

Sustainable Checklist

Environmentally Sustainable Design and Construction Checklist for the Design Professional & Owner

Green Building Technology can help make buildings more efficient and environmentally responsive while reducing physical demands on the planet.

Environmentally responsive development can significantly improve the comfort, aesthetics, resource efficiency and value of properties while reducing pollution and saving money.

The following is a checklist extracted from Environmental Building News. We hope you will find this information useful.

The Design Process

Small is better:

- Optimize use of interior spaces through careful design so that the overall building size and resource use in construction and future operations, are kept to a minimum.

Design buildings to use renewable energy:

- Use high levels of insulation, high performance windows, and tight construction. In warm climates, choose glazings with low solar heat gain.

Passive solar heating, daylighting, and natural cooling can be incorporated cost effectively into most buildings. Also consider solar water heating and photovoltaics-or design buildings for future panel installation. If wood heating is an option, specify low-emission wood stove or pellet stove.

Optimize material use:

- Minimize waste by designing for standard sizes. Avoid waste from structural over-design (use optimum-value engineering/ advanced framing).

Design water-efficient, low maintenance landscaping (sustainable landscapes):

- Conventional lawns have a high impact because of water use, pesticide use, and pollution generated from mowing. Landscape with drought resistant native plants and perennial ground covers.

Make it easy for occupants to recycle waste:

- Make provisions for storage and processing of recyclables: recycle bins near the kitchen, under sink door mounted bucket with lid for food waste, etc.

Look into the feasibility of gray water and roof top water catchment systems:

- Water that has been used for bathing, dish washing, or clothes washing can be used for flushing toilets or irrigation. If current codes prevent graywater recycling, consider designing the plumbing for future water adaption. Rooftop water catchment for outdoor watering should be considered in many regions.

Design for future reuse:

- Make the structure adaptable to other uses, and choose materials and components that can be reused or recycled.

Avoid potential health hazards: radon, EMF, pesticides:

- Follow recommend practices to minimize radon entry into the building and provide for future mitigation if necessary. Plan electrical wiring and placement of electrical equipment to minimize electromagnetic field exposure. Design insect resistant detailing that will require a minimal use of pesticides.

The Site

Renovate older buildings:

- Conscientiously renovating existing buildings is the most sustainable construction.

Evaluate site resources:

- Early in the siting process carry out a careful site evaluation: solar access, soils, vegetation, important natural areas, etc.

Locate buildings to minimize environmental impact:

- Cluster buildings or build attached units to preserve open space and wildlife habitats, avoid especially sensitive areas including wetlands, and keep roads and service lines short. Leave the most pristine areas untouched, and look for areas that have been previously damaged to build on.

Pay attention to solar orientation:

- Reduce energy use by orientating buildings to make optimal use of passive solar heating, daylighting, and natural cooling.

Situate buildings to benefit from existing vegetation:

- Trees on the east and west sides of a building can dramatically reduce cooling loads. Hedge rows and shrubbery can block cold winter winds or help channel cool summer breezes into the building.

Minimize transportation requirements:

- Locate buildings to provide access to public transportation, bicycle paths, and walking access to basic services. Commuting can also be reduced by working at home. Consider home office needs with layout and wiring.

Materials

Avoid ozone-depleting chemicals in mechanical equipment and insulation:

- CFC's have largely been phased out, but their primary replacements, HCFC's, also damage the ozone layer and should be avoided where possible. Reclaim CFC's when servicing or disposing of equipment, and if possible, take CFC based foam insulation to a recycler who can capture CFC's.

Use durable products and materials:

- Because manufacturing is very energy-intensive, a product that lasts longer or requires less maintenance usually saves energy. Durable products also contribute less to our solid waste problems.

Choose building materials with low embodied energy:

- One estimate of the relative energy intensity of various materials (by weight) is as follows: Lumber=1 Brick =2 Cement =2 Glass =3 Fiberglass + 7 Steel =8 Plastic =30 Aluminum = 80

Buy locally produced building materials:

- Transportation is costly in both energy use and pollution generation. Look for locally produced materials (local softwoods or hardwoods, for example) to replace products imported to your area.

Consider using alternative building materials either alone or in combination with traditional materials:

- Explore the possibility of building with rammed earth technology or straw bale construction. Explore steel frame & composite beam construction. Often the combined techniques are overlooked in favor of one alternative. Perhaps the use of rammed earth for solar massing can be utilized in the design in conjunction with traditional building materials.

Used salvaged building materials when possible:

- Reduce landfill pressure and save natural resources by using salvaged materials: lumber, millwork, certain plumbing fixtures, and hardware, for example. Make sure these materials are safe and don't sacrifice energy efficiency or water efficiency by reusing old windows or toilets.

Minimize old growth timber:

- Avoid lumber products produced from old-growth timber when acceptable alternatives exist. You may not need clear narrow-grained cedar or redwood siding, for example, when using opaque stain or paint as long as proper detailing is used to avoid rot. Laminated wood timbers can be substituted for old growth Douglas fir. Don't buy tropical hardwoods unless the seller can document that the wood comes from well managed forests.

Avoid materials that will offgas pollutants:

- Solvent based finishes, adhesives, carpeting, particle board, and many other building products release formaldehyde and volatile organic compounds (VOC's) into the air. These chemicals can effect workers' and occupants' health as well as contribute to smog and ground-level ozone pollution outside.

Minimize the use of pressure treated lumber:

- Use detailing that will prevent soil contact and rot. Where possible, use alternatives such as recycled plastic lumber. Take measures to protect workers when cutting and handling pressure treated wood, and never burn the scraps.

Minimize packaging waste:

- Avoid excess packaging, such as plastic wrapped plumbing fixtures or fasteners that aren't available in bulk. Tell your supplier why you are avoiding over packaged products. Keep in mind, however, that some products must be carefully wrapped to prevent damaged and resulting waste.

Equipment

Install high efficiency heating and cooling equipment:

- Well designed high efficiency furnaces, boilers, and air conditioning (and distribution systems) not only save the building occupants money, but also produce less pollution during operation. Install equipment with minimal risk of combustion gas spillage, such as sealed combustion appliances.

Install high efficiency lights and appliances:

- Fluorescent lighting has improved dramatically in recent years and is now

suitable for homes. High efficiency appliances offer both economic and environmental advantages over their conventional counterparts.

Install water efficient equipment:

- Water conserving toilets, showerheads, and faucet aerators not only reduce water use, they also reduce demand on septic systems or sewage treatment plants. Reducing hot water use also saves energy.

Install mechanical ventilation equipment:

- Mechanical ventilation is usually required to ensure safe, healthy indoor air. Heat recovery ventilators are preferred in cold climates because of energy savings, but simpler, less expensive exhaust only ventilation systems are also adequate.

On the Job Site

Protect trees and topsoil during site work:

- Protect trees from damage during construction by fencing off the "drip line" around them and avoiding major changes to surface grade.

Avoid use of pesticides and other chemicals that may leach into the groundwater:

- Look into less toxic termite treatments, and keep exposed frost walls free from obstruction to discourage insects. When backfilling a foundation or grading around a house, do not bury construction debris.

Minimize job waste:

- Centralize cutting operations to reduce waste and simplify sorting. Set up clearly marked bins or trash cans for different types of usable waste (wood scraps for kindling, sawdust for composting, cans, glass and paper for typical recycling). Find out where different materials can be taken for recycling, and educate your crew and subs about recycling.

Make your business operations more environmentally responsible:

- Make your office as energy efficient as possible, purchase energy efficient vehicles, arrange carpool to job sites, and schedule site visits and errands to minimize unnecessary driving. In your office, purchase recycled office paper and supplies, recycle office paper, use coffee mugs instead of disposable cups. On the job, recycle beverage container.