

# APPLICATION OF SUSTAINABLE TECHNOLOGIES IN PERMACULTURE

## Overview of sustainable technology in permaculture

- The '7 domains of permaculture' identifies 'Tools and Technology' as one of the main domains of permaculture.
- Technology can be defined as 'The application of scientific knowledge for practical purposes'
- Permaculture is about implementing solutions, all technologies are assemblies that orchestrate phenomena to some purpose (Arthur, 2009).
- Sustainable technology relies on resources that are either renewable or so abundant that we can treat them as such.
- Technology is often thought of as modern but includes the use of tools by early humans - such as stone axes and flints



## Types of technology

Technologies can be divided into two main groups:

**Hard technologies** - Those capable of functioning with minimal human input - such as a television or a fridge-freezer.

**Soft technologies** - Those which require significant human input to function such as spades or scythes.

*The application of technology to support the natural environment must be done in a way which is planned and carried out in a sustainable way. Carried out well, the use of technologies supports successful implementation of permaculture principles.*

Technology can be detrimental to the environment so it's important to fully consider the costs and benefits.

<b>Benefit</b>	<b>Cost</b>
How does it help us?	What energy is used to produce it?
Does it save resources elsewhere? Perhaps off-site?	What energy is used to run it?
Does it save transportation?	Does it's production generate waste?

The decision to use a technology should be based on an understanding of the full life-cycle of production and use, often referred to as it's 'embodied energy', this considers the energy used from mining or harvesting the materials, through use and to its eventual recycling or disposal. It can be difficult to get a complete understanding of the embodied energy of a technology, especially for more complex items which may contain multiple components, each with their own manufacturing processes. However, we should consider the trade off between costs and benefit and also consider these factors:

- How long will it last?
- How much waste will be generated when it breaks?
- Can it be recycled?

## **Applications**

The uses of technology in permaculture are almost infinite, but some of the more common examples are given below.

**Hand tools:** Used to cultivate the environment and to reduce waste by maintaining equipment.

**Bicycles:** Allowing the transportation of people and goods using human power.

**Efficient & low pollution wood stoves:** Using local resources instead of distant ones to cut down on transmission losses and inefficiencies.

**Fuels from organic wastes:** For equipment and transportation.

**Co-generation:** Use of fuel to generate electricity and provide heat for on-site use.

**Renewables:** To provide electricity / energy without using fossil fuels and with low or zero emissions.

## Chicken, weeds, worm tower - Closed cycle hen house

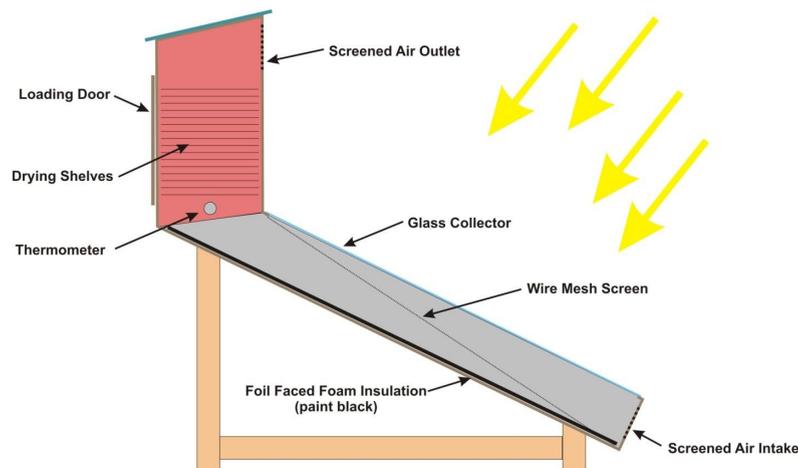


(N.B. A Quoll is species of marsupial native to Australia)

The “chicken, weeds, worm tower” was invented in 1996 by April Sampson Kelly. The system is designed to be a small ecosystem with little external input. It creates a small cycle of nutrients which allows it to be relatively self sufficient (when compared to a traditional hen house). The system uses rainwater harvesting to support both the chickens and the weeds. The manure from the chickens feeds worms at the lowest level who, create compost which supports the growth of weeds. The chickens can then eat the weeds as well as use it for bedding, making the system mostly self-supporting.

(Source: <http://www.permaculturevisions.com/our-chickens-weeds-worms-tower-system>)

## Solar dehydrator - Method of food preservation



The solar dehydrator is a method of food preservation which is very energy efficient and utilises passive solar gains. "Evidence shows that Middle East and oriental cultures actively dried foods as early as 12,000 B.C" (Source: [http://nchfp.uga.edu/publications/nchfp/factsheets/food\\_pres\\_hist.html](http://nchfp.uga.edu/publications/nchfp/factsheets/food_pres_hist.html)) . No electricity is required, the glass collector heats air drawn in at the base, warm air then flows from the top of the collector into a wooden chamber, within this chamber drying shelves support the food to be preserved, the hot air evaporates the water contained within the food, the evaporated moisture leaves the chamber via a vent. Once the moisture content has been lowered, the food will take much longer to spoil and thus will be preserved for all year round use.

## Smart Meters



Smart meters display information on electricity and gas usage. They enable the user to get a thorough understanding of their household energy use which can help them to do a thorough permaculture redesign and to understand the financial cost of electricity usage. They can also help the user to use their appliances in the most environmentally friendly way, for example, using higher wattage appliance at midday, when the energy from solar is at its highest.

## REFERENCES

Permaculture Visions, Permaculture Flower - The seven domains of permaculture action. *Permaculture Principles*. Available at: <https://permacultureprinciples.com/flower> [Accessed January 19, 2018].

Arthur, W. B. (2009). *The Nature of Technology: what it is and how it evolves*. New York, USA: Free Press.

Permaculture Visions, Hard and Soft Technologies. *Permaculture Visions*. Available at: <http://www.permaculturevisions.com/hard-soft-technologies> [Accessed January 19, 2018].

National Center for Home Food Preservation. *National Center for Home Food Preservation*. Available at: <http://nchfp.uga.edu> [Accessed January 19, 2018].

## READ MORE

The Earth Care Manual: A Permaculture Handbook for Britain and Other Temperate Climates: A Permaculture Handbook for Britain and Other Temperate Countries, Patrick Whitefield (ISBN: 9781856230216)

Small Is Beautiful: A Study of Economics as if People Mattered, E. F. Schumacher (ISBN: 9780099225614)

Centre for Alternative Technology short course: [courses.cat.org.uk](http://courses.cat.org.uk)

Permaculture Association Knowledgebase: [knowledgebase.permaculture.org.uk/practical-solutions/tools-and-technology](http://knowledgebase.permaculture.org.uk/practical-solutions/tools-and-technology)

Sustainable Earth Technologies: [www.sustainable.com.au](http://www.sustainable.com.au)

### **More permaculture projects from around the world**

Practical Action: <https://practicalaction.org>

Centre for Alternative Technology:  
<http://www.cat.org.uk/index.html>

By Shane Kelly