

# Green Certificate Body of Knowledge

## 1. SUSTAINABILITY & GLOBAL CONDITIONS

- 1.1. Sustainable Consumption and Production
  - 1.1.1. Sustainable Consumption & Production
- 1.2. Climate Change and Causes of Global Warming
- 1.3. Natural Resource Protection
- 1.4. Ecosystems & Biodiversity

## 2. MATERIAL AND SOLID WASTE MANAGEMENT

- 2.1 Solid Waste Streams
- 2.2 Solid Waste Management
- 2.3 Refuse, Reduce, Reuse, Recycle
- 2.4 Product Lifecycle Analysis
  - 2.4.1 Cradle-to-Cradle
  - 2.4.2 Waste creation/Product discard
  - 2.4.3 Green Purchasing/Procurement
- 2.5 Design for Environment
  - 2.5.1 Alternative Materials Considerations (cost, design, function, performance, etc.)
  - 2.5.2 Source Reduction
  - 2.5.3 Dematerialization
  - 2.5.4 By-Product Reduction
  - 2.5.5 Restructuring production/distribution systems
  - 2.5.6 Identifying/implementing synergies
- 2.6 Zero Waste/Zero Landfill
  - 2.6.1 Waste Exchange
- 2.7 Measuring Material Use and Solid Waste
  - 2.7.1 Data Sources for Material Use/Solid Waste
  - 2.7.2 Common Metrics/Measures
  - 2.7.3 Analysis & Trending
  - 2.7.4 Expressing Material & Solid Waste in Monetary/Cost Terms

## 3. ENERGY MANAGEMENT

- 3.1 Non-Renewable Energy Sources
- 3.2 Renewable Energy Sources
- 3.3 Major Energy Systems
  - 3.3.1 Building Envelope
  - 3.3.2 HVAC
  - 3.3.3 Electrical Supply
  - 3.3.4 Lighting
  - 3.3.5 Boiler and Steam
  - 3.3.6 Hot Water
  - 3.3.7 Compressed Air
  - 3.3.8 Motor Driven Systems
  - 3.3.9 Process Heating
  - 3.3.10 Special Purpose Process Equipment
- 3.4 Energy Audits
- 3.5 Measuring Energy Use
  - 3.5.1 Data Sources for Energy Utilization (utility bills, meters, etc.)
  - 3.5.2 Common Energy Metrics/Measures
  - 3.5.3 Analysis & Trending
  - 3.5.4 Expressing Energy & Energy Waste in Monetary/Cost Terms

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## 4. CHEMICAL WASTE MANAGEMENT/GREEN CHEMISTRY

- 4.1 The Principles of Green Chemistry
  - 4.1.1 "Hit List" Chemicals
  - 4.1.2 Electronic waste (e-waste)
- 4.2 Auxiliary Substances
  - 4.2.1 Substitutions
  - 4.2.2 Enclosure/recovery
- 4.4 Process Reengineering
  - 4.4.1 Switching from batch reactions to continuous processing
  - 4.4.2 Alternative Reactions/Catalysts
- 4.5 Environmental Hazard Prevention/Reduction
- 4.6 Regulatory Standards (e.g. RoHs, WEEE, REACH, ISO, OSHA, EPA, etc.)
- 4.7 Measuring Chemical Use/Waste
  - 4.6.1 Data Sources for Chemical Use/Waste
  - 4.6.2 Common Chemical Metrics/Measures
  - 4.6.3 Analysis & Trending
  - 4.6.4 Expressing Chemical & Chemical Waste in Monetary/Cost Terms

## 5. CLIMATE/ AIR EMISSIONS MANAGEMENT

- 5.1 Air Contaminants
  - 5.1.1 Global warming
  - 5.1.2 Ozone depletion
  - 5.1.3 Air quality index
- 5.2 Industrial Hygiene
  - 5.2.1 Environmental factors/stresses
  - 5.2.2 Measurement of airborne chemical exposures (calibration, collection, analysis, evaluation)
  - 5.2.3 Regulatory Standards, e.g., OSHA, acceptable levels
- 5.3 Pollution Prevention, Reduction & Treatment
- 5.4 Noise Pollution
  - 5.4.1 Accepted Units for Noise
  - 5.4.2 Regulatory standards, e.g., OSHA, EPA, etc.
  - 5.4.3 Noise Measurement Devices & Processes
  - 5.4.4 The Effects of Noise
  - 5.4.5 Controlling Noise
- 5.5 Air Sampling
  - 5.5.1 Purpose and components of air sampling
  - 5.5.2 Types of Air Samples (e.g. personal, breathing zone, general air/area, time weighted average, etc.)
  - 5.5.3 Health risk assessment
  - 5.5.4 Determine need for/effectiveness of engineering controls
  - 5.5.5 Incident/complaint investigation
- 5.6 Measuring Emissions
  - 5.6.1 Data Sources for Air/Noise emissions
  - 5.6.2 Emissions factors/metrics
  - 5.6.3 Analysis & Trending
  - 5.6.4 Expressing Air/Noise Management in Monetary/Cost Terms

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## **6. SUPPLY WATER / WASTEWATER MANAGEMENT**

- 6.1 Water Cycle
  - 6.1.1 Environmental changes impacting water cycle
- 6.1 Supply Water Resources & Conservation
  - 6.1.1 Sustainable drainage
  - 6.1.2 Water efficiency
  - 6.1.3 Water quality
  - 6.1.4 Legislation and Regulatory Standards (e.g., EPA)
- 6.2 Water Contaminants
- 6.3 Water Pollution Identification, Prevention, Monitoring, Reduction & Treatment
- 6.4 Measuring Water Use/Waste
  - 6.4.1 Data Sources for Water Use/Waste
  - 6.4.2 Common Metrics/Measures
  - 6.4.3 Analysis & Trending
  - 6.4.4 Expressing Water Use & Wastewater in Monetary/Cost Terms

## **7. ENVIRONMENTAL BUSINESS MANAGEMENT**

- 7.1 Green Business Philosophy
  - 7.1.1 Green products & eco-design
  - 7.1.2 Green packaging
  - 7.1.3 Clean production
  - 7.1.4 Green supply chain & transport
- 7.2 Standards, Regulations, Permitting
  - 7.2.1 Environmental Management Standards (EMS), e.g., ISO 14001
  - 7.2.2 Environmental Protection Agency
  - 7.2.3 Industry Specific Standards
- 7.3 Business Case for Sustainability
  - 7.3.1 Financial aspects (e.g., triple bottom line, investment, investment recovery, etc.)
  - 7.3.2 Environmental Performance Measurement
  - 7.3.3 Strategic Value