



The Business-NGO Working Group promotes the creation and adoption of safer chemicals and sustainable materials in a way that supports market transitions to a healthy economy, healthy environment, and healthy people.

## BizNGO Chemical Alternatives Assessment Protocol (v.1.0)

### How to Select Safer Alternatives to Chemicals of Concern to Human Health or the Environment

#### EXECUTIVE SUMMARY

**M**anufacturers are under increasing pressure from governments and consumers to reduce the environmental and human health impacts of their products. Of particular interest to BizNGO participants is the growing concern with the presence of toxic chemicals in products. To meet market demands, stay ahead of regulations, reduce costs, and create innovative and inherently safer products, manufacturers are designing new products and redesigning existing products to be as benign to human health and the environment as possible.

The *BizNGO Chemical Alternatives Assessment Protocol* is a decision framework for substituting chemicals of concern to human health or the environment with safer alternatives. It describes a process for identifying alternatives to a chemical of concern, screening out equally hazardous alternatives, and selecting an alternative that is technically and economically viable and does not have the potential for causing significant environmental or human health impacts.

The Protocol is especially designed for helping to make business decisions, although it may be applicable

to government decision making as well. The Protocol highlights the unique role and value of chemical hazard assessment in relation to other approaches for addressing concerns with chemicals in products, including risk assessment and life cycle assessment. Reducing the inherent hazard of a chemical is an integral principle of Green Chemistry, and this focus on hazard assessment is reflected in the Protocol.

Three principles, which BizNGO participants apply when evaluating and selecting alternatives to chemicals of concern, shape the design of the Protocol:

- Comparative chemical hazard assessments are essential to identifying a safer alternative—one that is less hazardous to human health or the environment than the chemical of concern.
- Life cycle assessments and risk assessments are not always essential to selecting a safer alternative—their role will vary depending on the alternative under consideration.
- The selection of an alternative shall not trade increased toxicity for other life cycle benefits, such as a reduced carbon footprint.

These principles are the foundation of the seven steps of the BizNGO Chemical Alternatives Assessment Protocol, which is depicted in the figure.

**Step 1. Chemicals of concern are the entry point into the alternatives assessment protocol.** Government regulations, market demands, and internal company practices are all triggers for identifying chemicals of concern.

**Steps 2 and 3. Characterizing the function of a chemical in a product is essential to identifying alternatives.** A business needs to know why the chemical is in the material or product to know the universe of potential alternatives. If flame retardancy is the function, then viable alternatives can be identified that range from product redesign—avoid the need for a flame retardant—to material or chemical substitution.

**Step 4. Chemical hazard assessments are critical for alternatives assessment because they screen out alternatives that are of equivalent or greater hazard.** After all, companies do not want to make a “regrettable substitution,” such as investing in an alternative that in a few years’

time becomes the object of a new government regulation or decreased market demand. Similarly, hazard assessments precede technical and economic assessments because businesses do not want to invest in evaluating alternatives that may pose problems in the future.

**Step 5. With the list of alternatives reduced by the hazard assessment screening, businesses then evaluate the technical and economic performance of the alternatives.** Not surprisingly, technical and economic assessments precede the application of any further environmental or human health assessments because companies do not want to expend scarce resources on alternatives that are not viable from a business perspective.

**Step 6. At this point it is time to apply life cycle thinking if the remaining alternatives involve making material or process changes that can result in significant upstream or downstream impacts to the environment or human health.** As companies are increasingly concerned

with increased carbon footprint, end-of-life management challenges, and worker exposure issues, a qualitative or quantitative life-cycle assessment or risk assessment may need to be conducted at this point in the evaluation process. Such assessments can be used to further screen out alternatives or to develop mitigation measures for the alternative to reduce its potential for causing significant impacts.

**Step 7. Now the company is left with one or a few alternatives to select from that meet its technical, economic, environmental and human health specifications.** Because chemical hazard assessments precede life cycle considerations, the Protocol's design ensures that alternatives do not trade increased toxicity for lower carbon footprint or other improved environmental attributes. If greenhouse gas emissions remain a concern, modifications to the production process could be made to reduce the potential carbon impacts of an alternative.

This screening logic of moving from a broad list of alternatives to selecting and implementing an alternative builds upon the work of many leaders in the field, including the: Lowell Center for Sustainable Production, U.S. Environmental Protection Agency's (EPA's) Design for the Environment (DfE) Program, United Nations Environment Programme–Stockholm Convention on Persistent Organic Pollutants, Massachusetts Toxics Use Reduction Institute, Interstate Chemicals Clearinghouse, Kooperationsstelle Hamburg, and Ökopool.

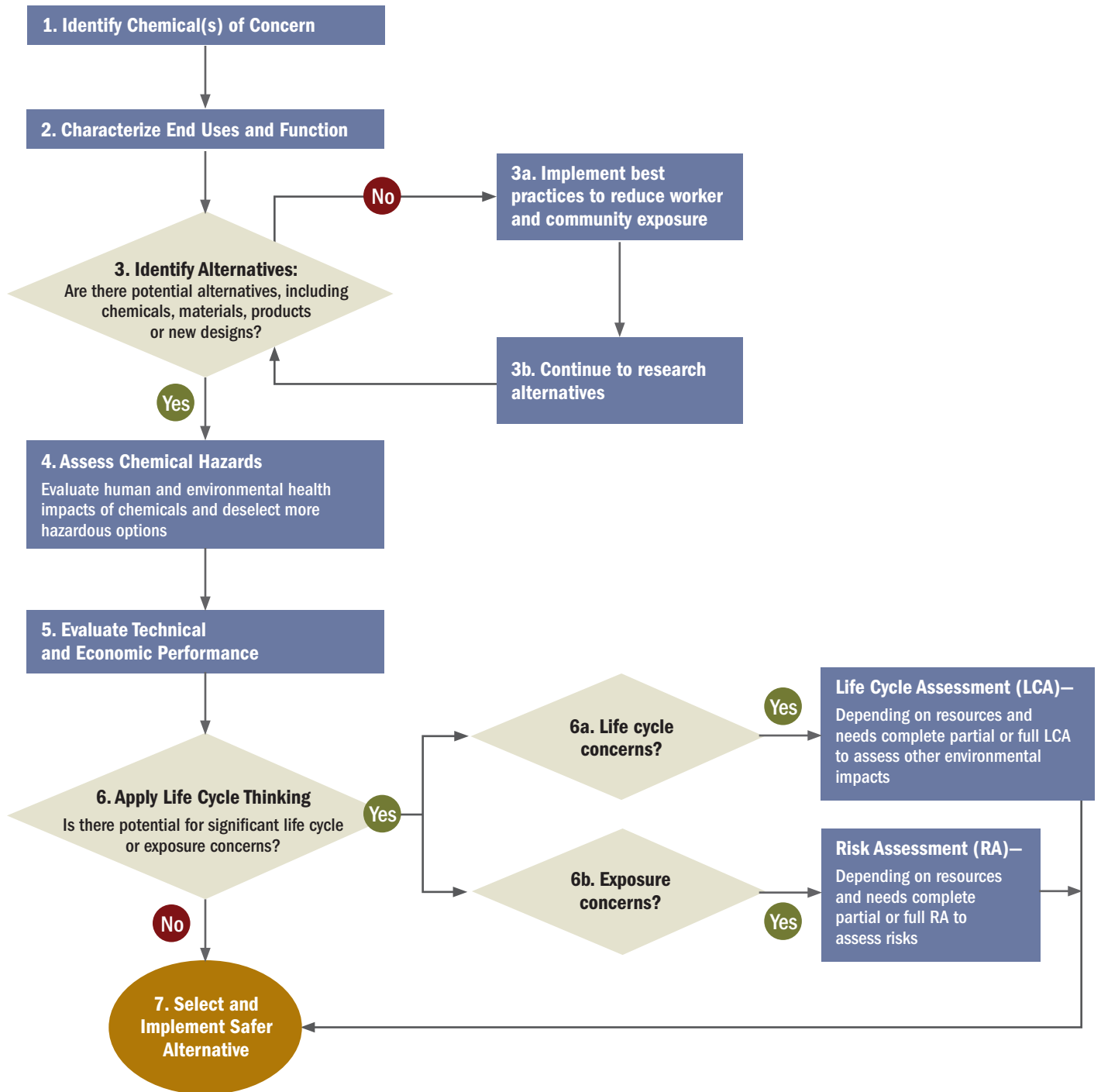
The unique lens that BizNGO brings to the field of chemical alternatives assessment is the perspective of what works in business practice—especially for those businesses who use chemicals by virtue of the products they purchase—the “downstream users” of chemicals. These companies are not invested in any particular chemical, they are invested in the function that the chemicals provide and product performance. Thus, their interest is how to identify safer, effective and efficient alternatives to chemicals of concern, as quickly and economically as possible.

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**For the complete version of the BizNGO  
Chemical Alternatives Assessment Protocol,  
go to: [www.bizngo.org/CAAProtocol](http://www.bizngo.org/CAAProtocol).**

**For further information, contact Mark Rossi, Chair, Business-NGO Working Group**  
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**BizNGO Chemical Alternatives Assessment Protocol (v.1.0):  
 Screening Logic for Selecting Safer Alternatives to  
 Chemicals of Concern to Human Health or the Environment\***



\* The decision logic builds from E. Lavoie, et al., "Chemical Alternatives Assessment," *ES&T*, 2010, 44(24): 9244-9; and M. Rossi, et al., *Alternatives Assessment Framework*, Lowell Center for Sustainable Production, 2006.