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United Nations Industrial Development Organization

Training Course
Ecologically Sustainable Industrial Development

Learning Unit 10

Review, with a Course Appraisal

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Further information may be obtained from:
Environment Coordination Unit, UNIDO
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Contents

Additional Course Materials

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Reading: Transforming Technology, a booklet written for the World Resources Institute by G. Heaton, R. Repetto and R. Sobin

Audio tape: Learning recall tape

Floppy disc: Sample project document "Pollution prevention at the (name) industrial facility"

Introduction

Learning Unit 10 is designed to help you review the information that has been covered in this training course and to stimulate your thinking about how you can apply that information to both your professional and your personal life.

Objectives

The specific objectives of this unit are as follows:

- To understand the relationships among the many ideas presented in the preceding Learning Units of the training course.
- To reflect on how the information and ideas presented in this course are relevant to the promotion of ESID.
- To stimulate your thinking about how you can begin to promote ESID and Cleaner Production in your country.
- To point out how the lessons you have learned can affect both your professional and your personal life.

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Key Learning Points

1 The information and ideas presented in this training course offer an integrated approach to the challenge of developing industry and, at the same time, protecting the environment.

2 The ESID approach to industrial development through Cleaner Production ensures that industrial development is compatible with environmental protection. The approach draws on a wide range of concepts and techniques that must be adjusted to each country's level of economic and institutional development.

3 Some ESID-related programmes and projects are relevant in all countries; others must be designed to respond to specific needs.

4 To become an effective spokesperson for ESID and Cleaner Production in your country, it is essential that you take actions in your personal life and your work to ensure better resource utilization and environmental protection.

Suggested Study Procedure

1 Work through the *Study Materials*. Prepare answers to the questions and check your answers against those suggested.

2 Read the *Case Studies*. If possible, work with a small group to discuss the questions raised. Compare your answers with those suggested.

3 Complete the exercises in the *Review*.

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Study Materials

This training course has introduced you to a wide range of concepts and issues concerning the relationship between industrial development and the environment. The problems and the issues are the same worldwide, and the need to achieve ecologically sustainable industrial development is urgent in every part of the world. This Learning Unit first asks you to reflect on what you have learned from the preceding Learning Units. It then asks you how the concepts and techniques are relevant to the situation in your country and suggests some actions that you might take to begin promoting ESID and Cleaner Production.

How ESID Training is Relevant to Your Work

Next Steps

1 Read through the course outline that follows.

2 Think about how the concepts and techniques are relevant to your situation by answering the questions.

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LU1 *Introduction* provides a general overview of the course content and its objectives. It includes an introductory test to assess existing knowledge about the subject matter.

LU2 *The Need for Ecologically Sustainable Industrial Development* explains the significance of trends in industrial development and the environment.

LU3 *Defining Ecologically Sustainable Industrial Development* presents the concept of ESID and the three criteria (eco-capacity, efficiency and equity) for measuring progress in achieving it. It also sets out the actions that industry can take to meet the criteria.

LU4 *Cleaner Production* explains the concept of Cleaner Production, describes many specific activities that constitute such production and outlines the advantages of and barriers to implementing Cleaner Production programmes in developing countries.

LU5 *Analytical Tools for Identifying Cleaner Production Opportunities* introduces techniques for identifying Cleaner Production opportunities that may be profitable for enterprises and beneficial to the environment: waste reduction audits, environmental compliance audits, product life-cycle analyses and environmental impact assessments.

LU6 *Economic Techniques for Assessing Cleaner Production Options* introduces economic analysis techniques that can be used to justify investments in Cleaner Production: financial analysis, micro-economic impact analysis, benefit-cost analysis and macro-economic impact analysis.

LU7 *The Role of Government in Industrial Environmental Management* describes the range of government activities that are used to manage the environment and discusses which of these are most effective for promoting Cleaner Production. It covers the basics of an environmental regulatory programme as well as innovative approaches such as economic incentives, multimedia permits, national sustainable development strategies and international agreements.

LU8 *Sources of Information on Cleaner Production* explains how to obtain information about Cleaner Production from UNIDO, UNEP and many other sources.

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LU9 *Environmental Considerations in Project Design* describes how UNIDO staff can incorporate environmental considerations into project designs consistent with the goals of the UNIDO environment programme, with the recommendations of the Conference on Ecologically Sustainable Industrial Development and with Agenda 21 of United Nations Conference on Environment and Development.

LU10 *Review, with a Course Appraisal*, provides a few exercises to help students recall the main points of the training course

Questions

1 What have been the trends in industrial development and environmental degradation in your country over the past 10 years? Can you see any direct cause-and-effect relationship?

2 What actions should be taken in your country to meet the three ESID criteria: eco-capacity, efficiency and equity?

3 What actions in Agenda 21 are most relevant for your country?

4 Do you know of any Cleaner Production/waste minimization programmes under way in your country?

5 What three industrial branches in your country most need to implement Cleaner Production techniques and technologies?

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6 Which technique for identifying Cleaner Production opportunities is most relevant for your country? Why?

7 Which technique for identifying Cleaner Production opportunities is least relevant for your country? Why?

8 Why is it useful to prepare an economic impact analysis of environmental regulations?

9 What types of environmental benefits do you think would be most persuasive in justifying environmental regulations in your country?

10 How effective are the four components of an environmental regulatory programme in your country?

11 Can you identify some government policies in your country that discourage Cleaner Production? What would be required to change these policies?

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12 Where is the INTIB focal point located in your country? Does it have any information on the EEIS information progamme?

13 Does your office receive the UNIDO *Environmental Awareness Bulletin* or the UNEP periodicals *Industry and Environment* and *Cleaner Production*? If it does, do you read these publications on a regular basis? If it does not, do you know how to obtain copies?

14 Where in your office is a copy of the UNIDO publication *Guidelines for Environmental Appraisal* kept? Have you found it useful in assessing the environmental impacts of a project?

15 Where in your office is a copy of the UNDP *Handbook and Guidelines for Environmental Management and Sustainable Development*? Have you used it to prepare an environmental overview of a project?

16 Where in your office is a copy of your country's national report submitted to UNCED? Have you read the sections that describe industrial activities?

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Next Steps

1 Read through the six actions you might initiate in your country to promote ESID.

2 Look at the UNEP/UNIDO publication *Audit and Reduction Manual for Industrial Emissions and Wastes*.

3 Think about how you might initiate such a project in your country. Answer the questions that follow Action 7 to stimulate your thinking.

Actions to Promote ESID

Action 1:

Participate in the preparation of a sustainable development strategy

This is not a project but rather an activity that UNIDO should be involved in to ensure that industrial activities are addressed when a country's sustainable development strategy is prepared. As a result of UNCED, every country is preparing a sustainable development strategy with assistance from the United Nations and bilateral donors.

To get started, find the country focal point for the effort and ask how the strategy will address industrial issues. Offer to participate in the effort. No funding is needed for this activity.

For additional information, see the World Bank publication *Environmental Assessment Sourcebook* (suggested as additional reading for Learning Unit 9).

Action 2:

Conduct an ESID industrial policy review

You could initiate a study in your country to identify the positive and negative effects of government policies and institutions on the shift of industry to proactive, eco-efficient production. The study would make recommendations on how to eliminate negative effects (usually a difficult task) and on how to create or enhance positive effects.

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Such a study would start with a review of government policies and institutions based on published and unpublished information on government policies and institutions as well as on interviews with government officials, industry associations and chambers of commerce, donor groups and environmental NGOs. It would then examine the categories of government actions that are most relevant: those explicitly encouraging eco-efficiency through pollution prevention and those indirectly encouraging eco-efficiency through national environmental regulatory programmes.

This project could be funded under Technical Support Services (TSS-1) from UNDP or Indicative Planning Figure (IPF).

For additional information, write to the Environment Co-ordination Unit of UNIDO to obtain the TSS-1 proposal "Government of (name of country) policy options and institutions to promote industrial 'eco-efficiency' and competitiveness" and the UNIDO publication *Ecologically Sustainable Industrial Development Strategies: A Methodological Framework.*

Action 3:

Conduct a conversion feasibility study for a plant using CFCs

Existing plants in developing countries that use CFCs will have to carry out a conversion programme. This can range from rearranging the production process to accommodate an alternative process of washing and drying chips, changing the length or diameter of the tubing used in refrigeration equipment, to totally replacing all existing capital equipment if a completely new production technology is to be introduced, e.g. food preservation via irradiation. The conversion feasibility study would examine the available options for a conversion, select the best option and estimate the incremental costs.

Funding for this project might be available through the Multilateral Fund of the Montreal Protocol.

For additional information, see your country's focal point for the Multilateral Fund and write to UNIDO, Industrial Operations Technology Division.

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Action 4:

Persuade your country's environmental management agency to establish a Cleaner Production unit

Most environmental management agencies have only a traditional environmental regulatory programme that concentrates on achieving discharge standards with end-of-pipe technology. These programmes are not always effective because they require too large a capital investment by industry.

The objective of this project would be to develop a core group within the environmental management agency to promote Cleaner Production. The core group would need a chief technical

advisor, external training, international consultants and a revolving loan fund. Funding for this project might be available through IPF.

You might build this type of project into the UNDP Country Programme, as was done in Sri Lanka.

For additional information, write to the Environment Coordination Unit of UNIDO to obtain the project document "Industrial pollution reduction programme in Sri Lanka" (DSRL 91 019).

Action 5:

Conduct a survey of the environment industry

The environment industry will grow significantly in this decade in response to new environmental requirements. It consists of two sectors, one for the manufacture of equipment and other for the provision of services. The latter will experience the most rapid growth, because the fuller incorporation of clean technologies into industrial processes requires enhanced engineering and analytical services.

You might conduct a survey that would estimate the demand for and the supply of both environmental equipment and environmental services in your country. The focus would be on the potential of domestic firms to meet the growing demand and the steps needed to increase their capacity.

Funding for this project might be available through the UNIDO Industrial Development Fund and Trust Funds.

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For additional information, request from UNIDO, OECD, USEPA and bilateral organizations their studies on this topic.

Action 6:

Encourage a non-governmental organization, such as a trade association or an industry confederation, to apply to be a national Cleaner Production centre

UNIDO, in cooperation with IE/PAC, will support national cleaner production centres (NCPCs) in approximately 20 countries. The NCPCs will play a coordinating and catalytic role in Cleaner Production by providing technical information and advice, by stimulating demonstrations of Cleaner Production techniques

and technologies and by training employees of industry and Government in this new area of industrial environmental management.

UNIDO, in cooperation with UNEP, launched phase I of this programme in October 1992. Funding for the programme is coming to UNIDO from the Industrial Development Fund.

For additional information, write to the Environment Coordination Unit of UNIDO for background information on NCPCs.

Action 7:

Undertake a demonstration waste reduction audit for an industrial facility

Most developing countries are failing to achieve significant reductions in industrial pollution by requiring conventional end-of-pipe solutions. Industry claims that it is too costly to install the equipment; moreover, when it is installed, it often fails to operate properly. Accordingly, much more emphasis has to be placed on achieving pollution reductions through modifications of the production process, because these modifications tend to be more cost-effective and sustainable.

You could suggest conducting a waste reduction audit at one facility in your country to demonstrate the waste being generated by current production processes and the opportunities for reducing it. The results of the demonstration would be shared with similar facilities in other parts of the country.

You might focus on the five manufacturing sub-sectors known to be the most energy- and materials-intensive as well as the most pollution-intensive: iron and steel; non-ferrous metals; non-metallic minerals; chemicals; and pulp and paper.

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Funding for this project might be available from Special Industrial Services and Industrial Development Funds.

Next Steps

For additional information, see the UNEP/UNIDO publication *Audit and Waste Reduction Manual for Industrial Emissions and Wastes*. After having looked at the manual, answer the following questions.

Questions

1 Do you know of any waste reduction audits that have been performed in your country? Have they been successful?

2 Can you think of any companies that might benefit from a waste reduction audit and that would welcome such an opportunity?

3 Who could you approach for help in initiating the project?

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4 What would you think are reasonable funding and resource requirements for such a project? (Hint: A generic project document for a waste reduction audit is on one of the two floppy discs included in this training kit).

5 How would you set about organizing the project? Do you have enough time and financial resources to manage the project?

Optional Suggested Reading

This concludes the study section of Learning Unit 10. For an overview of the material covered in the course, you may wish to read *Transforming Technology: An Agenda for Environmentally Sustainable Growth in the 21st Century*, included in the training kit. It will help you look again at the imperative to meet ESID objectives.

Questions

1 What have been the effects on the environment of technologies developed since the Second World War?

2 Why should we be concerned about these effects?

3 Is a lack of Cleaner Production techniques and technologies the limiting factor in transforming industrial production?

4 What are some of the main impediments in transforming technology?

5 Why do environmental regulatory programmes often discourage technological transformation?

6 What are some measures that can be used to change management attitudes towards technological transformation?

Answers

1 The technologies developed since the Second World War have resulted in significant increases in the amount of pollutants generated, new types of toxic pollutants, the spread of environmental degradation to developing countries and the emergence of global pollution problems

2 These effects are unsustainable, i.e. they exceed the eco-capacity (assimilative capacity) of the earth The emerging global problems are now large enough to alter the fundamental natural processes that support life

3 No. Technical solutions are available right now that could make dramatic environmental improvements at small costs or even at a saving. They are not adopted primarily because of corporate leaders' attitudes, organizational structure and competing priorities.

4 The most fundamental impediment is that the use of environmental resources (air, water etc.) is not fully priced. Thus, there is no incentive to conserve these resources. Another main impediment is that Governments create perverse incentives, such as regulation, policies, taxes and subsidies, that encourage excessive resource use.

5 Environmental regulations generally promote the use of existing technologies rather than the adoption of Cleaner Production technologies

6 The most important step is to draw management's focus away from end-of-pipe pollution control towards pollution prevention through Cleaner Production. Another important step would be to ensure that corporate accounting systems charge the full costs of waste generation to the responsible processes and plants

Case Studies

Because all of our activities affect the environment, the concepts that have been introduced in the industrial context can also be applied to our daily lives. The following *Case Studies* are designed to help you think about your own relationship with the environment. Think about the issues raised, preferably discussing them in a small group.

Case Study 1: Waste Reduction Audit

The techniques used in waste reduction audits can be applied to all of our activities. Prepare an informal waste reduction audit of your own kitchen. Use the example of cooking a simple dinner, say chicken and rice. Identify the inputs and the outputs and circulate the material balance. Remember, the sum of the inputs must equal the sum of the outputs. Can you identify any waste reduction options. Which options would be most effective. What steps would you have to take to implement them?

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Household Kitchen Waste Reduction Audit

Inputs	Outputs

Total inputs: Total outputs:

Waste reduction options	Ranking of three best options

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Case Study 2: Environmental Compliance Audit

Environmental standards and policies apply even to you and your own household. Again using the preparation of a chicken dinner as an example, prepare an informal environmental compliance audit of your own kitchen. What wastes do you generate? What environmental regulations and policies apply to the disposal of these wastes? Do you conform to those regulations and policies? Given the environmental trends in your community, do you think these regulations and policies might change? How? What might you want to do now to prepare for these changes?

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Household Kitchen Environmental Compliance Audit

Wastes	Environmental requirement	Compliance status	Potential changes

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Case Study 3: Product Life-Cycle Analysis

Claims that products are environmentally friendly, or green, are becoming important marketing tools for many companies. What products are really environmentally friendly? The techniques used in product life-cycle analysis can help us answer those questions.

1 A recent political platform called for the use of non-polluting electric vehicles. Are electric cars really non-polluting? Compare the environmental impacts of an electric car with those of a gasoline-powered car. First look at the differences in production, particularly the materials used in the engines and energy systems. Then look at the energy-related emissions resulting from operation of the cars. Finally, look at the disposal problems that the two different cars might create. Which cars do you think are less polluting? (Hint: for additional information, see UNEP *Industry and Environment*, vol. 16, No. 1-2 (January-June 1993), pp. 3-66.

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Product Life-Cycle Comparison: Electric Cars vs. Gasoline Cars

Environmental impact	Electric cars	Gasoline cars
Manufacture		
Energy used in operation		
Disposal		

2 Prepare a list of some products that are truly non-polluting.

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3 Some people argue that truly dedicated environmentalists should pursue a lifestyle that does not in any way pollute the environment. Describe such a lifestyle. Would it be possible? Is it desirable? Is it necessary?

Review

Final Review Test

LU2 The Need for Ecologically Sustainable Industrial Development

1 The developing countries' share of industrial output in 1990 was approximately

a. 10 per cent
b. 15 per cent
c. 20 per cent
d. 25 per cent

2 The region with the highest growth rate in industrial output in 1970-1990 was

a. Developed countries
b. East Asia/South-East Asia
c. Latin America
d. Africa

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3 The region with the lowest growth rate in industrial output in 1970-1990 was

a. Developed countries
b. East Asia/South-East Asia
c. Latin America
d. Africa

4 Industry uses approximately

a. One fifth of the world's energy
b. One quarter of the world's energy
c. One third of the world's energy
d. One half of the world's energy

5 Emissions of CO_2 from fossil fuel burning are a major cause of

a. Greenhouse effect
b. Aquatic system damage
c. Ozone depletion
d. All of the above

6 Emissions of CFCs come from

a. Refrigerators
b. Solvents
c. Foams
d. All of the above

7 Acid rain results primarily from emissions of

a. Sulfur dioxide
b. Nitrogen oxides
c. Hydrocarbons
d. Particulate matter

8 All of the following are toxic heavy metals except

a. Mercury
b. Lead
c. Cadmium
d. Dioxin

9 The most polluting fuel per unit of energy is

a. Oil
b. Coal
c. Nuclear
d. Natural gas

10 The World Commission on Environment and Development called for

a. Zero economic growth
b. Economic growth that is equitable and compatible with the environment
c. Large-scale financial transfers to developing countries
d. Preservation of the world's resources

LU3 Defining Ecologically Sustainable Industrial Development

11 Sustainable development means meeting the needs of the present without

a. Compromising the needs of the future
b. Creating pollution problems for those over 60 years of age
c. Increasing population
d. Creating greenhouse effects

12 To achieve ESID, we need all of the following except

a. Eco-capacity
b. High GNP per capita
c. Efficiency
d. Equity

13 The critical load of industrial pollutants beyond which the quality of life and the proper management of natural assets are affected is called

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a. Clean production limit
b. Effluent standard
c. Eco-capacity
d. Ambient environmental standard

14 Waste minimization is an objective of environmental

a. Eco-capacity
b. Equity
c. Economic analysis
d. Efficiency

15 The concept of a fair opportunity to share in the benefits of industrialization refers to

a. Efficiency
b. Eco-capacity
c. Dreams
d. Equity

16 The key to achieving ESID is

a. Transfer of clean technology
b. Government financial subsidies
c. Reduction of pollution intensity
d. Commitment to the Business Charter of the International Chamber of Commerce (ICC)

17 ESID is justified mainly by

a. Limited capacity for absorbing wastes from humanactivities
b. Shortage of natural resources
c. The need for new business ethics
d. UNCED

18 Agenda 21, chapter 30, "Strengthening the role of business and industry", calls for

a. Support of the Valdez Principles
b. Shipment of hazardous wastes to developing countries
c. Annual environmental reporting
d. Preparation of emergency response plans

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19 The Rio Declaration is

a. A call for reform of the United Nations system
b. A statement of principles of sustainable development
c. A commitment to address climate change issues
d. Industry's response to sustainable development issues

20 Agenda 21 is

a. A global action plan to implement the Rio Declaration
b. A call for a new international order
c. A tropical forest action plan
d. A UNDP initiative for capacity building

LU4 Cleaner Production

21 The first step in improving Cleaner Production in industry is a change in

a. Technology
b. Customer preference systems
c. Attitudes
d. Legislation on recycling

22 Industrial environmental management has evolved through

a. Abatement to prevention to dilution
b. Prevention to dilution to abatement
c. Dilution to prevention to abatement
d. Dilution to abatement to prevention

23 The most cost-effective management choice for combating industrial pollution is

a. Prevention
b. Dilution
c. Abatement
d. Control

24 Cleaner Production eliminates waste

a. During production
b. At every stage of the life cycle of a product
c. By disposing of wastes safely in approved facilities
d. By recycling processing residues

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25 Cleaner Production does not include

a. Better housekeeping
b. Ecologically benign products
c. Recycling of wastes by outside contractors
d. Low- and non-waste technology

26 From the practical business point of view, pollution prevention

a. Often pays
b. Does not pay
c. Has a long payback period
d. Is not possible

27 The implementation of Cleaner Production actions does not need

a. Training
b. Cooperation between government and industry
c. Change in management attitudes
d. Advanced technology

28 "Cleaner Production is just not realistic in developing countries where per capita GNP is below $1,000". This statement is

a. False
b. Correct
c. True
d. Helpful

29 The 10 steps for introducing Cleaner Production in an enterprise include all of the following except

a. Involvement of senior employees
b. Seeking government subsidies
c. Monitoring and evaluation
d. Disseminating information to employees

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30 All of the following are barriers to Cleaner Production except

a. Lack of financial resources, awareness, training, expertise and know-how and access to existing knowledge
b. Uncertainty about the right information, technology and regulations
c. Attitudes of employees who feel threatened by change
d. Demonstration projects

LU5 Analytical Tools for Identifying Cleaner Production Opportunities

31 Pollution prevention opportunities may best be identified through

a. Environmental impact assessment
b. Waste reduction audit
c. Environmental compliance audit
d. Product life-cycle analysis

32 A waste reduction audit makes a detailed analysis of plant processes and wastes with the purpose of

a. Producing wastes
b. Completely eliminating wastes
c. Identifying wastes
d. Hiding wastes

33 A waste reduction audit is best described as

a. An input characterization
b. A material balance
c. A balanced financial statement
d. A least-cost production programme

34 The main purpose of an environmental compliance audit is to

a. Ensure that a firm is complying with environmental norms
b. Provide information to environmental management agencies
c. Meet the requirements of the Business Charter of ICC
d. Protect environmental quality

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35 Conducting a waste reduction audit requires a commitment of

a. Top management
b. Supervisors
c. Workers
d. All of the above

36 A product life-cycle analysis considers

a. Only the design of a product
b. The potential for product recycling
c. All stages of production and consumption
d. The production process

37 The most controversial step in a product life-cycle analysis is

a. Cost analysis
b. Inventory analysis
c. Impact analysis
d. Improvement analysis

38 An environmental impact assessment predicts

a. Effects on the environment
b. Effects on production cost
c. Effects on management
d. Effects on pollutant discharge

39 Scoping for an environmental impact assessment means

a. Finding the best environmental location for a project
b. Identifying the major environmental impacts
c. Choosing the least-cost mitigation strategy
d. Finding the most qualified team of experts

40 All of the following are important principles in managing an environmental impact assessment except

a. Balancing the benefits and costs of mitigation measures
b. Involving the appropriate persons and groups
c. Linking information to decisions about the project
d. Presenting clear options for the mitigation of impacts

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LU6 Economic Techniques for Assessing Cleaner Production Options

41 To justify a Cleaner Production investment, the economic technique that measures cash flows and profitability over a future period at the plant level is

a. Financial analysis
b. Micro-economic analysis
c. Macroeconomic analysis
d. Environmental impact assessment

42 A payback period of one year is equivalent to a

a. 25 per cent return on capital
b. 50 per cent return on capital
c. 100 per cent return on capital
d. 200 per cent return on capital

43 Payback analysis is a limited measure of investment because it fails to account for

a. Economic life of the investment
b. Income tax
c. Present value of cash flows
d. All of the above

44 The technique that estimates the economic impact of Cleaner Production investment at an industry level is

a. Environmental impact assessment
b. Micro-economic analysis
c. Macroeconomic analysis
d. Financial analysis

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45 Micro-economic impact analysis examines all of the following except

a. Plant closure
b. Product price increases
c. Capacity expansion
d. Balance of payments

46 The economic technique that measures the cost of a Cleaner Production activity against possible benefits is

a. Marginal cost analysis
b. Financial analysis
c. Macroeconomic analysis
d. Benefit-cost analysis

47 The main difficulty with benefit-cost analysis is usually

a. Quantifying health effects
b. Estimating the costs
c. Valuing the benefits
d. Arithmetical

48 In environmental benefit-cost analysis, values can be

a. Market values based on prices and cost savings
b. Surrogate values based on land values, wage premiums, travel costs etc.
c. Survey values
d. All of the above

49 To justify a Cleaner Production investment, the economic tool that measures the effect of environmental expenditures on GDP, consumer prices and unemployment is

a. Environmental impact assessment
b. Micro-economic analysis
c. Macroeconomic analysis
d. Financial analysis

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50 Expenditure on pollution prevention and control in most developed countries accounts for

a. 2 per cent of GDP
b. 5 per cent of GDP
c. 8 per cent of GDP
d. 10 per cent of GDP

LU7 The Role of Government in Industrial Environmental Management

51 The concept of market failures in environmental management refers to

a. State ownership of enterprises
b. Subsidies for energy use
c. Accelerated depreciation for pollution control equipment
d. Treating environmental resources as free goods

52 An example of policy failure in environmental management is

a. Absence of environmental laws
b. Subsidies for water use
c. Absence of a national environmental action plan
d. Subsidies for building municipal waste-water treatment plants

53 One essential environmental management activity that needs to be undertaken by Governments is

a. Support for environmental non-governmental organizations (NGOs)
b. Tax credits to industry for installing pollution control equipment
c. Collection and dissemination of environmental data
d. A ministerial appointment for the head of the environmental management agency

54 An effective command-and-control regulatory programme requires

a. Issuing discharge permits
b. Monitoring compliance
c. Enforcing permit conditions
d. All of the above

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55 A multimedia approach to environmental management means

a. Using both command and control regulations and economic incentives
b. Documenting pollution problems with a video film
c. Using both self-monitoring and independent inspections to ensure compliance
d. Simultaneously regulating pollutant discharges to air, water and soil

56 Economic incentives include all of the following except

a. Effluent taxes
b. Marketable permits
c. Corporate income taxes
d. Deposit refund schemes

57 Economic incentives can

a. Promote least-cost solutions
b. Provide flexibility in pollution control technology
c. Stimulate the development of technology
d. All of the above

58 An essential component of a national sustainable development strategy is

a. Funding environmental research
b. Signing international protocols
c. Reducing pollutants in all sectors (agriculture, industry etc.)
d. Setting qualitative targets to be met at some unspecified time

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59 The Montreal Protocol calls for

a. Information exchange on ozone depletion
b. Research on ozone depletion
c. Prior approval for the transboundary shipment of hazardous wastes
d. Limits on the production and consumption of ozone-depleting substances

60 A government action that directly encourages Cleaner Production is

a. A national strategy for sustainable development
b. Economic incentives
c. Negotiated environmental compliance that allows for innovation
d. Multimedia environmental permits

LU8 Sources of Information on Cleaner Production

61 The information system that supports 70 focal points around the world is

a. INTIB
b. IE/PAC
c. REED
d. ICPIC

62 Data on UNIDO energy- and environment-related industrialization activities in developing countries are obtained from UNIDO via

a. METADEX
b. REED
c. Energy Technology Clearinghouse
d. ICPIC

63 The name of the UNEP on-line pollution prevention clearinghouse is

a. Pollution Prevention Information Clearinghouse
b. Awareness and Preparedness for Emergencies at a Local Level (APELL)
c. ICPIC
d. Energy and Environment Information Systems

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64 A United Nations-sponsored source of data on hazardous chemicals and health is

a. INTIB
b. IRPTC
c. International Occupational Safety and Health Information Centre
d. REED

65 One source of information in setting up a national environmental management association for enterprises is

a. World Environment Centre
b. Business Council for Sustainable Development
c. International Network for Environmental Management Organizations (INEM)
d. World Industry Council for the Environment (WICE)

LU9 Environmental Considerations in Project Design

66 The United Nations organization that has prepared guidelines for the rapid assessment of sources of air, water and land pollution is

a. World Health Organization (WHO)
b. UNIDO
c. UNEP
d. UNDP

67 The UNIDO *Guidelines for Environmental Appraisal* are most useful at which stage of the project cycle?

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a. Design
b. Identification
c. Approval
d. Evaluation

68 All of the following measures might be appropriate environmental measures for projects without capital implications except

a. Environmental awareness
b. Technology change
c. Training
d. Information management

69 All of the following measures might be appropriate environmental measures for projects with capital implications except

a. Information management
b. Good housekeeping
c. Process changes
d. Treatment and disposal of wastes

70 The UNDP *Handbook and Guidelines for Environmental Management and Sustainable Development* focuses on

a. Identifying environmental problems
b. Assessing environmental impacts
c. Designing environmental management agencies
d. Planning technical assistance

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Answers to questions 1-70

1-10	b b c c a d d a b b
11-20	a b c d d c a c b a
21-30	c d a b c a d a b d
31-40	b c b a d c c a b a
41-50	a c d b d d a d c a
51-60	d b c d d c d c d c
61-70	a b c b c a a b a d

Some Ideas to Think About

The following are some additional questions that you might think about. If possible, discuss them in a small group and try to achieve consensus.

1 What has this course inspired you to do.What will be your next steps?

2 How will this course change your activities as a professional in the development field?

3 How will it change your personal life?

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4 What do you think are the most urgent environmental problems in your country? What can you personally begin to do about them?

Course Appraisal

Next Steps

1 On the following three pages are course appraisal sheets. Please tear them out and complete them now, taking some time to think about your reactions to the course.

2 When you have finished, either give them to your instructor or mail them to the Environment Coordination Unit of UNIDO.

Course Appraisal

Organizer's name:

Location and date completed:

Study method (alone, group or with instructor):

Your name and title:

Organization name, address, telephone and fax:

General functions of your organization:

Previous background in ESID:

Test scores at beginning and end of course:

Please evaluate each Learning Unit by making comments or suggestions for additions, deletions or improvements. Rate each Learning Unit with a score based on the following:

1 = excellent, 2 = good, 3 = fair, 4 = poor, 5 = very poor

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Learning Unit 1 _____	Learning Unit 6 _____
Learning Unit 2 _____	Learning Unit 7 _____
Learning Unit 3 _____	Learning Unit 8 _____
Learning Unit 4 _____	Learning Unit 9 _____
Learning Unit 5 _____	Learning Unit 10 _____

Overall evaluation

- **Content:**
- **Presentation:**
- **Administration:**
- **Usefulness:**

Comments on course:

Suggestions for improvement:

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Was enough guidance, briefing and help provided?	YES/NO
Did the learning stimulate you?	YES/NO
Did you know the learning objectives before you started?	YES/NO
Do you think you achieved the learning objectives?	YES/NO
Would you choose to learn this way again?	YES/NO
Were the materials practical and relevant to you?	YES/NO
Were the technical terms a block to your learning?	YES/NO
Would a more experienced teacher have improved the learning environment?	YES/NO
Did you find the materials too confusing at times?	YES/NO
Did the time constraints upset you?	YES/NO
Did something disturb your learning? What was it?	YES/NO

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Next Steps

1 The real value of this training does not depend on what you think now; it depends more on what you actually do with what you have learned. Therefore, please find the learning recall tape (LRT) in the training kit and play it on day 1 after you have completed the course.

2 The introduction to the LRT will describe the three stages of the learning recall process. In stage one, which takes place on day 1, look through the material that you used for the course and spend five minutes thinking about what you learned.

3 In stage two, which is repeated on days 3, 6, 13 and 24 after completion of the course, play the full LRT (30 minutes).

4 In stage three, on day 28, take the final review test again and answer the questions below.

5 Please give your answers to the questions below to the course organizer, who will forward a copy to the Environment Coordination Unit of UNIDO at Vienna. If there was no organizer, please send them yourself.

6 You will receive copies of any learning research papers produced from the data.

Did you complete the LRT exactly as scheduled? Please explain any variations.

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How have you actually used what you taught yourself in the programme? Please explain:

How efficient was the learning? Please explain:

How effective was the learning? Please explain:

Did you achieve your course objectives? Have they changed now? Do you have any other useful comments? Please answer overleaf.

Can you now offer one or two brief cases, with solutions, that might in future be used for this training course? Please outline them overleaf.

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