

# List of Eligible Technology and Equipment

## 1. Industry Sector

Code No	Sub-sector and item	Specification	Eligible portion	Energy source
<b>1. Chemical</b>				
1.2	Zero-Gap bipolar electrolyzer for membrane electrolysis process	Natural circulation, Zero-Gap bipolar electrolyzer with ion exchange membrane (low voltage anode and cathode recommendable for longer durability).	(a) Electrolysis cell (b) Membrane (c) Catholyte (d) Anolyte (e) Frame, header (f) Hydraulic cylinder	Electricity
<b>2. Paper &amp; pulp</b>				
2.2	De-inking plant	50 TPD or more	(a) Pulper (b) Screen (c) Flotation machine (d) Bleaching machine (e) Pumps	Electricity & Gas
<b>3. Textile and garment</b>				
3.1	Spinning machine	(1) Roving frames with pneuma-less waste collection system (2) Ring spinning frames with permanent magnet motor (3) Automatic winder with balloon controller (4) Air jet spinning	Spinning machines may be accompanied by the followings: (a) Automatic roving & cone transportation (b) Automatic packing system (c) Overhead travelling cleaner (OHTC)	Electricity
3.2 (1)	Loom (weaving machine)	(1) Air-jet loom with technology for reducing both air consumption and air pressure.	Loom may be accompanied by the followings: (a) Warp tying machine with leasing option, (b) Warp leasing machine, (c) Beam carrier (automatic), with heald support as required.	Electricity
3.2 (2)	Warper & sizer	(2) Warper & sizer with inverter control (motor should meet the standard which is stipulated in item 9.7.1).		Electricity
3.3	Sewing machine	Sewing machine driven by directly connected motor. Main driving motor type is to be a servomotor.		Electricity
3.4	Stenter	Stenter controlled by inverter, whose air volume and width of nozzle are adjustable.		Electricity & Gas
3.6	Complete garment (3D) flatbed knitting machine	Flatbed knitting machine with three-dimensional knitting function eliminating seam allowances.		Electricity
3.7	Automation functions for dyeing machine	Programmable logic control (PLC) based automation function for dosing, motor speed, temperature and running time controls of dyeing machines.	PLC based automation system including following functions: (a) Software and OA equipment, (b) mechanical control (c) sensors, measuring, monitoring, logging and analysis functions.	Electricity & Gas
3.8	Jet dyeing machine for disperse dyeing with discharge rinsing function	Jet dyeing machine for polyester knit fabrics (long tube, liquid flow circulation movement type) with discharge rinsing system having heat exchanger from high temperature dye wastewater to raw rinsing water to save water/energy consumption, shorten operating time and remove chemical impurities. Steam consumption of less than 1.5kg/kg-fabric; Water consumption of less than 8 liter/kg-fabric, and; Liquor ratio of less than 1:6.	Dyeing machine may be accompanied by the following functions: (a) Inverter for pump motor. (b) Dye-kitchen system (c) Low liquid washing system (d) Automatic process program setting system	Electricity & Gas
3.9	Cold pad batch (CPB) dyeing for knit fabrics	Dyeing and finishing line with cold pad batch (CPB) dyeing process with tension control and automated dosage for knit fabrics.	A production line comprised of the following functions: (a) pre-treatment, (b) cold pad batch dyeing, (c) washing, (d) drying, and (e) plaiting.	Electricity & Gas

4. Glass				
4.1	Combustion control of glass melting furnace	Combustion control unit controlled by air ratio in exhaust gas.		Gas
5. Cement & clinker grinding				
5.1	Vertical roller grinding mill for cement clinker and slag	A mill equipped with main rollers for grinding materials and sub-rollers for stabilizing materials, or with equivalent function to stabilize the grinding. Having delivery record of mill with power consumption of less than 29 kWh/ton (mill + separator + fan) at 3,300 cm <sup>2</sup> /g OPC basis.	Vertical roller grinding mill may be accompanied by the followings: (a) Hot gas generator function, (b) Electric & automation equipment, (c) Training for the plant operation.	Electricity
5.3	High pressure grinding rolls (HPGR) / Roller press for cement pre-grinding	Hydraulically controlled two rollers to pre-grind cement using interparticle and compression forces.	Roller press may be accompanied by the followings: (a) Vertical separator, (b) Dynamic separator.	Electricity
6. Iron & steel				
6.3	Vertical type scrap pre-heating unit for arc furnace	Vertical type scrap pre-heating unit for A/C (alternative current) arc furnace.	(a) scrap handling (b) preheating shaft (c) off gas treatment system	Electricity
6.4	Endless bar rolling system	Hot bar rolling equipment with reduction of steel bar loss, re-melting energy and improvement of productivity features.	(a) Flame cutter (b) Welder (c) Handling system	Electricity
6.5	Regenerative burner	(1) Regenerative burner with a pair of burners unit and ceramic material recuperator. Excess air ratio of 1.1. (2) Self-regenerative burner with a burner unit with a pair of ceramic material recuperators. Excess air ratio of 1.1	(a) Burner unit with ceramic recuperator, (b) Control valves, orifices for combustion control, (c) Combustion air blowers and exhaust gas suction fan, (d) Combustion control panels (e) Piping and heat insulation material (f) Burner tile and refractories for burner units.	Gas
7. Foods and beverages (cold storage)				
7.1	Screw compressor refrigeration unit	Screw compressor with motor whose capacity is equal to 10 kW or more, including chiller, condensing unit, and cold storage capital machineries (Insulation panel, cooling tower, control panel, pumps, and pressure vessels) COP>=4.0 @ +3°C (e.g. potato cold storage) COP>=1.9 @ -25°C (e.g. cold storage in general) COP>=1.4 @ -35°C (e.g. cold storage in general) COP>=1.1 @ -40°C (e.g. ice cream factory)		Electricity



9 Common technology				
9.1 Power receiving and distribution				
9.1.1	Transformer	Transformer with amorphous metal core		Electricity
9.2 Water pump				
9.2.1	Pump with inverter	Pump with inverter control, whose motor output is 10 kW or more (motor should meet the standard which is stipulated in item 9.7.1).		Electricity
9.3 Fan and blower				
9.3.1	Fan and blower with Inverter	Fan and blower with inverter control, whose motor output is 10 kW or more (motor should meet the standard which is stipulated in item 9.7.1)		Electricity
9.4 Air compressor				
9.4.1	Air compressor (single)	(1) Screw compressor with inverter control, (2) Centrifugal compressor, whose motor output is 10 kW or more.	Compressors may be accompanied by the following functions: (a) Dryer (b) Motor starter (c) Filter	Electricity
9.4.2	Multi air compressor with control unit	(1) Screw compressors with inverter control. The numbers of air compressors being 2 sets or more, equipped with an optimum control unit. (2) Centrifugal compressors, in a set of 2 or more, whose motor output is 10kW or more each, with an optimum control unit.		Electricity
9.5 Motor drive				
9.5.1	Inverter drive	Inverter drive whose total connected motor output is of 10 kW or more for each sub-project.	A drive system comprised of motor (IE3 or superior in efficiency), inverter and controller	Electricity
9.6 Boiler and steam system				
9.6.1	Once-through steam boiler	Steam generation capacity is between 1 ton/h to 4 ton/h. Boiler efficiency is to be 90% or more at rated load.		Gas
9.6.2	Multiple installation system of once-through steam boilers	-Steam generating capacity of a single boiler is from 1 ton/h to 4 ton/h. -Efficiency of a single boiler is to be 90% or more at rated load and the efficiency of total system is to be 80% or more at 50% load. -Total steam generating capacity is 2 ton /h or more by multiple numbers of boilers.		Gas
9.6.3	Economizer for boiler	Exhaust gas economizer		Gas
9.7 Motor				
9.7.1	Motor	Efficiency is IE3 specified in IEC 60034 or superior		Electricity
9.8 Air conditioning system				
9.8.1 (1) 9.8.1 (2) 9.8.1 (4) 9.8.1 (5)	Chiller system	(1) Centrifugal chiller; (2) Absorption chiller utilizing waste heat; (4) Air cooled chiller, whose COP is 3.0 or more, and; (5) Water cooled chiller, whose COP is 4.0 or more.	Chiller system may include the following ancillary items: (a) Air handling unit (b) Fan coil unit (FCU). (c) Chilled water pump (d) Chilled water pipe (e) Duct, damper (f) Cooling tower (g) Cooling water pump (h) Cooling water pipe (i) Control device.	Electricity
9.8.1 (3)	Variable Refrigerant Flow (VRF)	(3) Variable Refrigerant Flow (VRF) air conditioner whose COP is 4.2 or more.	Packaged whole VRF system including ducting and piping.	

9.9 Heat pump			
9.9.1	CO2 Heat pump	Motor Capacity is 10 kW or more COP>= 3.5 (Hot water supply: heat source=air) COP>= 5.0 (Cooling + Heating supply)	Electricity
9.10 Lighting			
9.10.1	LED light	LED light with 100 lm/W or more, life time: 40,000 hours or more, number of lamps is 500 or more, and with LED patent license certificate.	(a) LED lamps or LED tips (b) Fixture for LED tips Electricity
9.11 Co-generation, tri-generation			
9.11.1	Gas engine cogeneration	New installation or conversion from existing gas engine power generation to higher efficiency (*) gas engine with co-generation / tri-generation utilizing waste heat. Requirements for gas engine are as follows: (*) The gas engine should also be equipped with at least one of the following technical principles: - Lean combustion; - Optimisation of compression and expansion ratios (including Miller cycle); - Boost pressure controlling, including the using of turbocharger with efficiency improvement mechanism or comparable technology; - Individual cylinder combustion control. (*) The gas engine should be equipped with integrating flow meter to monitor actual gas consumption. (*) Power generation efficiency of gas engine whose generator output is more than or equal to 5MW should be 45% or more, while that of gas engine whose generator output is less than 5MW should be 42% or more. Maximum power generation capacity per sub-project is 10 MW.	(a) Gas engine (b) Power generator (c) Heat recovery function (d) Integrating flow meter Gas
9.11.2	Gas turbine cogeneration	Gas turbine co-generation / tri-generation, whose total rated thermal efficiency is more than 80%. The gas turbine should be equipped with integrating flow meter to monitor actual gas consumption. Maximum capacity per sub-project is 20 MW.	(a) Gas turbine with gas pressurizer (b) Starter (c) Power generator (d) Heat recovery function (e) Integrating gas flow meter Gas
9.12 Waste heat recovery			
9.12.1	Once-through steam boiler	Once-through boiler with automatic gas bypass device	Gas
9.12.2	Waste heat recovery system	Exhausted heat recovery system, whose capacity is equal to 10,000 kJ/h or more.	Gas
9.12.3	Heat exchanger	Heat exchanger whose capacity is equal to 10,000 kJ/h or more.	Gas



## 2. Building Sector

Priority will be given to green buildings

Item	Specification	Energy source
2AZ00	Heat reflective glass Low-e pair glass and solar reflective glass (solar heat reflective ratio is 50% or more)	Electricity
2BZ00	Elevator Elevator with PM motor and LED lighting	Electricity
2CZ00	BEMS BEMS, which visualizes a real time energy consumption of the building and controls energy consumption for air conditioning and lighting	Electricity
2DZ00	Others Equipment listed in Component I and III are also eligible	-
	Note: BEEER accreditation should somehow be reflected when the new regulation is introduced (to be passed on to the next revision).	

## 3. Residential Sector

Following equipment to be provided by Participating Distributors (PDs)

Item	Specification	Energy source
3AZ00	Refrigerator Inverter controlled (energy efficiency label: 3 stars or more, when the programme is established)	Electricity
3BZ00	Air conditioner Inverter controlled (energy efficiency label: 3 stars or more, when the programme is established)	Electricity
3CZ00	Others Further additions are expected in accordance with the establishment of energy efficiency labelling programme A way to integrate the new SREDA labelling programme is being considered.	-
	Note: New component III (using A-type loan) should somehow be incorporated (to be passed on to the next revision).	

Note1 : COP: Coefficient of Performance  
IEC: International Electrotechnical Commission  
LED: Light Emitting Diode  
OPC: Ordinary Portland Cement

Note 2: Fuel oils may apply as the energy source in lieu of gas in some of the cases.

Note 3: Specifications  
ISO standards, where available, apply to the conditions under which specifications are measured.  
Calorific values in the specifications are in LHV basis, wherever applicable.  
Power generation in the specifications is in gross basis.

Note 4: The specification for eligibility may change without prior notification

