**Managing the Supply Chain**

**Fluorinated greenhouse gases**
Fluorinated gases, which are used in many electronics manufacturing processes and to clean manufacturing equipment, are potent greenhouse gases that contribute to climate change. Manufacturers of electronics should work with their component suppliers to implement emissions controls in manufacturing facilities.

**Supply chain transparency**
Chain-of-custody and other data-sharing systems and initiatives can help improve transparency concerning the chemicals and materials used in electronics components. Manufacturers and suppliers can work together to find safer chemicals and more sustainable materials.

**Use of Resources**

**Climate and energy**
Component manufacturing and final product assembly can consume significant amounts of electricity and energy, leading to greenhouse gas emissions. Manufacturers can help abate these impacts by measuring, tracking, and reporting energy use and greenhouse gas emissions, with a focus on reduction. They can also perform preventative maintenance on equipment, replace inefficient equipment, and encourage efficient energy behaviors throughout their operations.

**Disposal and end-of-life**
Manufacturers should participate in product stewardship programs, design products with product end-of-life in mind, and engage downstream partners to ensure that products are responsibly managed. Used consumer electronics peripherals need to be collected, treated, and disposed of responsibly to ensure that the product and valuable components and materials are available for further reuse or recycling. When electronics or their components are burned or disposed of improperly, heavy metals and other hazardous materials can be released, posing a threat to humans and the environment.
Packaging
Packaging design should be optimized to ensure that packaging performs its essential functions of containment and protection while minimizing use of materials, energy resources, and environmental impacts across the life cycle of the packaged product. Under-packaging and over-packaging can both lead to increased impacts. These impacts may be mitigated by using more energy-efficient manufacturing, creating packaging materials from renewable resources, designing packaging to be recyclable, and encouraging consumers to recycle packaging.

Product efficiency
Manufacturers should design electronic products to be energy-efficient in power charging and operation and have power management features where appropriate. This is important because there is a significant amount of electricity used to operate electronics.

Workers and Communities

Conflict Minerals
Conflict minerals, including gold and ores that produce tantalum, tin, and tungsten, are those that are mined in areas where armed groups responsible for human rights abuses control mining operations and profit from mineral sales. Manufacturers should work to ensure that materials in their products are sourced responsibly to help improve stability and quality of life for miners and their communities.

Workers
Workers may be exposed to hazards in the workplace. In some parts of the world, their rights to freedom of association, equal opportunity and treatment, and fair wages may not be protected. To help ensure worker health, safety, and labor rights, final product manufacturers should have a documented health and safety management plan, including a chemical management plan where needed, and provide safety training and personal protective equipment to workers. Manufacturers should procure materials from suppliers that address worker health and safety and labor rights transparently and should perform audits when needed.