

# CHECKLIST FOR LIFECYCLE DESIGN & DESIGN FOR ENVIRONMENT

## **Steps to Get Started with Life Cycle (LC) and Design for Environment (DfE)**

- ☐ **Introduce the concepts.** Often, implementation of environmental efforts starts with a small, self-motivated “green team” that gains recognition and greater authority over time. The idea is to eventually secure management commitment to LC analysis and design for environment DfE; and incorporate the concepts in your company policies or environmental management system
- ☐ **Educate cross-functional staff on the basics of LC and DfE;** make plans for more in-depth training as time and budget allows. Learn from available case studies on LC and DfE projects. Search the web for LC and DfE projects for your industry sector or product. Also review:
  - Environmental Protection Agency (EPA) National Risk Management Research Lab  
(URL: [www.epa.gov/ORD/NRMRL/lcaccess/resources.htm](http://www.epa.gov/ORD/NRMRL/lcaccess/resources.htm) - go to “Software and Databases”)
  - LCA Links (URL: [www.life-cycle.org](http://www.life-cycle.org) - go to “Companies Using LCA”)

## **Activities to Enhance and Build on a DfE/LifeCycle Initiative**

- ☐ **Establish cross-functional teams,** including manufacturing managers and material handling personnel, in evaluating LC impacts and applying DfE and LC design for new or existing products and processes. Specific DfE and LC opportunities in premanufacture and design, manufacture, distribution and packaging, and end of life, are listed on the next page.
- ☐ **Influence your supply chain** (and your customers): Give suppliers responsibility for meeting environmental standards for the products you purchase from them
- ☐ **Utilize some of the interactive and software tools** available for more ideas and opportunities
  - Go to EPA's National Risk Management Research Lab for a lengthy list of available tools  
(URL: [www.epa.gov/ORD/NRMRL/lcaccess/resources.htm](http://www.epa.gov/ORD/NRMRL/lcaccess/resources.htm) - go to “Software and Databases”)
  - Score your product or process using 58 questions in the DfE Toolkit matrix by Minnesota Office of Environmental Assistance (URL: [www.moea.state.mn.us/berc/dfetoolkit.cfm](http://www.moea.state.mn.us/berc/dfetoolkit.cfm))
  - Perform a Cleaner Technologies Substitutes Assessment  
(URL <http://www.epa.gov/opptintr/dfe/pubs/tools/ctsa/index.html>)
- ☐ **If your program involves takeback or leasing returns,** incorporate information gleaned on disassembly techniques and inefficiencies resolved during the recycling/recovery process back into new product design
- ☐ **Measure, document and publicize** results

# **CHECKLIST FOR LIFECYCLE DESIGN & DESIGN FOR ENVIRONMENT**

## **(Continued)**

Specific DfE and LC opportunities in premanufacture, manufacture, distribution and packaging, and end of product life

### **Premanufacture Design Considerations**

- ✓ Minimize soil and ecological disturbance related to all process and product inputs
- ✓ Design for disassembly, remanufacture, reuse, and recycle:
  - Minimize dissimilar materials and number of components
  - Use interchangeable parts; Identify materials;
  - Do not use incompatible inks or surface treatments
  - Make hazardous parts components easily detachable
  - Make disassembly easy and efficient; Minimize disposable components
- ✓ Minimize volume and weight
- ✓ Incorporate recovered materials
- ✓ Use low-energy materials and processes
- ✓ Avoid hazardous or toxic materials and constituents
- ✓ Consider transport implications of supplies, raw materials, the product and packaging
  - lightweighting
  - volume reduction
  - local purchase
- ✓ Product use & maintenance features such as enhanced durability, operation without oil, battery, chemicals or other consumables, and minimizing energy and water consumption

### **Product Manufacture**

- ✓ Minimize chemical usage and associated waste or emissions (Of special concern are heavy metals, toxic chemicals and those linked to global warming and ozone depletion)
- ✓ Minimize surface treatments; use low-VOC, or water or vegetable based coatings, inks, etc.
- ✓ Minimize energy- and water-intensive manufacturing processes
- ✓ Maximize energy and water recovery
- ✓ Minimize and/or reclaim effluent and process discharge
- ✓ Minimize and/or reuse scrap
- ✓ Follow spill prevention and secondary containment procedures

### **Distribution & Packaging**

- ✓ Utilize environmental packaging and materials, including reusable, bulk and non-hazardous
- ✓ Ask suppliers to minimize packaging
- ✓ Minimize volume, weight, and different material types
- ✓ Identify different types of packaging material
- ✓ Organize and use efficient (means of) transportation
- ✓ Prevent hazardous spills during transport

### **End of Life**

- ✓ Maximize material and part recovery opportunities
- ✓ Avoid gaseous, liquid, or leachable releases from any portion of the product that requires disposal