

Constructing A Simple And Inexpensive Recirculating

Autonomous building

houses are a small heat pump, which also provides air conditioning, or a central hydronic (radiator) air heater with water recirculating from the water

An autonomous building is a hypothetical building designed to be operated independently from infrastructural support services such as the electric power grid, gas grid, municipal water systems, sewage treatment systems, storm drains, communication services, and in some cases, public roads. The literature mostly refers to housing, or the autonomous house.

Advocates of autonomous building describe advantages that include reduced environmental impacts, increased security, and lower costs of ownership. Some cited advantages satisfy tenets of green building, not independence per se (see below). Off-grid buildings often rely very little on civil services and are therefore safer and more comfortable during civil disaster or military attacks. For example, off-grid buildings would not lose power or...

Solar air conditioning

convection (advection). A desiccant like calcium chloride can be mixed with water to create a recirculating waterfall that dehumidifies a room using solar thermal

Solar air conditioning, or "solar-powered air conditioning", refers to any air conditioning (cooling) system that uses solar power.

This can be done through passive solar design, solar thermal energy conversion, and photovoltaic conversion (sunlight to electricity). The U.S. Energy Independence and Security Act of 2007 created 2008 through 2012 funding for a new solar air conditioning research and development program, which should develop and demonstrate multiple new technology innovations and mass production economies of scale.

Hydroponics

water is released over the plant's roots and then runs back into the reservoir below in a constantly recirculating system. As with deep water culture, there

Hydroponics is a type of horticulture and a subset of hydroculture which

involves growing plants, usually crops or medicinal plants, without soil, by using water-based mineral nutrient solutions in an artificial environment. Terrestrial or aquatic plants may grow freely with their roots exposed to the nutritious liquid or the roots may be mechanically supported by an inert medium such as perlite, gravel, or other substrates.

Despite inert media, roots can cause changes of the rhizosphere pH and root exudates can affect rhizosphere biology and physiological balance of the nutrient solution when secondary metabolites are produced in plants. Transgenic plants grown hydroponically allow the release of pharmaceutical proteins as part of the root exudate into the hydroponic medium.

The nutrients...

Evaporative cooler

pot-in-pot refrigerators, are simple and inexpensive ways to keep vegetables fresh without the use of electricity. Several hot and dry regions throughout the

An evaporative cooler (also known as evaporative air conditioner, swamp cooler, swamp box, desert cooler and wet air cooler) is a device that cools air through the evaporation of water. Evaporative cooling differs from other air conditioning systems, which use vapor-compression or absorption refrigeration cycles. Evaporative cooling exploits the fact that water will absorb a relatively large amount of heat in order to evaporate (that is, it has a large enthalpy of vaporization). The temperature of dry air can be dropped significantly through the phase transition of liquid water to water vapor (evaporation). This can cool air using much less energy than refrigeration. In extremely dry climates, evaporative cooling of air has the added benefit of conditioning the air with more moisture for the...

Pump

pumps are relatively inexpensive and can perform a wide variety of duties, from pumping air into an aquarium, to liquids through a filter press. Double-diaphragm

A pump is a device that moves fluids (liquids or gases), or sometimes slurries, by mechanical action, typically converted from electrical energy into hydraulic or pneumatic energy.

Mechanical pumps serve in a wide range of applications such as pumping water from wells, aquarium filtering, pond filtering and aeration, in the car industry for water-cooling and fuel injection, in the energy industry for pumping oil and natural gas or for operating cooling towers and other components of heating, ventilation and air conditioning systems. In the medical industry, pumps are used for biochemical processes in developing

and manufacturing medicine, and as artificial replacements for body parts, in particular the artificial heart and penile prosthesis.

When a pump contains two or more pump mechanisms...

Technological and industrial history of Canada

about 1650 to 1750, both urban and rural, were simple wooden structures. Wood was inexpensive, readily available and easily worked by most residents

The technological and industrial history of Canada encompasses the country's development in the areas of transportation, communication, energy, materials, public works, public services (health care), domestic/consumer and defense technologies. Most technologies diffused in Canada came from other places; only a small number actually originated in Canada. For more about those with a Canadian origin, see Invention in Canada.

The terms chosen for the "age" described below are both literal and metaphorical. They describe the technology that dominated the period in question but are also representative of a large number of other technologies introduced during the same period. Also of note is the fact that the period of diffusion of a technology can begin modestly and can extend well beyond the "age..."

Aquaculture

needed] Recirculating aquaculture systems (RAS) recycle water by circulating it through filters to remove fish waste and food and then recirculating it back

Aquaculture (less commonly spelled aquiculture), also known as aquafarming, is the controlled cultivation ("farming") of aquatic organisms such as fish, crustaceans, mollusks, algae and other organisms of value such as aquatic plants (e.g. lotus). Aquaculture involves cultivating freshwater, brackish water, and saltwater populations under controlled or semi-natural conditions and can be contrasted with commercial fishing, which is the harvesting of wild fish. Aquaculture is also a practice used for restoring and rehabilitating marine and freshwater ecosystems. Mariculture, commonly known as marine farming, is aquaculture in seawater habitats and lagoons, as opposed to freshwater aquaculture. Pisciculture is a type of aquaculture that consists of fish farming to obtain fish products as food...

Solar thermal energy

designed primarily for space heating. They recirculate building air through a solar air panel where the air is heated and then directed back into the

building

Solar thermal energy (STE) is a form of energy and a technology for harnessing solar energy to generate thermal energy for use in industry, and in the residential and commercial sectors. Solar thermal collectors are classified by the United States Energy Information Administration as low-, medium-, or high-temperature collectors. Low-temperature collectors are generally unglazed and used to heat swimming pools or to heat ventilation air. Medium-temperature collectors are also usually flat plates but are used for heating water or air for residential and commercial use.

High-temperature collectors concentrate sunlight using mirrors or lenses and are generally used for fulfilling heat requirements up to 300 °C (600 °F) / 20 bar (300 psi) pressure in industries, and for electric power production...

Ex vivo

pressure and continuously recirculating the medium, the apparatus proved that long-term organ maintenance outside the body was feasible and laid the groundwork

Ex vivo (Latin for 'out of the living') refers to biological studies involving tissues, organs, or cells maintained outside their native organism under controlled laboratory conditions. By carefully managing factors such as temperature, oxygenation, nutrient delivery, and perfusing a nutrient solution through the tissue's vasculature, researchers sustain function long enough to conduct experiments that would be difficult or unethical in a living body. Ex vivo models occupy a middle ground between in vitro (lit. 'in the glass') models, which typically use isolated cells, and in vivo (lit. 'in the living') studies conducted inside living organisms, offering both experimental control and physiological relevance.

Ex vivo platforms support pharmacologic screening, toxicology testing, transplant...

Laser

the medium is larger than the resonator losses, then the power of the recirculating light can rise exponentially. But each stimulated emission event returns

A laser is a device that emits light through a process of optical amplification based on the stimulated emission of electromagnetic radiation. The word laser originated as an acronym for light amplification by stimulated emission of radiation. The first laser was built in 1960 by Theodore Maiman at Hughes Research Laboratories, based on theoretical work by Charles H. Townes and Arthur Leonard Schawlow and the optical amplifier patented by Gordon Gould.

A laser differs from other sources of light in that it emits light that is coherent. Spatial coherence allows a laser to be focused to a tight spot, enabling uses such as optical communication, laser cutting, and lithography. It also allows a laser beam to stay narrow over great distances (collimation), used in laser pointers, lidar, and free...

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