features, landform, schools, and communities in the surrounding areas within a 1- to 5-kilometer radius. Developments over 10 hectares (including) or linear developments stretching beyond 10 kilometers shall be indicated on a 1/25000 or 1/50000 scale map or topographic map.

(4)Layout [14]

(14) The layout shall be clearly labeled, such as the relative positions of each venues (facilities), dimensions, and distances; the actual distances or scale shall also be indicated, as well as legends, orientation, and other necessary matters that benefit the assessment.

iii. Information Checklist

(i) Processing Techniques [15]

Applicant Self-Checklist
☐ BATs shall be applied in Processing Techniques for Petroleum Refineries in Appendix 3 of Regulations Governing the Assessment of Energy Development and Utilization. In accordance with the version of EU Reference Document on Best Available: Techniques for the Refining of Mineral Oil and Gas: BREF (2015) ☐ BATs shall not be applied in Processing Techniques for Petroleum Refineries in Appendix 3 of Regulations Governing the Assessment of Energy Development and Utilization. Described as follows:
1. (The BAT of Processing Techniques) (1) (The BAT of Processing Techniques) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(For other BAT of Processing Techniques, please attach additional spaces to the chart)

(For other matters requiring further explanation, please attach additional spaces to the chart)

(15) Processing techniques in compliance with EU BREFs shall be indicated. For processing techniques of EU BREFs industries that do not comply with regulations, explanations must be provided.

(ii) Utility Systems and Equipment [16]

Applicant Self-Checklist
BATs shall be applied in Utility Systems and Equipment in Appendix 1 of Regulations Governing the Assessment of Energy Development and Utilization. ☐ Yes. ☐ No. It isn't applicable in circumstances of being restricted by laws and regulations, patent right protection, international trade barriers, or other factors bot attributable to the applicants, given evidence are submitted by the applicants. Described as follows:
1. The item is whether the combustion handling systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 23 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 23 below.)
(1) Lignite pre-drying ☐ Applicable

Applicant Self-Checklist
☐ Partially applicable ☐ Not applicable Described as follows:
(2) Coal gasification ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Fuel drying ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Biomass gasification ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Bark pressing ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Expansion turbine to recover the energy content of pressurized gases ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Advanced computerised control of combustion conditions for emission reduction and boiler performance ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Using flue-gas heat to supply district heating system

Applicant Self-Checklist
☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Reducing excess air and make it reach the optimum air-fuel ratio ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Properly reducing the exhaust temperature to reduce heat loss ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Reducing the concentration of carbon monoxide in the exhaust gas and improving boiler efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(12) Heat accumulation ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(13) Cooling tower discharge ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(14) Different techniques for the cooling system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(15) Using waste heat to preheat gas fuels to improve thermal efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(16) Preheating combustion air to improve fuel efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(17) Installing recuperative or regenerative burners to recover burner waste heat ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(18) Controlling and optimizing combustion conditions by monitoring fuel, air flow rates, and oxygen content in flue gas ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(19) Fuel choice ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(20) Using oxygen-enriched combustion technology to improve energy efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(21) Reducing heat loss by insulation ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(22) Reducing heat loss cause by frequent opening and closing or poor sealing of furnace doors ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(23) Fluidised bed combustion ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
2. The item is whether the heat recovery systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 2 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 2 below.)
(1) Monitoring the efficiency periodically ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Preventing or removing the internal scaling and external dust accumulation of equipment ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
3. The item is whether the steam handling systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 28 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 28 below.)
(1) Energy efficient design and installation of steam distribution pipework ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Throttling devices and the use of backpressure turbines: utilize backpressure

Applicant Self-Checklist
turbines instead of PRVs ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Improve operating procedures and boiler controls ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Use sequential boiler controls (apply only to sites with more than one boiler) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Install flue-gas isolation dampers (applicable only to sites with more than one boiler) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) For feed water preheating, the following methods are available: <1>process waste heat recovery <2>recovery of heat energy from combustion air by economizer <3>heating condensate with deoxygenated feed water <4>using heat exchangers to condense the steam used for degassing and feed water heating ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Prevention and removal of scale deposits on heat transfer surfaces. (Clean boiler heat transfer surfaces) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(8) Boiler blowdown is reduced by improving the water treatment system and installing automatic dissolved solids control equipment ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) It is necessary to check and attach/repair the boiler refractory material during regular inspection ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Maintaining optimal discharge rate of degassers ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Minimise boiler short cycling losses ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(12) Carrying out boiler maintenance ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(13) Optimizing steam from distribution system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(14) Isolate steam from unused lines ☐ Applicable ☐ Partially applicable

Applicant Self-Checklist
☐ Not applicable Described as follows:
(15) Regularly inspecting and confirming the heat insulation of steam pipes and condensate return pipes. (Confirming the proper heat insulation of the pipes, pipe fittings, valve bodies, and tanks) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(16) Implement a control and repair programme for steam traps ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(17) Collect and return condensate to the boiler for re-use. (Optimise condensate recovery) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(18) Re-use of flash-steam. (Use high pressure condensate to make low pressure steam) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(19) Recover energy from boiler blowdown ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(20) Expansion turbine to recover the energy content of pressurised gases ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(21) Change turbine blades when repairing ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(22) Using advanced materials to meet high steam parameter requirements to improve efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(23) Supercritical steam parameters ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(24) Double reheat ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(25) Regenerative feed-water ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(26) Use of heat content of the flue-gas for district heating ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(27) Heat accumulation ☐ Applicable ☐ Partially applicable ☐ Not applicable

Applicant Self-Checklist
Described as follows:
(28) Advanced computerised control of the gas turbine and subsequent recovery boilers ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
4. The item is whether the electric power supply systems would be installed [(14)]: ☐ Yes. Provide further description in BAT Items 1 to 8 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 8 below.)
(1) Installing capacitors in the AC circuits to decrease the magnitude of reactive power ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Minimising the operation of idling or lightly loaded motors ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Avoiding the operation of equipment above its rated voltage ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) When a new or replacement motor is installed, a high efficiency motor (≥ IE3) should be used ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Ensure power cables have the correct dimensions for the power demand ☐ Applicable ☐ Partially applicable

Applicant Self-Checklist
☐ Not applicable Described as follows:
(6) Keep online transformer(s) operating at a load above 40 ~50 % of the rated power ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Use high efficiency/low loss transformers ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Place equipment with a high current demand as close as possible to the power source (e.g. transformer) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
5. The item is whether the electric motor drive subsystems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 7 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 7 below.)
(1) Using energy efficient motors (EEMs) (≥ IE3) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Proper motor sizing ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Installing high efficiency transmission/reducers ☐ Applicable ☐ Partially applicable

Applicant Self-Checklist
☐ Not applicable Described as follows:
(4) Use: direct coupling where possible, synchronous belts or cogged V-belts in place of V belts, helical gears in place of worm gears ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Rewinding: avoid rewinding and replace with an EEM, or use a certified rewinding contractor (EEMR) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Power quality control ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Lubrication, adjustments, tuning ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
6. The item is whether the air compressor systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 13 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 13 below.)
(1) Overall system design, including multi-pressure systems ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Improve cooling, drying and filtering ☐ Applicable ☐ Partially applicable

Applicant Self-Checklist
☐ Not applicable Described as follows:
(3) Reduce frictional pressure loss (for example by increasing pipe diameter) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Improvement of drives (high efficiency motors) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Improvement of drives (speed controller) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Use of sophisticated control systems ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Recover waste heat for use in other functions ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Use external cool air as intake ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Storage of compressed air near highly-fluctuating uses ☐ Applicable ☐ Partially applicable

Applicant Self-Checklist
☐ Not applicable Described as follows:
(10) Optimise certain end use devices ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Reduce compressed air leaks ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(12) More frequent filter replacement ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(13) Optimise working pressure ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
7. The item is whether the pump systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 11 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 11 below.)
(1) Avoid oversizing when selecting pumps and replace oversized pumps ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Match the correct choice of pump to the correct motor for the duty ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(3) Design of pipework system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Control and regulation system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Shut down unnecessary pumps ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Use of variable speed drives (VSDs) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Use of multiple pumps (number of units under control) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Regular maintenance. Where unplanned maintenance becomes excessive, check for: cavitation, wear, wrong type of pump ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Minimise the number of valves and bends commensurate with keeping ease of operation and maintenance ☐ Applicable ☐ Partially applicable

Applicant Self-Checklist
☐ Not applicable Described as follows:
(10) Avoid using too many bends (especially tight bends) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Ensuring the pipework diameter is not too small (correct pipework diameter) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
8. The item is whether the heating, ventilation and air conditioning systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 11 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 11 below.)
(1) Overall system design. Identify and equip areas separately for: <1>general ventilation <2>specific ventilation <3>process ventilation ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Optimise the number, shape, and size of intakes ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Use fans: <1>of high efficiency <2>designed to operate at optimal rate ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(4) Manage airflow, including considering of dual ventilation systems (indoor and outdoor ventilation and heat exchange) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Air system design: <1>ducts are of a sufficient size <2>circular ducts <3>avoid long runs and obstacles such as bends, narrow sections ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Optimise electric motors, and consider installing a VSD ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Use automatic control systems. Integrate with centralised technical management systems ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Integration of air filters into air duct system and heat recovery from exhaust air (heat exchangers) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Reduce heating/cooling needs by: <1>building insulation <2>energy-efficient glazing <3>air infiltration reduction <4>automatic closure of doors

Applicant Self-Checklist
<5>destratification <6>lowering of temperature set point during non-production period (programmable regulation) <7>reduction of the set point for heating and raising it for cooling ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Improve the efficiency of heating systems through: <1>recovery or use of wasted heat <2>heat pumps <3>radiative and local heating systems coupled with reduced temperature set points in the non-occupied areas of the buildings ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Improve the efficiency of cooling systems through the use of free cooling ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
9. The item is whether the lighting systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 5 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 5 below.)
(1) Determining the lighting requirements based on the illuminance and spectral content (color temperature and color rendition) required by the predetermined task ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Plan space and activities in order to optimise the use of natural light ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(3) Selection of fixtures and lamps according to specific requirements for the intended use ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Use of lighting management control systems, including occupancy sensors, timers, etc. ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Train building occupants to utilise lighting equipment in the most efficient manner ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
10. The item is whether the drying, separation, and concentration processing systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 10 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 10 below.)
(1) Selecting the best separation technology or a combination of the following separation technologies to satisfy specific process equipment ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Use of surplus heat from other processes ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Use a combination of techniques ☐ Applicable

Applicant Self-Checklist
☐ Partially applicable ☐ Not applicable Described as follows:
(4) Mechanical processes, e.g. filtration, membrane filtration ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Heat drying method: <1> directly heated dryers <2> indirectly heated dryers <3> using multiple effect ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Superheated steam ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Heat recovery (including MVR and heat pumps) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Optimise insulation of the drying system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Radiation processes ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(10) Process automation in thermal drying processes ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
11. The item is whether the industrial cooling systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 4 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 4 below.)
(1) The overall system is designed based on the requirements of the manufacturing process and factory and is categorized as: <1> closed type <2> open type ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) For the BAT of the design phase of the industrial cooling systems, the lowest energy consumption is achieved by the following combinations: <1> reducing pressure loss in water flow and airflow <2> adopting high efficiency and low energy consumption equipment <3> reducing the number of energy-demanding equipment <4> applying optimized cooling water treatment in water-cooled cooling systems to keep the heat transfer surfaces clean and avoid scaling, rusting, fouling, etc., so that in each individual case, the lowest energy consuming combination of the above factors must be achieved to operate the industrial cooling systems ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) The methods to reduce direct energy consumption are provided as follows. Fans or pumps: <1> matching motors with high efficiency <2> designing for optimum pressure loss and flow rate <3> using speed variators ☐ Applicable ☐ Partially applicable ☐ Not applicable

Applicant Self-Checklist
Described as follows:
(4) Operating the industrial cooling systems according to process requirements: <1> water supply pressure <2> backwater pressure <3> temperature of water supply <4> temperature difference between the water supply and backwater <5> pump efficiency <6> fan motor efficiency <7> point-of-use pressure requirements ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

(For other matters requiring further explanation, please attach additional spaces to the chart)

(16) Public facilities include: combustion handling systems; heat recovery systems; steam handling systems; electric power supply systems; electric motor drive subsystems; air compressor systems; pump systems; heating, ventilation and air conditioning systems; lighting systems; drying, separation, and concentration processing systems; industrial cooling systems. If the facility has the said public facilities, please select "Yes" and answer the following BAT items; if the facility does not have the said public facilities, answer "No" and explain why the facilities are not installed; no need to answer the BAT Items.

(3) Co-generation system less than 50MW

The item is whether the co-generation systems less than 50MW would be installed: ☐ Yes. Provide further description in BAT Items 1 to 5 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 5 below.)
(1) System that generates effective thermal and electrical energy at the same time ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Steam turbines and the power generation system: considering the use of a computer-controlled system ☐ Applicable ☐ Partially applicable ☐ Not applicable

Described as follows:
(3) Steam turbines and the power generation system: considering the use of advanced materials ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Steam turbines and the power generation system: upgrading steam turbines requires a consideration of increasing steam temperature and pressure ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Steam turbines and the power generation system: optimizing working fluid operating conditions ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

(For other matters requiring further explanation, please attach additional spaces to the chart)

iv. Energy Management Measures

Item	Description
☐ Energy Management System	(Ex: Plan to install energy management computer control system, plan to deploy energy management staff…)
☐ Green Energy Introduction	(Ex: Plan to install solar PV panels, plan to install wind turbines, plan to install solar water heater…etc.)
☐ Plant Facility Optimization	(Ex: Plan to obtain Green Factory or Green Building Certifications)
☐ Others	

(For other matters requiring further explanation, please attach additional spaces to the chart)

v. Appendix: Required Related Information and Documents

(i) Letter of Approval for “Electricity Consumption Plan” / Explanation of self-usage power generation equipment: Please attach Letter of Approval for “Electricity Consumption Plan” / Explanation of self-usage power generation equipment.

(ii) Other Related Information and Documents: Those adopting new processing techniques must provide qualitative or quantitative descriptions of efficiency greater than existing standards.

IV. Energy Users as massive energy-consumption users

i. Format

(i) The text of Energy Utilization Manual shall be written horizontally. Text, figures, and tables, shall be in clear fonts with proper spacing. The compilation shall be concise and truthful. A4 (21 cm x 29.7 cm) paper is required, and the contents shall be printed on both sides of the paper except graphs or tables of special sizes.

(ii) The sources of maps or photographs shall be properly cited. Colored maps and photographs shall be printed in colors. When the figures and tables exceed the size of paper, leaflets shall be used; the reduced or photocopied figures and tables shall be clear and easy to read.

(iii) The applicant shall submit one version of printed Energy Utilization Manual in 15 copies, and one CD of an electronic copy saved in Microsoft Word format and related electronic records, or kindly submit the Manual online.

ii. Basic Information

Date: / /

<table>
<tr><td colspan="8">1. Basic Information of Applicant</td></tr>
<tr><td colspan="4">Plan Name</td><td colspan="4"></td></tr>
<tr><td colspan="4">Applicant (1)</td><td colspan="4"></td></tr>
<tr><td colspan="4">Responsible Person</td><td colspan="4"></td></tr>
<tr><td colspan="4">Address</td><td colspan="4"></td></tr>
<tr><td colspan="4">Contact</td><td colspan="4"></td></tr>
<tr><td colspan="4">Phone No.</td><td></td><td>Fax</td><td colspan="2"></td></tr>
<tr><td colspan="4">E-Mail</td><td colspan="4"></td></tr>
<tr><td colspan="4">Industrial Classification (2)</td><td colspan="4"></td></tr>
<tr><td colspan="8">2. Basic Information of Project</td></tr>
<tr><td rowspan="4">(1)Plan Summary</td><td colspan="3">Plan Location (3)</td><td colspan="4"></td></tr>
<tr><td colspan="3">Plan Site (4)</td><td colspan="4">☐ Northern ☐ Central ☐ Southern ☐ Offshore islands</td></tr>
<tr><td colspan="3">Construction Period (5)</td><td colspan="4">From To</td></tr>
<tr><td colspan="3">Projected Commercialization Year/Month</td><td colspan="4">Year Month</td></tr>
<tr><td rowspan="6">(2)Energy Consumption Category and Volume</td><td rowspan="4">A. Energy consumption facilities</td><td colspan="2">Category</td><td>☐ Coal (Ton/Year)</td><td>☐ Natural Gas (1000 m^3/Year)</td><td colspan="2">☐ Plant Power Consumption (kW) (6)</td></tr>
<tr><td rowspan="2">Volume (7)</td><td>Completed</td><td></td><td></td><td colspan="2"></td></tr>
<tr><td>Permit Application</td><td></td><td></td><td colspan="2"></td></tr>
<tr><td colspan="2">Category</td><td colspan="4">☐ Petroleum Products (8) (kL/Year)</td></tr>
<tr><td colspan="2">☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td colspan="2">Volume</td><td>Completed</td><td></td><td></td><td></td><td></td></tr>
</table>

			Permit Application				
	B. Cogeneration System using Fossil Fuels			☐ Installed	☐ Coal-Fired Unit ☐ Gas-Fired Unit ☐ Oil-Fired Unit Rated thermal input [9]: _____ (MW_{th}) Installed capacity: _____ (MW_e) Effective thermal ratio [10]: _____ (%) Electrical efficiency [11]: _____ (%, LHV) Fuel utilization [12]: _____ (%, LHV)		
				☐ Not Installed			

Note:

(1) If the applicant is the energy user of a massive investment and production plan, the applicant shall provide the name of the registered legal entity with the Ministry of Economic Affairs, as well as Tax ID Number; if the applicant is still in the preparatory stage, please indicate the name of preparatory office.

(2) Please indicate the industry in accordance with ROC Standard Industrial Classification.

(3) Plan location refers to the address of the new establishment or expansion of energy consumption facilities; projects without addresses may fill in land number.

(4) Plan site refers to the region of the project. Northern refers to the region north of Fongshan River and Heping River; Central refers to the region south of Fongshan River and norther of Jhuoshuei River, and Hualien County; Southern refers to the region south of Jhuoshuei River and Taitung County that is not included in the Northern or Central regions; Offshore islands refers to islands that are not connected with the power grid of the island of Taiwan.

(5) Please enter common date.

(6) Refer to Utilities Supply Contract Capacity or Self-usage Power Generation Capacity.

(7) In new establishment plans, volume refers to the maximum annual consumption after commercial operation; in expansion plans, volume refers to the maximum additional annual consumption after the commercialization; for those with cogeneration system, volume should be the maximum sum of all energy used, combining both cogeneration system and other main energy-using facilities.

(8) Please indicate the type of petroleum products, such as fuel oil, gasoline, diesel and so on.

(9) Rated thermal input: The rate at which fuel can be burned at the maximum continuous rating of the equipment multiplied by the total calorific value of the fuel and expressed as megawatts thermal.

(10) The effective thermal ratio of Cogeneration System is defined in the Article 3 of the Regulation for the Implementation of Cogeneration System.

(11) Electrical Efficiency Equation is as followed:

$$\eta_{net} = \frac{P_{el,net} * 860}{\dot{m}_{fuel} H_u} = \frac{\left(P_{el,gross} - P_{aux}\right) * 860}{\dot{m}_{fuel} H_u}$$

$P_{el,gross}$: Optimized maximum power output under design conditions (kW)

$P_{el,net}$: Net optimized maximum power output under design conditions (kW)

P_{aux}: Designed value for station service load (kW)

$\dot{m}_{fuel}$: Total fuel input per hour under design conditions (kg/h)

H_u: Fuel calorific value (kcal/kg), LHV

*1kW = 860kcal/h

(12) Fuel Utilization Equation is as followed:

$$\mathcal{E}_{net} = \frac{P_{el,net} * 860 + \dot{Q}_{net}}{\dot{m}_{fuel} H_u}$$

$P_{el,net}$: Net optimized maximum power output under design conditions (kW)

$\dot{Q}_{net}$: Net optimized thermal output per hour under design conditions (kcal/h)

$\dot{m}_{fuel}$: Total fuel input per hour under design conditions (kg/h)

H_u: Fuel calorific value (kcal/kg), LHV

*1kW = 860kcal/h

(3)Site [13]

(13) Using a 1/5000 or 1/10000 scale basic figure or reduced size map of Taiwan to disclose the development site and transportation, rivers, urban plan, terrain, surface features, landform, schools, and communities in the surrounding areas within a 1- to 5-kilometer radius. Developments over 10 hectares (including) or linear developments stretching beyond 10 kilometers shall be indicated on a 1/25000 or 1/50000 scale map or topographic map.

(4)Layout [14]

(14) The layout shall be clearly labeled, such as the relative positions of each venues (facilities), dimensions, and distances; the actual distances or scale shall also be indicated, as well as legends, orientation, and other necessary matters that benefit the assessment.

iii. Information Checklist

(i) Processing Techniques [15]

Applicant Self-Checklist
☐ BATs shall be applied in Processing Techniques in Appendix 3, 4, 5 or 6 of Regulations Governing the Assessment of Energy Development and Utilization. Industry: _____ Version: _____ ☐ BATs shall not be applied in Processing Techniques in Appendix 3, 4, 5 or 6 of Regulations Governing the Assessment of Energy Development and Utilization. ☐ In accordance with the version of EU BREFs Industry: Industry: _____ Version: _____ ☐ Not EU BREFs Industry Described as follows: (Please specify the reason why the BATs are not applicable, and the standards to be adapted)
1. (The BAT of Processing Techniques) (1) (The BAT of Processing Techniques) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(For other BAT of Processing Techniques, please attach additional spaces to the chart)

(For other matters requiring further explanation, please attach additional spaces to the chart)

(15) Processing techniques in compliance with Appendix 3, 4, 5 or 6 of Regulations Governing the Assessment of Energy Development and Utilization shall be indicated, explanations must be provided. If failing to comply with regulations, explanations must be provided. Processing techniques are incompatible with Appendix 3, 4, 5 or 6 of Regulations Governing the Assessment of Energy Development and Utilization, qualitative or quantitative descriptions of efficiency should be provided by applicant.

(ii) Utility Systems and Equipment [16]

Applicant Self-Checklist
BATs shall be applied in Utility Systems and Equipment in Appendix 1 of Regulations Governing the Assessment of Energy Development and Utilization. ☐ Yes. ☐ No. It isn't applicable in circumstances of being restricted by laws and regulations, patent right protection, international trade barriers, or other factors bot attributable to the applicants, given evidence are submitted by the applicants. Described as follows:
1. The item is whether the combustion handling systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 23 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 23 below.)
(1) Lignite pre-drying ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Coal gasification ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Fuel drying ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Biomass gasification ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Bark pressing ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(6) Expansion turbine to recover the energy content of pressurized gases ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Advanced computerised control of combustion conditions for emission reduction and boiler performance ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Using flue-gas heat to supply district heating system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Reducing excess air and make it reach the optimum air-fuel ratio ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Properly reducing the exhaust temperature to reduce heat loss ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Reducing the concentration of carbon monoxide in the exhaust gas and improving boiler efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(12) Heat accumulation ☐ Applicable ☐ Partially applicable

Applicant Self-Checklist
☐ Not applicable Described as follows:
(13) Cooling tower discharge ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(14) Different techniques for the cooling system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(15) Using waste heat to preheat gas fuels to improve thermal efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(16) Preheating combustion air to improve fuel efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(17) Installing recuperative or regenerative burners to recover burner waste heat ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(18) Controlling and optimizing combustion conditions by monitoring fuel, air flow rates, and oxygen content in flue gas ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(19) Fuel choice ☐ Applicable

Applicant Self-Checklist
☐ Partially applicable ☐ Not applicable Described as follows:
(20) Using oxygen-enriched combustion technology to improve energy efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(21) Reducing heat loss by insulation ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(22) Reducing heat loss cause by frequent opening and closing or poor sealing of furnace doors ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(23) Fluidised bed combustion ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
2. The item is whether the heat recovery systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 2 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 2 below.)
(1) Monitoring the efficiency periodically ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Preventing or removing the internal scaling and external dust accumulation of equipment ☐ Applicable

Applicant Self-Checklist
☐ Partially applicable ☐ Not applicable Described as follows:
3. The item is whether the steam handling systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 28 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 28 below.)
(1) Energy efficient design and installation of steam distribution pipework ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Throttling devices and the use of backpressure turbines: utilize backpressure turbines instead of PRVs ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Improve operating procedures and boiler controls ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Use sequential boiler controls (apply only to sites with more than one boiler) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Install flue-gas isolation dampers (applicable only to sites with more than one boiler) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) For feed water preheating, the following methods are available: <1>process waste heat recovery

Applicant Self-Checklist
<2>recovery of heat energy from combustion air by economizer <3>heating condensate with deoxygenated feed water <4>using heat exchangers to condense the steam used for degassing and feed water heating ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Prevention and removal of scale deposits on heat transfer surfaces. (Clean boiler heat transfer surfaces) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Boiler blowdown is reduced by improving the water treatment system and installing automatic dissolved solids control equipment ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) It is necessary to check and attach/repair the boiler refractory material during regular inspection ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Maintaining optimal discharge rate of degassers ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Minimise boiler short cycling losses ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(12) Carrying out boiler maintenance ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(13) Optimizing steam from distribution system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(14) Isolate steam from unused lines ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(15) Regularly inspecting and confirming the heat insulation of steam pipes and condensate return pipes. (Confirming the proper heat insulation of the pipes, pipe fittings, valve bodies, and tanks) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(16) Implement a control and repair programme for steam traps ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(17) Collect and return condensate to the boiler for re-use. (Optimise condensate recovery) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(18) Re-use of flash-steam. (Use high pressure condensate to make low pressure steam) ☐ Applicable

Applicant Self-Checklist
☐ Partially applicable ☐ Not applicable Described as follows:
(19) Recover energy from boiler blowdown ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(20) Expansion turbine to recover the energy content of pressurised gases ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(21) Change turbine blades when repairing ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(22) Using advanced materials to meet high steam parameter requirements to improve efficiency ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(23) Supercritical steam parameters ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(24) Double reheat ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(25) Regenerative feed-water

Applicant Self-Checklist
☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(26) Use of heat content of the flue-gas for district heating ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(27) Heat accumulation ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(28) Advanced computerised control of the gas turbine and subsequent recovery boilers ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
4. The item is whether the electric power supply systems would be installed [(14)]: ☐ Yes. Provide further description in BAT Items 1 to 8 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 8 below.)
(1) Installing capacitors in the AC circuits to decrease the magnitude of reactive power ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Minimising the operation of idling or lightly loaded motors ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Avoiding the operation of equipment above its rated voltage

Applicant Self-Checklist
☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) When a new or replacement motor is installed, a high efficiency motor (≥ IE3) should be used ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Ensure power cables have the correct dimensions for the power demand ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Keep online transformer(s) operating at a load above 40 ~50 % of the rated power ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Use high efficiency/low loss transformers ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Place equipment with a high current demand as close as possible to the power source (e.g. transformer) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
5. The item is whether the electric motor drive subsystems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 7 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 7 below.)

Applicant Self-Checklist
(1) Using energy efficient motors (EEMs) (≥ IE3) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Proper motor sizing ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Installing high efficiency transmission/reducers ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Use: direct coupling where possible, synchronous belts or cogged V-belts in place of V belts, helical gears in place of worm gears ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Rewinding: avoid rewinding and replace with an EEM, or use a certified rewinding contractor (EEMR) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Power quality control ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Lubrication, adjustments, tuning ☐ Applicable ☐ Partially applicable ☐ Not applicable

Applicant Self-Checklist
Described as follows:
6. The item is whether the air compressor systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 13 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 13 below.)
(1) Overall system design, including multi-pressure systems ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Improve cooling, drying and filtering ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Reduce frictional pressure loss (for example by increasing pipe diameter) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Improvement of drives (high efficiency motors) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Improvement of drives (speed controller) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Use of sophisticated control systems ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
(7) Recover waste heat for use in other functions ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(8) Use external cool air as intake ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Storage of compressed air near highly-fluctuating uses ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Optimise certain end use devices ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Reduce compressed air leaks ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(12) More frequent filter replacement ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(13) Optimise working pressure ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

Applicant Self-Checklist
7. The item is whether the pump systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 11 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 11 below.)
(1) Avoid oversizing when selecting pumps and replace oversized pumps ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Match the correct choice of pump to the correct motor for the duty ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Design of pipework system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Control and regulation system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Shut down unnecessary pumps ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Use of variable speed drives (VSDs) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Use of multiple pumps (number of units under control) ☐ Applicable

Applicant Self-Checklist
☐ Partially applicable ☐ Not applicable Described as follows:
(8) Regular maintenance. Where unplanned maintenance becomes excessive, check for: cavitation, wear, wrong type of pump ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Minimise the number of valves and bends commensurate with keeping ease of operation and maintenance ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Avoid using too many bends (especially tight bends) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Ensuring the pipework diameter is not too small (correct pipework diameter) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
8. The item is whether the heating, ventilation and air conditioning systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 11 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 11 below.)
(1) Overall system design. Identify and equip areas separately for: <1>general ventilation <2>specific ventilation <3>process ventilation ☐ Applicable ☐ Partially applicable ☐ Not applicable

Applicant Self-Checklist
Described as follows:
(2) Optimise the number, shape, and size of intakes ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Use fans: <1>of high efficiency <2>designed to operate at optimal rate ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Manage airflow, including considering of dual ventilation systems (indoor and outdoor ventilation and heat exchange) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Air system design: <1>ducts are of a sufficient size <2>circular ducts <3>avoid long runs and obstacles such as bends, narrow sections ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Optimise electric motors, and consider installing a VSD ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Use automatic control systems. Integrate with centralised technical management systems ☐ Applicable ☐ Partially applicable

Applicant Self-Checklist
☐ Not applicable Described as follows:
(8) Integration of air filters into air duct system and heat recovery from exhaust air (heat exchangers) ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Reduce heating/cooling needs by: <1>building insulation <2>energy-efficient glazing <3>air infiltration reduction <4>automatic closure of doors <5>destratification <6>lowering of temperature set point during non-production period (programmable regulation) <7>reduction of the set point for heating and raising it for cooling ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Improve the efficiency of heating systems through: <1>recovery or use of wasted heat <2>heat pumps <3>radiative and local heating systems coupled with reduced temperature set points in the non-occupied areas of the buildings ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(11) Improve the efficiency of cooling systems through the use of free cooling ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
9. The item is whether the lighting systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 5 below.

Applicant Self-Checklist
☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 5 below.)
(1) Determining the lighting requirements based on the illuminance and spectral content (color temperature and color rendition) required by the predetermined task ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Plan space and activities in order to optimise the use of natural light ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Selection of fixtures and lamps according to specific requirements for the intended use ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Use of lighting management control systems, including occupancy sensors, timers, etc. ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Train building occupants to utilise lighting equipment in the most efficient manner ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
10. The item is whether the drying, separation, and concentration processing systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 10 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 10 below.)

Applicant Self-Checklist
(1) Selecting the best separation technology or a combination of the following separation technologies to satisfy specific process equipment ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Use of surplus heat from other processes ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Use a combination of techniques ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Mechanical processes, e.g. filtration, membrane filtration ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Heat drying method: <1> directly heated dryers <2> indirectly heated dryers <3> using multiple effect ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(6) Superheated steam ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(7) Heat recovery (including MVR and heat pumps) ☐ Applicable

Applicant Self-Checklist
☐ Partially applicable ☐ Not applicable Described as follows:
(8) Optimise insulation of the drying system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(9) Radiation processes ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(10) Process automation in thermal drying processes ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
11. The item is whether the industrial cooling systems would be installed: ☐ Yes. Provide further description in BAT Items 1 to 4 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 4 below.)
(1) The overall system is designed based on the requirements of the manufacturing process and factory and is categorized as: <1> closed type <2> open type ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) For the BAT of the design phase of the industrial cooling systems, the lowest energy consumption is achieved by the following combinations: <1> reducing pressure loss in water flow and airflow <2> adopting high efficiency and low energy consumption equipment <3> reducing the number of energy-demanding equipment <4> applying optimized cooling water treatment in water-cooled cooling systems to keep the heat transfer surfaces clean and avoid scaling, rusting, fouling, etc.,

Applicant Self-Checklist
so that in each individual case, the lowest energy consuming combination of the above factors must be achieved to operate the industrial cooling systems ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) The methods to reduce direct energy consumption are provided as follows. Fans or pumps: <1> matching motors with high efficiency <2> designing for optimum pressure loss and flow rate <3> using speed variators ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Operating the industrial cooling systems according to process requirements: <1> water supply pressure <2> backwater pressure <3> temperature of water supply <4> temperature difference between the water supply and return water <5> pump efficiency <6> fan motor efficiency <7> point-of-use pressure requirements ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

(16) Public facilities include: combustion handling systems; heat recovery systems; steam handling systems; electric power supply systems; electric motor drive subsystems; air compressor systems; pump systems; heating, ventilation and air conditioning systems; lighting systems; drying, separation, and concentration processing systems; industrial cooling systems. If the facility has the said public facilities, please select “Yes” and answer the following BAT items; if the facility does not have the said public facilities, answer “No” and explain why the facilities are not installed; no need to answer the BAT Items.

(iii) Co-generation system less than 50MW

The item is whether the co-generation systems less than 50MW would be installed: ☐ Yes. Provide further description in BAT Items 1 to 5 below. ☐ No. Description: (Reasons for no installing system, no need to answer BAT Items 1 to 5 below.)
(1) System that generates effective thermal and electrical energy at the same time ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(2) Steam turbines and the power generation system: considering the use of a computer-controlled system ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(3) Steam turbines and the power generation system: considering the use of advanced materials ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(4) Steam turbines and the power generation system: upgrading steam turbines requires a consideration of increasing steam temperature and pressure ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:
(5) Steam turbines and the power generation system: optimizing working fluid operating conditions ☐ Applicable ☐ Partially applicable ☐ Not applicable Described as follows:

(For other matters requiring further explanation, please attach additional spaces to the chart)

iv. Energy Management Measures

Item	Description
☐ Energy Management System	(Ex: Plan to install energy management computer control system, plan to deploy energy management staff…)
☐ Green Energy Introduction	(Ex: Plan to install solar PV panels, plan to install wind turbines, plan to install solar water heater…etc.)
☐ Plant Facility Optimization	(Ex: Plan to obtain Green Factory or Green Building Certifications)
☐ Others	

(For other matters requiring further explanation, please attach additional spaces to the chart)

v. Appendix: Required Related Information and Documents

(i) Letter of Approval for “Electricity Consumption Plan” / Explanation of self-usage power generation equipment: Please attach Letter of Approval for “Electricity Consumption Plan” / Explanation of self-usage power generation equipment.

(ii) Other Related Information and Documents: Those adopting new processing techniques must provide qualitative or quantitative descriptions of efficiency greater than existing standards.