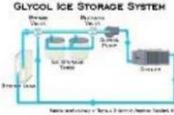


N°Ref	Best Available Technology (BAT)	Objective	Applications	Minimum Performance Criteria/ Minimum requirements	International Reference Standards	Estimated pay back time short term : 2-4 years, medium term: 4-6years, long term : 6-8 years (*)	Comments	Visual Example
<b>A. Improve thermal performances of building envelope</b>								
<b>A.1. Roofs and walls</b>								
A.1.1.	Insulated metal Panels Polyurethane /polycyanurate foam , Extruded polystyrene, Glass wool	Improvement of roof and wall insulation on open frame structures	Existing or new industrial buildings (example: air conditioned production plants, warehouses)	Roof : $U < 0,4 \text{ W/m}^2 \text{ } ^\circ\text{C}$ , Walls : $U < 0,5 \text{ W/m}^2 \text{ } ^\circ\text{C}$ + Reflective or clear coloured external coating	CE MARK, KEYMARK, ACERMI, ASTM C518	short/medium term	Roof is one of the main sources of cold loss in an air conditioned office or apartment building, or air conditioned storage facilities or warehouses; roof insulation -reduces -cold loss by up to 70 %	
A.1.2.	Extruded or expanded polystyrene panels, polyurethane panels, spray polyurethane foam , glass wool, rock wool panels or rolls	Improvement of roof insulation on concrete flat roofs and walls	All air conditioned buildings: Offices or apartment buildings, hotels hospitals, production plants...	Roof : $U < 0,4 \text{ W/m}^2 \text{ } ^\circ\text{C}$ , under the waterproof covering Walls : $U < 0,5 \text{ W/m}^2 \text{ } ^\circ\text{C}$	CE MARK, KEYMARK, ACERMI EN 13 164	Medium term		
<b>A.2. Windows</b>								
A.2.1.	Double-glazing window with low SHGC glass	Improvement of thermal transfer through windows	New or retrofit of all kinds of air-conditioned buildings; windows exposed to direct sunshine	Global U factor $\leq 2 \text{ W/m}^2\text{K}$ Low E coating SHGC (solar heat gain coefficient) $< 0,5$	CE Marking as per EN ISO 10077-1	Medium term	Wood, PVC or metal frame . When metal frame, it is necessary to plan thermal ruptors to avoid thermal bridges. Considering the climate in Mauritius, it is necessary to favour the reduction of the solar factor by coloured or reflective glazing on the windows directly exposed to the sun.	
A.2.2.	Existing windows fitted with heat resistant adhesive film	Improvement of thermal transfer through windows	Retrofit of all kinds of air-conditioned buildings; windows exposed to direct sunshine	Solar energy reflection $> 50 \%$		Short term	Heat adhesive film is a fast and economic measure to thermal transfer by direct sun radiation. However, the life expectancy of this equipment is short.	
A.2.3.	External Shading devices: blinds, window covers, horizontal or vertical sun protectors on the facade	Protection against direct sunshine	New or retrofit of all kinds of air-conditioned buildings; protection type depends on the sunshine exposure	Avoid direct sunshine on more than 80 % of the facade in all seasons		Medium term	The implementation of solar shading devices on windows is the most effective way to reduce the thermal contributions on facades exposed to direct solar radiation. Type of shading device depends on the orientation of facades; Blackout types for east and west facing windows are favoured protections against raising solar radiations, and overhanging types for the north facing windows.	
<b>B Improve HVAC&amp;Refrigeration System performances</b>								
<b>B.1. Individual air conditioning systems</b>								
B.1.1.	Monosplit air cooled with inverter Pcooling<12 Kw	Reduce the electricity consumption by replacing air conditioners	For small air conditioned spaces (housing, offices, retail stores....)	At least Energy Efficiency class : A++ or SEER $> 6,10$	Commission Regulation (EU) No 626/2011 supplementing Directive 2010/30/EU EN 814-2/3 (E 36-104-2/3)	Short/medium term	New generation of inverter monosplit air conditioner Eurovent classified up to A++ produce energy savings of up to 20%, over comparable usual equipment	

Energy Efficiency Class	SEER
A+++	SEER $\geq 8,50$
A++	$6,10 \leq \text{SEER} < 8,50$
A+	$5,60 \leq \text{SEER} < 6,10$
A	$5,10 \leq \text{SEER} < 5,60$

B.2. Small and medium range air conditioning systems								
B.2.1.	<b>Variable refrigerant flow (VRF) units</b>	Reduce the electricity consumption by replacing existing monosplit, multisplit or small chilled water air conditioned systems.	<b>For medium sized buildings, up to 40 rooms (housing, offices, hotels, hospitals...)</b>	EER ≥ 3,4 VSD	EU IPCC BAT EE, US DOE EN 814-2/3 (E 36-104-2/3)	Short/medium term	VRF systems are a combination of up to 40 indoor fan coil units connected to a single outdoor condensing unit by refrigerant piping and wiring only. Each fan coil unit can be independently controlled by varying the refrigerant flow, and in doing so varying capacity being delivered to each zone; making it one of the most effective and efficient systems available; Energy savings of up to 50% are predicted over comparable unitary equipment	
B.3. Large range air conditioning systems - chillers								
B.3.1.	<b>Air cooled high efficiency chillers</b>	Reduce electricity consumption of chillers and pumps by replacing existing air cooled or water cooled chillers	<b>Large public and private air conditioned office buildings, hotels, hospitals</b>	Eurovent class A EER>3,1 or Inverter ESEER >4,5 Hydrocarbon HFC refrigerants only	Eurovent	Medium term	Reducing electricity consumption by improving performance of chilled water system including chillers, cooling towers, pumps, energy storage . Energy savings can be obtained by replacing chillers with a higher ESEER (higher Eurovent classification), higher efficiency cooling towers (evaporative or semi-evaporative, fans with VSD), revamping pumps with a more efficient motor IE3 or IE2 vs IE1, and adding variable speed drive (VSD); in addition to these energy efficient implementations, energy savings are generally up to 20% better than performances of an usual chilled water system.	
B.3.2.	<b>Water cooled high efficiency chillers</b>		<b>Large public and private air conditioned office buildings, hotels, hospitals</b>	Eurovent class A EER>5,1 Hydrocarbon HFC refrigerants only	Eurovent	Medium term		
B.3.3.	<b>Absorption/adsorption refrigeration Machine</b>	Replace existing water cooled chiller, to benefit from free energy produced by waste in industrial process or solar heating panels	<b>Industrial plants, hotels, hospitals equipped with solar heating panels</b>	Only when free energy is available (waste or solar energy)		long term		
B.4. Large range air conditioning systems - cooling towers								
B.4.1.	<b>High efficiency dry cooling tower with high efficiency fans and motors, VSD</b>	Reduce electricity consumption by replacing existing dry cooling tower	<b>Large air conditioning installations with water chiller; industrial plants, large office buildings, hotels, hospitals</b>	At least IE2 class efficiency motor , VSD	CTI Standards	Medium term	On big installations, cooling of the chiller condenser is realised by an open or closed, dry or wet circuit of water; energy savings can be realised on pumps of the cooling loop (high-efficiency motor, VSD), fans (fiberglass blades, high-efficiency motors, VSD); Evaporative open systems use the heat from the evaporation of water to decrease the temperature in the condenser and improve the chiller efficiency. Hybrid system limits the use of the evaporative function during the hot seasons.	
B.4.2.	<b>High efficiency evaporative cooling tower , mini IE2 fan motors and VSD</b>	Reduce electricity consumption by replacing existing dry cooling or evaporative tower						
B.4.3.	<b>High efficiency evaporative cooling tower with hybrid condenser, mini IE2 fan motors and VSD</b>							

B.5. Large range air conditioning systems - pumps								
B.5.1.	High efficiency pump (Motor and pump integrated or non integrated)	Reduce electricity consumption by replacing existing pump	For or pumps that function for long durations	At least IE3 class efficiency motor or IE2 class+VSD		Medium/long term	To justify economically the replacement of pumps, a high annual duration of functioning is necessary (for example, at least 3000 hours per year); to justify the set-up of a VSD (variable speed drive, the operating cycle of pumps has to undergo important variations.	
B.6. Air handling units								
B.6.1.	High efficiency air handling unit (AHU)	Reducing electricity consumption by replacing existing AHU	HVAC for large spaces	At least IE2 class efficiency motor equipped withVSD	EN 814-2 (E 36-104-2)	Medium/long term	Fans electricity consumption is reduced by high efficiency IE2 motors driven with VSD . In the case of a heat recovery handling unit, extracted fresh air crosses a heat exchanger to refresh new air and reduce electricity consumption for air conditioning	
B.6.2.	Air handling unit with cold recovery	Reducing electricity consumption by replacing existing AHU	Places with high occupation when significant air renewal is needed	plate heat exchanger or thermal wheel		Medium/long term		
B.7. Cold water chilled water storage (Thermal storage) system								
B.7.1.	Cold water storage (Thermal storage) system	Store energy produced free or at a low cost to postpone its use to the peak hours of cold or electricity demand	Hotels, hospitals and places needing continuous air conditioning	Minimum cold capacity of storage: 2 hours of nominal hourly cold production from the main chiller (indicative value)		Medium term	Cold chilled water storage is useful in many ways: provides smooth operation and reduces maximum power demand within the chillers, reduces fixed tariff rate, useful for self consumption PV implementations, for energy storage when continuous air conditioned service is needed (hotels, hospitals....) Thermal Storage System provides Energy Saving features and smooth operation of the AC; if applicable, it is a complementary component to a PV System	
C. Reduce energy consumption to produce hot water								
C.1. Solar water heaters								
C.1.1	Evacuated tube collectors	Produce hot water from solar energy for sanitary or industrial uses	When domestic hot water is needed (hotels, hospitals, private houses)	EN 12975-1, ISO 9806, EN 12976, EN 12977		Medium term	Install solar water heaters. Replace fuel or electricity; Energy saving: 800 kWh /m2/year. Evacuated tube collectors offer temperatures of hot water appreciably higher than flat plate collectors, which have however a better global efficiency.	
C.1.2.	Flat plate collectors		When domestic hot water is needed (hotels, hospitals, private houses)	EN 12975-1, ISO 9806, EN 12976, EN 12977		Medium term		

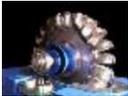
<b>C.2. Heat recovery</b>								
C.2.1.	Heat recovery exchanger on chiller condensers	Recover heat from hot gases before chiller condenser to produce hot water for sanitary or industrial uses	<b>When there is simultaneous need for air conditioning and for domestic hot water (hotels, hospitals, private houses)</b>			Short/ Medium term	Reduce fossil or electrical energy consumption by recuperating free energy on hot gases. Chiller units are equipped with desuperheaters and heat exchangers on the discharge line to recover heat from the superheated refrigerant vapour. The recovered heat shall be utilised to pre-heat the hot water supply.	
C.2.2.	Heat recovery on air compressor	Recover heat from hot compressed air to produce hot water for sanitary use	<b>Generally to satisfy the hot water needs for the staff toilets</b>			Medium term	Air/water	
<b>D. Improve lighting system efficiency</b>								
<b>D.1. Lamps, fixtures and ballasts</b>								
D.1.1.	LED lamps LED downlight fixtures	Replace lamps and fixtures existing lamps by more efficient and sustainable LED equipped devices.	<b>When there are substantial durations of lighting required (commercial premises, halls and circulations in hotels and hospitals)</b>		EU Directive 2005/32/EC	Short/ Medium term	LED gradually replaces the other types of lamps, including compact fluorescent light bulbs, as a result of the light being more efficient on the one hand, and with their prolonged life expectancy on the other (the quality of the manufacturing is an important factor for this life expectancy).	
<b>E. Reduce electricity consumption by monitoring and Control System implementation</b>								
<b>E.1. Lighting and HVAC control system</b>								
E.1.1.	Occupancy sensors	Reduce lighting and air conditioning consumption by implementing occupancy control systems	<b>Hotels, offices, corridors</b>		CE Marking; Energy Star Requirements.	Short/ Medium term	Occupancy sensors are generally associated with lighting; can also be associated to ventilation, or air conditioning.	
E.1.2.	Energy saving switch for hotels	Reduce the electricity consumption by automatically cutting of the supply of the main electrical devices	<b>Hotels</b>			Short/ Medium term	This device is generally associated with the access in the room (Key Tab)	
E.1.3.	Window air Conditioning shut-off Switch	Automatically stops the air conditioning functioning when windows are opened	<b>Generally for any window in air-conditioned places</b>			Short/ Medium term	Automatically shuts off air conditioning or heating when a monitored door or window remains open for a period of time	

E.1.4.	DALI (Digital adressable lighting interface)	Decrease of electricity consumption of electricity by an optimized management of lighting	Mainly for offices or large halls		IEC 62386		Reduce lighting consumption by implementing daylighting control system: Energy saving ; variable depends of use ; up to 20 % in best cases Simple to install and commission, a DALI lighting control system can monitor and control lighting within a commercial office environment, which significantly reduces the use of energy. Energy costs are lowered through daylight harvesting and standard controls such as dimming and occupancy sensors																																																																																																																									
E.1.5.	Building management system	Computerised data collection of energy consumption parameters such as flows, electric power, temperatures, pressure in order to manage and optimise lighting, HVAC and other devices.	For any complex air conditioning installation		CE marked, and; Compatibility to EN 15232 and 15500.	Short/ Medium term	Control and reduce electricity consumption by implementing a building management system: energy savings: variable, up to 20% in general case																																																																																																																									
<b>F. Improve efficiency of electric system</b>																																																																																																																																
<b>F.1. Transformers</b>																																																																																																																																
F.1.1.	Premium efficiency transformer	Replace end of life transformer by efficient equipment	For MT BT transformers for large electricity consumers in the industrial and tertiary sectors	<table border="1" style="font-size: 8px;"> <thead> <tr> <th>Single-phase kVA</th> <th>Three-phase kVA</th> <th>Single-phase (%)</th> <th>Three-phase (%)</th> </tr> </thead> <tbody> <tr><td>10</td><td>10</td><td>97,5</td><td>97,5</td></tr> <tr><td>15</td><td>15</td><td>97,5</td><td>97,5</td></tr> <tr><td>20</td><td>20</td><td>97,5</td><td>97,5</td></tr> <tr><td>25</td><td>25</td><td>97,5</td><td>97,5</td></tr> <tr><td>30</td><td>30</td><td>97,5</td><td>97,5</td></tr> <tr><td>35</td><td>35</td><td>97,5</td><td>97,5</td></tr> <tr><td>40</td><td>40</td><td>97,5</td><td>97,5</td></tr> <tr><td>45</td><td>45</td><td>97,5</td><td>97,5</td></tr> <tr><td>50</td><td>50</td><td>97,5</td><td>97,5</td></tr> <tr><td>60</td><td>60</td><td>97,5</td><td>97,5</td></tr> <tr><td>70</td><td>70</td><td>97,5</td><td>97,5</td></tr> <tr><td>80</td><td>80</td><td>97,5</td><td>97,5</td></tr> <tr><td>90</td><td>90</td><td>97,5</td><td>97,5</td></tr> <tr><td>100</td><td>100</td><td>97,5</td><td>97,5</td></tr> <tr><td>125</td><td>125</td><td>97,5</td><td>97,5</td></tr> <tr><td>150</td><td>150</td><td>97,5</td><td>97,5</td></tr> <tr><td>175</td><td>175</td><td>97,5</td><td>97,5</td></tr> <tr><td>200</td><td>200</td><td>97,5</td><td>97,5</td></tr> <tr><td>250</td><td>250</td><td>97,5</td><td>97,5</td></tr> <tr><td>300</td><td>300</td><td>97,5</td><td>97,5</td></tr> <tr><td>350</td><td>350</td><td>97,5</td><td>97,5</td></tr> <tr><td>400</td><td>400</td><td>97,5</td><td>97,5</td></tr> <tr><td>450</td><td>450</td><td>97,5</td><td>97,5</td></tr> <tr><td>500</td><td>500</td><td>97,5</td><td>97,5</td></tr> <tr><td>600</td><td>600</td><td>97,5</td><td>97,5</td></tr> <tr><td>700</td><td>700</td><td>97,5</td><td>97,5</td></tr> <tr><td>800</td><td>800</td><td>97,5</td><td>97,5</td></tr> <tr><td>900</td><td>900</td><td>97,5</td><td>97,5</td></tr> <tr><td>1000</td><td>1000</td><td>97,5</td><td>97,5</td></tr> </tbody> </table>	Single-phase kVA	Three-phase kVA	Single-phase (%)	Three-phase (%)	10	10	97,5	97,5	15	15	97,5	97,5	20	20	97,5	97,5	25	25	97,5	97,5	30	30	97,5	97,5	35	35	97,5	97,5	40	40	97,5	97,5	45	45	97,5	97,5	50	50	97,5	97,5	60	60	97,5	97,5	70	70	97,5	97,5	80	80	97,5	97,5	90	90	97,5	97,5	100	100	97,5	97,5	125	125	97,5	97,5	150	150	97,5	97,5	175	175	97,5	97,5	200	200	97,5	97,5	250	250	97,5	97,5	300	300	97,5	97,5	350	350	97,5	97,5	400	400	97,5	97,5	450	450	97,5	97,5	500	500	97,5	97,5	600	600	97,5	97,5	700	700	97,5	97,5	800	800	97,5	97,5	900	900	97,5	97,5	1000	1000	97,5	97,5	Nema premium efficiency specifications DOE CSL-3 efficiency	Long term	Reduce energy consumption by replacing transformer: energy saving: up to 3%	
Single-phase kVA	Three-phase kVA	Single-phase (%)	Three-phase (%)																																																																																																																													
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<b>F.2. Compensation systems</b>																																																																																																																																
F.2.1.	Power factor correction capacitor banks	Add capacitor banks	For installations producing reactive energy (use of electrical motor or not compensated lighting systems)		IEC 61921	Short/long term	Reduce energy consumption and tariff rates by installing power factor correction capacitor banks. Energy or costs savings: variable. Utilities typically charge additional costs to commercial customers who have a power factor below a certain limit, which is typically 0.9 (Cf CEB Tariff)																																																																																																																									
<b>F.3. Electric motors</b>																																																																																																																																
F.3.1.	High efficiency low voltage motors	Replace existing motors by efficient motor	For electrical motors with a high annual duration of functioning (for example more than 3000 hours per year)	P> 7,5 kW : mini IE3 Premium efficiency class criteria P<7,5 kW, mini IE2 High efficiency class criteria	Standard IEC 60034-30 2009	Medium/long term	Reduce electricity consumption by replacing electrical motors and implementing VSD (if useful): energy saving: replacing IE2 with IE3: up to 20% for small size motors, up to 10% for medium size; implementing VSD: energy saving: depends on the use: up to 30% in best cases.																																																																																																																									
F.3.2.	Variable Speed drive for AC induction motors 0,5 kW- 1 MW range	Add Variable speed drive to an existing motor	Economically relevant if the functioning regime is variable	For electrical motors with a high annual duration of functioning (for example more than 3000 hours per year)	CE marked; • Compatibility to EU EMC 2004/108/EC Directive.	Short/long term																																																																																																																										

F.3.3.	Variable speed drive for Synchronous motors 0,75kW- 500 Kw	Add Variable speed drive to an existing motor	Economically relevant if the regime of functioning is variable	For electrical motors with a high annual duration of functioning (for example more than 3000 hours per year)	CE marked; • Compatibility to EU EMC 2004/108/EC Directive.	Short/long term		
<b>F.4. PV Solar</b>								
F.4.1.	Mono/Polycrystalline PV panels	Add PV plants on roofs or ground	Ground or roof installation	Electric efficiency $\geq 15\%$ Total installed capacity $\leq 100$ kWc	Performance tests IEC 61215, IEC 61730	Medium term	Replacing fossil energy consumption by solar renewable energy is an increasing solution in Mauritius. Considering the climatic conditions, PV energy recovery is about 1500 kWh / year / Kw <sub>p</sub> ,	
F.4.2.	Thin film Panels	Add PV plants on roofs or ground	Ground or roof installation	Electric efficiency $\geq 10\%$ Total installed capacity $\leq 100$ kWc	Performance tests IEC 61646, IEC 61730	Medium term	Thin films PV panels are less known than silicon PV panels; they are however less expensive and their efficiency are less sensitive to ambient temperature.	
F.4.3.	PV Inverter			Electric efficiency $\geq 95\%$ Total installed capacity $\leq 100$ kWc	IEC 61 000, IEC 62109, DIN VDE 0126	Medium term	Inverter is the weak link in the photovoltaic plant in terms of life expectancy, ( two times shorter than the life expectancy of the PV panels.	
F.4.4.	PV tracker	Add uni or bi directional tracker to increase efficiency of solar panels		increasing efficiency of PV plant not less than 20 %			Trackers allow a continuous adaptation of the position of the solar panel with regard to the course of the sun; the tracker can be monoaxis (to follow the sun's daily course , and bi axis to follow also the seasonal modification of the solar course; monoaxis tracker allows PV panels to reach an annual production of about 1900 kWh / year / W <sub>p</sub> considering Mauritius climatic conditions, to compare with static PV pannels production, in ordrer of 1500 kWh / year / W <sub>p</sub> . The capacity of resistance of trackers at the cyclonic risk must be taken into account.	
F.4.5.	High efficiency Solar Pump	Pumps with pv direct drive		Motors with over 90% efficiency ; Maximum power point tracking (MPPT) technology		Medium term		
<b>G. Improve performance of Compressed air system</b>								
<b>G.1. Compressors</b>								
G.1.1.	High efficiency Screw Air Compressor	Replace reciprocating air compressor	For general uses, for workshops and industrial units	High efficiency motor IE2 class + VSD		Short/medium term	Reducing electricity consumption by up to 20% by replacing compressor, dryer and improve compressed air network: potential energy saving: electricity consumption as usual (7bar): 150 Wh/Nm <sup>3</sup> ; consumption with highly efficient compressor and efficient network: less than 100 Wh/Nm <sup>3</sup>	
<b>G.2. Compressed air dryers</b>								
G.2.1.	Recycling Refrigerated air dryer or VSD compressor air dryer	Replace air dryer with high efficiency equipment	For industrial uses requiring medium dry air (dew compressed air: 3°C)	Required air quality class 4 specific consumption $\leq 5$ kWh/1000 m <sup>3</sup> (air cooled) $\leq 3$ kWh/1000 m <sup>3</sup> (water cooled) HFC refrigerants only	EU IPPC /BAT/EE ISO 8573-1:2010	Medium term	Considering the average humidity of the ambient air of Mauritius, it is necessary to dry compressed air in order to protect the devices from condensations, such as pneumatic motors or control valves. Only drying condensation by cold systems allows high flows of air.	

G.2.2.	<b>Absorption air dryer</b>	Replace air dryer in case of high quality and low volumes	<b>For medical or food industrial uses requiring a clean and very dry air</b>	Heatless type Required air quality class ≤3	EU IPPC BAT EE ISO 8573-1:2010	Medium term	Adsorption is used to dry the air in high quality conditions, free from the risk of oil contamination, used for medical purposes in particular; To save energy in the regeneration of the adsorbent, heat compressed air can be used	
<b>H. Improve performance of steam production and steam network</b>								
<b>H.1. Boilers</b>								
H.1.1.	<b>High efficiency steam boiler</b>	In case of new equipment or boiler house retrofit	<b>For industrial and tertiary uses (hotel laundries hospitals)</b>	Net thermal efficiency ≥ 92%	EU IPPC BAT EE ; Council Directive 92/42/EEC ; Council Directive 93/68/EEC ; Directive 2004/8/EC ; Directive 2005/32/EC, •	Medium/long term	Efficiency of the steam production system depends mainly on the quality of the exchange between flue gases and steam; Three-pass conventional firetube boiler / wetback design + integrated ecosystem associated to an efficient burner, allows increase of efficiency from 5 to 10 % compared with a traditional boiler.	
H.1.2.	<b>Economiser (Non-condensing)</b>	Add to a standard boiler when a constant régime	<b>To improve the efficiency of industrial boiler rooms working permanently to a high regime</b>	Efficiency by up to 4%.		Long term	Water-flue gas heat exchanger for preheating the feeding water, Recovers heat from the boiler exhaust and is used to pre-heat the boiler feed water. This reduces the load on the boiler as the temperature differential of the feed water in the boiler is reduced.	
H.1.3.	<b>Condensate recovery system</b>	Recycle condensates in boiler to recover heat.	<b>For manufacturing units using steam in heat exchangers (food-processing, textile industry)</b>	Recovery efficiency 5 to 10 % of fuel energy consumption		Medium/long term	Energy contained in the steam condensates represents more than 10% of the available energy; these condensates are evacuated at high temperature by steam traps; if they are not polluted, they can be partially sent back in the boiler by an appropriate network.	
<b>H.2. Burners</b>								
H.2.1.	<b>High efficiency forced draught type burner</b>	As a replacement to the classic ventelle (ventile?) burner	<b>Applicable to any steam or hot water boiler burner with a high operating regime</b>	Efficiency up to 3 % of fuel energy consumption and 20% of electricity consumption CO < 40 mg/kWh, NOx ≤ 120 mg/kWh Speed-controlled air fan motor, CO/O2 controller	Pressure Equipment Directive 97/23/EC, or CE Marked	Medium term	Burners mix combustive air and fuel (heavy fuel oil, diesel oil, coal or liquefied gas); Quality of this mix is a result of several factors such as viscosity of fuel, pulverising pressure and temperature. Techniques exist to improve the mix such as steam assisted pulverising, rotary spin atomiser, the electric consumption of the combustive air fan can be reduced by using a variation speed drive motor ( VSD)	
H.2.2.	<b>Oil burner manual or testing kit</b>	To allow for better regulation of burners and the improvement of the burner efficiency	<b>Applicable to any steam or hot water boiler house</b>	Energy saving: variable, up to 1% of fuel energy consumption		Short term	Testing gas burner efficiency during installation and servicing, including CO, Oxygene, smoke test measuring . Associated with an appropriate training for operators, control and adjustment of the oxygen quantity in exhaust gases will improve the efficiency of the combustion installation at several points without any investment.	
<b>H.3. Insulation for plumbing and equipment</b>								
H.3.1.	<b>Removable insulating pads or valves and fittings</b>	To reduce heat losses from the steam network	<b>Applicable to any steam boiler house</b>	mini 50 mm thickness : Aluminium coated or silicone coated fiber glass or rockwool		Short/medium term	For retrofit ; 80 % of energy saving for each fitting	

H.3.2.	<b>Fiber glass or foam glass pipe and fitting insulation</b>	To reduce heat losses from the steam network	<b>Applicable to any steam or hot water boiler house</b>	mini 50 mm thickness; Metal coated fiber glass or rockwool		Short/medium term	For steam and condensate recovery network The U.S. DOE estimates that the installation of insulation on valves, pipes, and fittings can reduce steam system energy use by 1-3% (U.S. DOE 2006c).	
<b>I. General process equipment</b>								
<b>I.1. Fan</b>								
I.1.1.	<b>High efficiency fan</b>	Replace or retrofit of fans on industrial installations or HVAC	<b>Applicable to high power fans and boosters in industry sector and cooling towers</b>	at least IE3 class efficiency motor or IE2 class + VSD		Short/medium term	Improvement of fans energy efficiency depends on efficiency of electrical motors, implementation of variable speed drive and technological arrangements (blades in fiberglass, plug fans	
<b>I.2. Pump</b>								
I.2.1.	<b>High efficiency pump</b>	Replace or retrofit of pumps on industrial installations or HVAC	<b>Applicable to pumps for ice water networks, and cooling loops, as well as to the pumps for diverse uses in industry.</b>	At least IE 2 class efficiency motor + VSD		Medium/long term	Most of the industrial processes need variable flows of fluids according to the conditions of production; flow variation produced by variable speed drive motor replaces advantageously flow adjustment by control valve in terms of energy efficiency.	
<b>I.3. Heat pump</b>								
I.3.1.	<b>High efficient heat pump</b>	Production of hot water for sanitary or industrial use	<b>For the production of medium-temperature hot water in the industry, and for the production of domestic hot water in hotels and hospitals</b>	COP ≥ 5.10 5 (water to water type) COP ≥ 3.8 (air to water type)	European Heat Pump Association		Production of hot water by heat pump is a competitive alternative in production of hot water by diesel oil boilers. Associated with photovoltaic panels, heat pump can be an alternative in solar water heaters.	
<b>I.4. Sensors and metering</b>								
I.4.1.	<b>Pressure, Temperature, Humidity, Mass flow rate, power, lumens</b>	Optimisation of the equipment's energy use by monitoring	<b>Applicable to all industrial processes and tertiary sector</b>		CE marked ; Compatibility to EN 15500		Appropriate measurement of thermal or hydraulic processes is essential before their energy optimisation.	
<b>J Specific Process equipment</b>								
<b>J.1. Coolrooms, refrigerated showcases and display cabinets</b>								
J.1.1.	<b>High efficiency coolrooms, refrigerated showcases and display cabinets</b>	Reduction of electricity consumption by more efficient new equipment	<b>Applicable to all food stores and food cold rooms</b>	Including reinforced wall and roof insulation, double glazing doors, high efficiency compressors and fans (VSD drive, electronic commuted), high efficiency LED lighting		Short term	Energy savings resulting from effective modern equipment are more than 30% with regard to classic food store equipment.	

J.1.2.	<b>Reinforced wall and roof insulation</b>	Reduction of electricity consumption by retrofit of equipment	<b>Applicable to cold rooms</b>			Medium/Long term	Reinforcing the wall insulation ensures economising over longer periods	
J.1.3.	<b>Night blinds</b>	Reduction of electricity consumption by retrofit of equipment	<b>Applicable to food displays</b>			Short term	The implementation of night-curtains on the displays cooled in positive temperature is an immediately profitable measure.	
<b>K</b>	<b>Renewable Energy</b>							
<b>K.3.</b>	<b>Micro hydroelectricity</b>							
K.3.1.	<b>Hydroelectric turbine</b>	Increase in the production by retrofit or replacement of equipment		Efficiency > 80%	IEC 1116 (Electromechanical equipment Guide for small installations)	Medium/Long term	Total installed capacity ≤ 100kW	
K.3.2.	<b>Generator, Alternator</b>	Increase in the production by retrofit or replacement of equipment		Efficiency > 85%	IEC 60034 IEC 1116 (Electromechanical equipment Guide for small installations)	Medium/Long term		