GLOSSARY OF TERMS – ENERGY EFFICIENCY AND RENEWABLES

AC: Measured in Hertz. Electrical energy which alternates cyclically between positive and negative in polarity. In the UK, this occurs 50 times per second (50 hertz).

Acid Rain: Rain mixed with sulphuric and other acids arising from emissions released during the burning of fossil fuels.

Anaerobic digestion: A biological process that produces a gas principally composed of methane (CH4) and carbon dioxide (CO2) (known as biogas). These gases are produced from organic wastes such as livestock manure, food processing waste, etc. Anaerobic processes could either occur naturally or in a controlled environment. In the controlled environment, the gas is collected and used as a fuel

Ampere (amp): The number of electrons flowing past a given point in an electrical conductor in a given amount of time : this is the electrical current.

Ballast: A device used with electric discharge lamps e.g. fluorescent lamps, to make them operate properly. It is used to start a lamp by providing the high voltage needed to cause an electrical arc to jump from one end of the lamp to the other. Once an arc is established, the ballast maintains the proper, reduced current flow needed to keep the lamp lit.

Biomass and biomass fuels: Organic non-fossil material of biological origin. For example, trees, plants, excreta etc.

Biomass Energy: Energy produced by combusting biomass materials such as wood. The carbon dioxide emitted from burning biomass is only the carbon recently taken in by the organism (e.g. tree) from the atmosphere. Therefore this does not increase total atmospheric carbon dioxide.

Borehole: Any exploratory hole drilled into the Earth or ice to gather geophysical data. In the context of Ground Source Heat Pumps, a vertical hole around 200mm diameter and 70m deep to accommodate a closed loop pipe which is used to extract solar heat from the ground.

BTU: British Thermal Unit - A measure of heat energy; the amount needed to raise the temperature of one pound of water by one degree Fahrenheit.

Capital Costs: Costs associated with the capital or investment expenditures on land, plant, equipment and inventories. Unlike labour and operating costs, are independent of the level of output, (IPCC)

Carbon Dioxide (CO2): The greenhouse gas whose concentration is being most affected directly by human activities. CO2 also serves as the reference to compare all other greenhouse gases (see carbon dioxide equivalents). The major source of CO2 emissions is fossil fuel combustion for heating, transport and electricity generation plus forest clearing, cement production etc. Atmospheric concentrations are now about 30% above pre-industrial levels.

Cathode: In a fluorescent lamp, a wire coil inside the end of the lamp that acts as the terminal for an electric arc.

CFL (Compact fluorescent lamp); Commonly known as an energy-saving lamp. 90% of the electrical energy used is converted to light via a small folded fluorescent tube. Typically they generate 5 times more light than an incandescent (filament) lamp for the same electricity consumption. Many lamps have enclose the tube in a diffused glass bulb in order to give the appearance of a standard incandescent bulb.

Climate: The average weather (usually taken over a 30-year time period) for a particular region and time period. Climate is not the same as weather, but rather, it is the average pattern of weather for a particular region. Weather describes the short-term state of the atmosphere. Climate elements include precipitation, temperature, humidity, sunshine, wind velocity, phenomena such as fog, frost, and hail storms, and other measures of the weather.

Climate Change: (Also referred to as 'global climate change' or ‘global warming’). The term 'climate change' is sometimes used to refer to all forms of climatic inconsistency, but because the Earth's climate is never static, the term is more properly used to imply a significant change from one climatic condition to another. In some cases, climate change' has been used synonymously with the term, 'global warming'; scientists however, tend to use the term in the wider sense to also include natural changes in climate. See also Enhanced Greenhouse Effect.

Climate lag: The delay that occurs in climate change as a result of some factor that changes only very slowly. For example, the effects of releasing more carbon dioxide into the atmosphere may not be known for some time because a large fraction is dissolved in the ocean and only released to the atmosphere many years later.

Closed loop: A type of heating or cooling system in which the heat transfer fluid circulates in a pipe from the heating or cooling components to a heat exchanger where it transfers heat from a space or a storage.

Conservation: The curtailment of water / energy use and doing "less" with less water / energy, for example minimizing lawn watering and vehicle washing in order to conserve water. See also Efficiency.

Cogeneration: The simultaneous production of electrical power and thermal energy from a process, thus reducing any heat or energy lost from the process. Also known as combined heat and power (CHP).

Colour rendering index: A measure of light quality, specifically the shift in surface colour of an object compared with a reference light source of the same colour temperature. The maximum CRI value of 100 is given to incandescent lighting and natural daylight. The closer a lamp's CRI rating is to 100, the better its ability to show true colours to the human eye.

GLOSSARY OF TERMS – ENERGY EFFICIENCY AND RENEWABLES

Colour temperature: A measure of the quality of a light source by expressing the colour appearance correlated with a black body. The temperature refers to the colour objects emit when heated to a certain temperature on the absolute temperature scale. The lower numbers correspond to reddish colours and the higher to blue-white colour.

Combined heat and power (CHP): See Cogeneration

Conductivity: This is the property of a substance and is used in the calculation of heat transfer rates for materials. It is the amount of heat that flows through a specified area and thickness of a material over a specified period of time when there is a temperature difference of one degree between the surfaces of the material. It is also used as a measure of the ability of a material to transmit electrical energy

Conservation: Achieving the use of less energy, either by using more efficient technologies or by changing wasteful habits.

Cost effective: "Cost effective" means that energy savings realized during the life of an energy efficiency measure more than pay for any difference in incremental purchase and installation costs and differences in maintenance as compared to another measure.

Data-logger: An electronic device that gathers data from meters. It can be any type of meter supplying gas, electricity, water or oil as long it has an output that can be connected to the data-logger.

Daylight Linking: Control of lighting by photocell(s), i.e. reducing the light output of a light fitting depending on the availability of natural light.

DC: Electrical energy which does not cyclically alternate in polarity: e.g. electrical energy from a battery or solar cell .

Degree day: A unit for measuring the extent that the outdoor daily average temperature (the mean of the maximum and minimum daily dry-bulb temperatures) falls below (in the case of heating), or falls above (in the case of cooling) an assumed base temperature, normally taken as 65 degrees Fahrenheit, unless otherwise stated. One degree day is counted for each degree below (for heating) or above (in the case of cooling) the base, for each calendar day on which the temperature goes below or above the base.

Emission: A substance discharged into the environment.

Energy: The capacity (of a fuel) to do work.

Energy-efficiency: The ratio of energy input to energy output – often expressed as a percentage i.e. a boiler than is 50% efficient (ratio 2:1) is less efficient than a boiler that is 75% efficient (ratio 3:4).

Energy sources: Primarily they are Fossil fuels, Nuclear or Renewables (solar, wind, geothermal, biomass, hydro, wave).

Fluorescent: The conversion of electric power to visible light by using an electric charge to excite gaseous atoms in a glass tube. These atoms emit ultraviolet radiation that is absorbed by a phosphor coating on the walls of the lamp tube. The phosphor coating produces visible light.

Fossil fuels: Hydrocarbon fuels formed many millions of years ago from decayed plants and animals i.e. oil, coal and natural gas. Can also include other fuels such as petrol or LPG derived from fossil fuels.

Fuel: A material which is consumed, giving up its molecularly stored energy which is then used for other purposes, e.g. to do work (run a machine).

Fuel cell: A device which produces electricity with high efficiency (little heat) by using a fuel and a chemical (commonly hydrogen) which reacts with it (commonly oxygen) at two separate electrical terminals thereby producing electricity.

Geothermal: Heat energy extracted from reservoirs in the earth's crust such as geysers, hot rocks and steam spouts.

Global warming: see climate change

Grey water: Domestic wastewater that does not contain human wastes such as bath, shower, or washing machine water.

Ground Source: With reference to heat pumps - the solar heat stored in the ground.

Groundwater: water that infiltrates into the earth and is stored in usable amounts in the soil and rock below the earth's surface; water within the zone of saturation.

Heat Pump: An electrically-driven compressor that removes a larger volume of low-level heat from one location (source) and transfers it to another location as a smaller volume of higher-grade heat. Using 1kW of electrical energy, a heat pump can deliver 3 to 4kW of heat

Harmonic distortion: Also called "harmonic factor," it is a measure of the extent to which a waveform is distorted by other waveforms. When referring to AC, it is usually expressed as current or voltage "total harmonic distoration2 or THD.

GLOSSARY OF TERMS – ENERGY EFFICIENCY AND RENEWABLES

High pressure sodium: A type of High-Intensity discharge (HID) lamp that uses sodium under high pressure as the primary light-producing element. These high efficiency lights produce a golden white colour usually for industrial lighting.

Heat capacity: The heat required to raise the temperature of a substance one Celsius degree.

Hydro: A prefix meaning produced by or derived from water or the movement of water, as in "hydroelectricity".

Hydroelectric: That generation of electricity which converts the energy of running water into electric power.

Hydro power: Power obtained from the natural movement of masses of water.

Incandescent light: A bulb which uses the ohmic resistance in a conductor to produce light upon the passage of an electrical current through it. The conductor is usually in the form of a wire or filament.

Inverter : A device which changes direct current (DC) into alternating current (AC). Direct current is created by photovoltaic modules or batteries and converted to AC through the use of an inverter.

kBtu: A unit of 1,000 British thermal units.

kW/ton : A ratio of the number of kilowatts of electricity to produce 12,000 Btu of cooling effect.

Kilowatt hour (KWh): see Watt: A unit or measure of electricity supply or consumption of 1,000 Watts over the period of one hour; equivalent to 3,412 Btu therefore can be used to measure the heat energy of fuels such as coal, mains gas, heating oil, petrol etc.

Life Cycle Cost (LCC): The sum of all the costs both recurring and nonrecurring, related to a product, structure, system, or service during its life span or specified time period.

Lighting Controls: Means of controlling the operation of lights

Light emitting diode (LED): A small electronic device that lights up when electricity is passed through it. LEDs are highly energy-efficient and have very long lives.

Low emissivity (low-e): A coating applied to the surface of the glazing of a window to reduce heat transfer through the window.

Light fixture: A complete lighting unit consisting of a lamp(s), housing, and connection to the power circuit.

Low pressure sodium: A discharge lamp in which light is produced by radiation from sodium vapour operating at a low pressure (0.1-1.5 PASCAL's).

Lumens: An empirical measure of the quantity of light emitted from a source, typically used to rate the output of lamps. A lumen is defined as the quantity of incident luminous flux (flow of light) which will, when distributed uniformly over a one square foot surface area, produce an illumination of one foot-candle on every point of the surface. One foot-candle is the equivalent of light output of one candle measured at a distance of one foot from the centre of the flame.
Lumens per watt : A measure of the efficacy (efficiency) of lamps. It indicates the amount of light (lumens) emitted by the lamp for each unit of electrical power (Watts) used.

Mbtu: A unit of one million British thermal units (Btu).

Mercury vapour: A high-intensity discharge lamp that uses mercury as the primary light-producing element. Includes clear, phosphor coated, and self-ballasted lamps.

Nuclear fission: Atomic nuclear processes which involve the splitting of nuclei with the accompanying release of energy.

Nuclear fuel: Energy derived from atomic nuclear processes during the fission or fusion.

Nuclear fusion: Atomic nuclear processes which involve the fusing of nuclei with an accompanying release of energy.

Open loop: A heating or cooling system, such as a solar water heater or ground source heat pump, in which the working fluid is heated or cooled and used directly, not returning to the heating device.

Payback: The amount of time required (usually in years) for positive cash flows to equal the total investment costs. This is often used to describe how long it will take for energy savings resulting from using more energy-efficient equipment.

Photo, photo-electric, or solar-cell: A thin sandwich of silicon-based materials that generate an electrical charge when exposed to light.

Photovoltaics (PV): A means of electricity generation using photo-electric cells

PIR Sensor: Pasive Infra-Red sensor which detects the movement of warm objects

GLOSSARY OF TERMS – ENERGY EFFICIENCY AND RENEWABLES

Potable water: Water that is suitable for drinking, as defined by local health officials.

Renewable resource: A resource or substance that can be replenished via natural or artificial means e.g. trees or wind.

Rapid start ballast: A ballast that provides a low-voltage winding for preheating the electrodes and initiating the arc without a starting switch or the application of high voltage.

Renewable energy: Energy from sources that cannot be used up: sunshine, water flow, wind and vegetation.

Renewable energy devices: Solar collectors, wind machines, hydroelectric turbines, etc. are typical examples.

Solar cell: See Photo cell.

Solar cooling: The use of devices which absorb sunlight to operate systems similar to gas-fired refrigerators.

Solar electricity: Electricity produced directly by action of sunlight.

Solar greenhouse: A conventional greenhouse in which mass is added for heat storage, double glazing is used, and the north side is attached to a house or beam.

Solar heating: Processes, active or passive, which derive and control heat directly from the sun.

Solar panel: A cover-all term used to describe a solar water-heating system or a solar electricity-generating system.

Solar process heat: The use of sunlight to drive industrial processes directly.

Surface water: Precipitation that does not soak into the ground or return to the atmosphere by evaporation or transpiration. It is stored in streams, lakes, rivers, ponds, wetlands, oceans, and reservoirs.

Ultrasonic: Transmission of sound waves above the range of human hearing, i.e. above 20,000 cycles per second.

Ultraviolet: Electromagnetic radiation in the wavelength range of 4 to 400 nanometres.

Uninterruptible power: Electrical power supported by a battery backup power supply which remains fully charged and automatically switched to provide power in the event of failure of utility power supply.

U-Value: The heat transfer coefficient of a material or an assembly of materials. It is measured in terms of Btu per hour, per square foot of area, per degree of temperature difference across the material. The reciprocal of the U-value is the thermal resistance of the R-Value. The lower the U-Value number, the greater the heat transfer resistance (insulating) characteristics of the material or assembly of materials.

Wastewater: Water that has been used for domestic or industrial purposes.

Water conservation: practices which reduce water use.

Water Saving Taps: These in general operate in two ways, by either restricting the water flow out of the tap spout or by controlling the amount of time the tap is open for. The latter are generally called push taps but are also referred to as percussion taps or self closing taps.

Water table: The upper surface of the zone of saturation of groundwater.

Watt: The rate of energy transfer equivalent to one ampere under an electrical pressure of one volt. One watt equals 1/746 horsepower, or one joule per second. It is the product of Voltage and Current (amperage).