

LECTURE 11

DETERMINING A SUSTAINABLE APPROACH (CONT'D)

4) Transport

Human powered-vehicles include the bicycle, which provides general-purpose, human-powered transport at a lower cost of ownership than motorized vehicles, with many gains over simply walking, and the whirlwind wheelchair, which provides mobility for disabled people who cannot afford the expensive wheelchairs used in developed countries. Animal powered vehicles/transport may also be another appropriate technology.

Certain zero-emissions vehicles may be considered appropriate transportation technology, including compressed air cars, liquid nitrogen and hydrogen-powered vehicles. Bicycles can also be applied to commercial transport of goods to and from remote areas. An example of this is Karaba, a free-trade coffee co-op in Rwanda, which uses 400 modified bicycles to carry hundreds of pounds of coffee beans for processing. Other projects for developing countries include the redesign of cycle rickshaws to convert them to electric power.

5) Sanitation

As of 2006, waterborne diseases are estimated to cause 1.8 million deaths each year, marking the importance of proper sanitation systems. It is clear that the developing world is heavily lacking in proper public sanitation and that solutions as sewerages (or alternatively small-scale treatment systems) need to be provided. Ecological sanitation can be viewed as a three-step process dealing with human excreta: (1) Containment, (2) Sanitization, (3) Recycling. The objective is to protect human health and the environment while limiting the use of water in sanitation systems for hand (and anal) washing only and recycling nutrients to help reduce the need for synthetic fertilizers in agriculture.

Small scale systems include:

Composting toilets are the most environmental form of excrement disposal systems. In addition, the toilets design allows the nutrients to be reused (e.g. for fertilising food crops). Also, Do It Yourself composting toilets can be build at a very low cost.

BiPu is a portable system suitable for disaster management, while other forms of latrine provide safe means of disposing of human waste at a low cost. The Orangi Pilot Project was designed based on an urban slum's sanitation crisis.

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Treatment ponds and constructed wetlands can help to purify sewage and greywater. They consist mostly of plants (e.g. reed) and therefore require only little power, and are hugely self-sufficient.

Certain other options as Slow sand filters, UV filters, ... may also be employed

6) Lighting

White LED and a source of renewable energy (such as solar cells) are used by the Light Up the World Foundation to provide lighting to poor people in remote areas, and provide significant benefits compared to the kerosene lamps which they replace. Certain other companies as Powerplus also have LED-flashlights with imbedded solar cells.

Organic LEDs made by roll-to-roll production are another source of cheap light that will be commercially available at low cost by 2015. Compact fluorescent lamps (as well as regular fluorescent lights and LED-lightbulbs) can also be used as appropriate technology. Although they are less environmentally friendly than LED-lights, they are cheaper and more efficient than incandescent lights. The Safe bottle lamp is a safer kerosene lamp designed in Sri Lanka. Lamps as these allow relative long, mobile, lighting. The safety comes from a secure screw-on metal lid, and two flat sides which prevent it from rolling if knocked over. An alternative to fuel or oil-based lanterns is the Uday lantern, developed by Philips as part of its Lighting Africa project (sponsored by the World Bank Group).

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The Faraday flashlight is a LED flashlight which operates on a capacitor. Recharging can be done by manual winching or by shaking, hereby avoiding the need of any supplementary electrical system. HID-lamps finally can be used for lighting operations where regular LED-lighting or other lamps will not suffice. Examples are car headlights. Due to their high efficiency, they are quite environmental, yet costly, and they still require polluting materials in their production process.

7) Food production

Food production has often been included in autonomous building/community projects to provide security. Skilled, intensive gardening can support an adult from as little as 15 square meters of land. Some proven intensive, low-effort food-production systems include urban gardening (indoors and outdoors). Indoor cultivation may be set-up using hydroponics with Grow lights, while outdoor cultivation may be done using permaculture, forest gardening, no-till farming, Do Nothing Farming, etc. In order to better control the irrigation outdoors, special irrigation systems may be created as well (although this increases costs, and may again open the door to cultivating non-indigenous plants; something which is best avoided). Crop production tools are best kept simple (reduces operating difficulty, cost, replacement difficulties and pollution, when compared to motorized equipment). Tools can include scythes, animal-pulled plows (although no-till farming should be preferred), dibbers, wheeled augers (for planting large trees), kirpis, hoes. Greenhouses are also sometimes included (see Earthship Biotincture). Sometimes they are also fitted with irrigation systems, and/or heat sink-systems which can respectively irrigate the plants or help to store energy from the sun and redistribute it at night (when the greenhouse starts to cool down).

8) Food preparation

According to proponents, Appropriate Technologies can greatly reduce the labor required to prepare food, compared to traditional methods, while being much simpler and cheaper than the processing used in Western countries. This reflects E.F. Schumacher's concept of "intermediate technology," i.e. technology which is significantly more effective and expensive than traditional methods, but still an order of magnitude (10 times) cheaper than developed world technology. Key examples are: the Malian peanut shelle,the fonio husking machine ,the screen less hammer

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mill. All other types of electrical or hand-operated kitchen equipment (grinders, cutters) Special multifunctional kitchen robots that are able to perform several functions (e.g. grinding, cutting, and even vacuum cleaning and polishing) are able to reduce costs even more. Examples of these devices were e.g. the (now discontinued) Piccolo household appliance from Hammelmann Werke (previously based in Bad Kissingen.) It was equipped with a flexible axis, allowing a variety of aids to be screwed on

9) Cooking

Solar cookers are appropriate to some settings, depending on climate and cooking style. They are emission-less and very low-cost. Hybrid variants also exist that incorporate a second heating source such as electrical heating or wood-based. Hot plates are 100% electrical, fairly low cost (around 20€) and are mobile. They do however require an electrical system to be present in the area of operation. Rocket stoves and certain other wood stoves (e.g. Philips Woodstove) improve fuel efficiency, and reduce harmful indoor air pollution. The stoves however still make use of wood. However, briquette makers can now turn organic waste into fuel, saving money and/or collection time, and preserving forests.