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**NUCLEAR ENERGY GENERAL OBJECTIVES:  
APPLYING THE NUCLEAR ENERGY BASIC  
PRINCIPLES**

INTERNATIONAL ATOMIC ENERGY AGENCY

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## FOREWORD

One of the IAEA's statutory objectives is to "seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world". To fulfill this objective, the IAEA publishes technical guides, reports on technology status and advances, and best practices for nuclear power plant operation based on inputs from international experts. These publications are included in the IAEA Nuclear Energy Series.

The Nuclear Energy Basic Principles is the highest level publication in the IAEA Nuclear Energy Series, and describes the rationale and vision for the peaceful uses of nuclear energy. It presents seven Basic Principles on which nuclear energy systems should be based to fulfill nuclear energy's potential to help meet growing global energy needs.

The Nuclear Energy Series Objectives are the second level publications. These Objectives describe what needs to be considered and specific goals to be achieved at different stages of implementation, all of which are consistent with the Basic Principles.

Within each of these four Objectives publications, the individual Topics that make up each Area are addressed. The topics included in "Nuclear General" are "Energy Systems Analysis and Development of Strategies for Nuclear Energy", "Economics", "Infrastructure", "Management Systems", "Human Resources" and "Knowledge Management". All four Objectives documents follow the same structure: for each Topic in the Area, a section describes the objectives to be met, which are consistent with the Basic Principles.

The IAEA expresses its gratitude to the many experts who contributed to the drafting of this publication. The IAEA officers responsible for this publication were T. Mazur and P. Vincze of the Department of Nuclear Energy.

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# 1. INTRODUCTION

## 1.1. BACKGROUND

The IAEA's Nuclear Energy Basic Principles publication [1] presents the basic principles on which nuclear energy systems should be based to fulfil nuclear energy's potential to help meet growing global energy needs. The principles are intended to provide a broad and holistic approach to the use of nuclear energy and to be equally applicable to all essential elements of the nuclear energy systems, including human, technical, management and economic aspects, with due regard to protection of people and the environment, non-proliferation and security.

The following presents an overview of the Basic Principles:

### **Beneficial use**

- **Benefits.** The use of nuclear energy should provide benefits that outweigh the associated costs and risks.
- **Transparency.** The use of nuclear energy should be based on open and transparent communication of all its facets.

### **Responsible use**

- **Protection of people and the environment.** The use of nuclear energy should be such that people and the environment are protected in compliance with the IAEA safety standards and other internationally recognized standards.
- **Security.** The use of nuclear energy should take due account of the risk of the malicious use of nuclear and other radioactive material.
- **Non-proliferation.** The use of nuclear energy should take due account of the risk of the proliferation of nuclear weapons.
- **Long term commitment.** The use of nuclear energy should be based on a long term commitment.

### **Sustainable use**

- **Resource efficiency.** The use of nuclear energy should be efficient in using resources.
- **Continual improvement.** The use of nuclear energy should be such that it pursues advances in technology and engineering to continually improve safety, security, economics, proliferation resistance, and protection of the environment.

## 1.2. PURPOSE AND SCOPE

This publication establishes the objectives that need to be considered and the specific goals to be achieved by the member states in order to be consistent with the Nuclear Energy Basic Principles in the area of general nuclear issues which include the following topics: energy systems analysis and development of strategies for nuclear energy, economics, infrastructure, management systems, human resources, and knowledge management. These six areas are collectively known as "Nuclear General"

### DERIVATION OF THE NUCLEAR GENERAL OBJECTIVES

The objectives for Nuclear General reflect the goals and needs of Member States for long term energy strategies that ensure efficiency, safety, cost benefits, and are adequately managed and maintained for the lifetime of the facility. Objectives for all topics were developed through collaboration with and

advice from participants and Member States in multiple technical meetings, committee meetings and conventions.

## 2. DESCRIPTION OF THE NUCLEAR GENERAL OBJECTIVES

The objectives for each topic within the area of “nuclear general” are described in accordance with the sequence in the Basic Principles publication [1].

### 2.1. OBJECTIVES FOR ENERGY SYSTEMS ANALYSIS and DEVELOPMENT OF STRATEGIES FOR NUCLEAR ENERGY

#### **Basic Principle: Benefits**

*Objective: Energy systems analysis and development of strategies for nuclear energy consider options which lead to a system that delivers affordable, secure and clean energy services; and that the potential of nuclear energy for meeting future energy needs is analysed with its specific characteristics and requirements for technological and institutional development.*

The energy systems analysis will ensure that (a) the evaluation of energy options is holistic and integrated, covering social, economic and environmental aspects, (b) the energy strategies strive to deliver affordable, secure and clean energy services, (c) the contribution of nuclear energy to meeting future energy needs is analysed with its specific characteristics and requirements for technological and institutional development, and (d) nuclear energy contributes to the sustainable development goals of the Member States.

#### **Basic Principle: Transparency**

*Objective: The energy systems analysis are presented and discussed in an open and transparent manner, engaging stakeholders and the public, by organizations in the nuclear field.*

Energy systems analysis will ensure that (a) information is shared with all stakeholders (relevant government departments, utilities, research institutes, regulatory authorities and the public), and (b) the concerns of stakeholders are addressed. This calls for the full disclosure of assumptions, including security, safeguards, technical and financial, and the methodology underlying the assessments.

#### **Basic Principle: Protection of People and the Environment**

*Objective: The energy systems analysis of the member states give credit for strengthening and achieving higher levels of protection of the public and the environment from adverse impacts of energy conversion and use.*

The assessment of energy options and nuclear energy systems will include the assessment of impacts on the public and the environment, and the strategies for development of energy systems and nuclear energy technologies will explicitly include striving to achieve higher safety, mitigation of potential adverse environmental impacts and reduction of waste generation.

#### **Basic Principle: Security**

*Objective: The energy systems analysis addresses security concerns relating to different energy options and includes in the analysis necessary improvements in technical, regulatory and institutional areas.*

The energy system analysis will address security concerns relating to different energy options and also identify the necessary improvements to procedures and practices in technical, regulatory and institutional areas.

**Basic Principle: Non-Proliferation**

*Objective: The energy systems analysis includes the assessment of proliferation concerns and non-proliferation benefits.*

The energy systems analysis for the development of nuclear energy systems will include the assessment of proliferation concerns, safeguards arrangements, the study of relevant information and necessary innovation relating to reactor technologies and fuel cycle options, and relevant institutional arrangements to improve the proliferation-resistance of the nuclear energy system in order to fulfil national obligations in relation to non-proliferation of nuclear weapons.

**Basic Principle: Long Term Commitment**

*Objective: The energy systems analysis includes the evaluation of technical, economic, institutional and regulatory requirements and commitments on a long term basis and covering the entire fuel cycle.*

As most energy production, conversion and supply facilities have very long operating lifetimes, the energy systems analysis will ensure that the assessment of energy options and nuclear energy systems includes the evaluation of technical, economic, institutional and regulatory requirements and commitments on a long term basis.

**Basic Principle: Resource Efficiency**

*Objective: The energy systems analysis includes the assessment of the efficiency of resource use, and the identification of technical innovations to improve the efficiency of resource use.*

Energy services are delivered by using natural resources, employing various technologies and devoting personnel to the system. The energy systems analysis will ensure that the assessment of energy options and nuclear energy systems includes both assessment of the efficiency of resource use and the identification of technical innovations to improve the efficiency of resource use.

**Basic Principle: Continual Improvement**

*Objective: The energy systems analysis provides for the continual improvement of the sustainability of energy services in terms of safety, affordability, reliability, security and environmental compatibility.*

The energy systems analysis will ensure that the energy strategies strive for continual improvement of the sustainability of energy services in terms of affordability, reliability, security and environmental compatibility. Sharing good practices, experience and information on technical, institutional and regulatory improvements and innovations is encouraged. International collaboration provides an efficient means for this purpose.

**2.2. OBJECTIVES FOR ECONOMICS**

**Basic Principle: Benefits**

*Objective: The economic analysis and evaluation of nuclear energy compare alternatives that cover the social costs and benefits on a lifetime basis, as well as the commercial and financial viability of nuclear energy projects.*

The economic analysis of nuclear and non-nuclear energy supply options will cover not only the direct economic costs and benefits, but also all external costs. The economic competitiveness of nuclear energy will be established with respect to the commercial and financial viability of nuclear energy project(s) in direct comparison with non-nuclear alternatives.

**Basic Principle: Transparency**

*Objective: The economic assessment of nuclear energy is conducted in an open and transparent manner, with results reported to the public.*

The economic assessment of nuclear energy versus non-nuclear energy supply options will be transparent and will allow for full involvement of stakeholders. The assumptions and methodologies of analysis will be clearly reported so that other entities can repeat the assessments.

**Basic Principle: Protection of People and the Environment**

*Objective: The economic assessment of nuclear energy includes the costs associated with the protection of people and the environment.*

The economic assessment of nuclear energy and other options will include the assessment of impacts on the public and the environment, the potential damages and risks, and the estimation of corresponding damage and other external costs. The mitigation solutions will be identified together with cost estimates for implementing those solutions. Appropriate strategies will be developed to minimize the impacts of energy systems on people and the environment.

**Basic Principle: Security**

*Objective: The economic assessment of nuclear energy includes the costs associated with strengthening nuclear security.*

The economic assessment will include the cost of measures for addressing security concerns relating to nuclear energy and other options. The costs relating to necessary improvements to procedures and practices from a technical viewpoint, with all regulatory and institutional aspects, will be estimated and included in the economic assessments.

**Basic Principle: Non-Proliferation**

*Objective: The economic assessment of nuclear energy includes the costs associated with preventing the proliferation of nuclear weapon technologies.*

The economic assessment will include the cost of measures for developing, improving and implementing appropriate safeguards measures to fulfil national safeguard obligations, addressing concerns about the non-proliferation of nuclear weapon technologies and adherence to non-proliferation regimes. An economic evaluation of different strategies for developing and introducing proliferation resistant nuclear reactor technologies and fuel cycle options should be conducted.

**Basic Principle: Long Term Commitment**

*Objective: The economic assessment of nuclear energy includes the costs associated with the entire life cycle of the nuclear facilities, including decommissioning and waste disposal.*

As nuclear power plants involve very long term responsibilities and commitment (e.g. for decommissioning and waste disposal) beyond the commercial lives of the plants, the economic burden of those responsibilities and commitments will be assessed and included in the economic assessment, as well as the costs relating to regulatory requirements and commitments on a long term basis.

**Basic Principle: Resource Efficiency**

*Objective: The economic assessment of nuclear energy fully takes into account the use of natural and economic resources.*

The economic assessment of nuclear energy and other options will include the costs/depletion costs for natural resources, the use costs for economic resources (the opportunity cost of diverting financial resources to capital intensive projects), human resource development costs, and other resource use costs.

**Basic Principle: Continual Improvement**

*Objective: Nuclear energy systems strive for continuous improvement regarding economics and safety.*

The commercial and regulatory requirements must be balanced and a synergy developed between economics and safety. Safe plants perform better economically in the long run. The costs relating to improvements will be assessed and least-cost solutions to achieve the desired, targeted or required safety level or standard will be developed and implemented. Sharing of good practices, experiences and information on technical, institutional and regulatory improvements and innovations is encouraged.

### 2.3. OBJECTIVES FOR INFRASTRUCTURE

**Basic Principle: Benefits**

*Objective: National infrastructure for nuclear energy systems supports effective economical, safe, and secure implementation and operation, in a manner that provides societal benefits at an affordable cost and with acceptable risks.*

From the initial consideration of nuclear energy systems, a structured, systematic approach will be taken to ensure that the costs and risks of the programme are within acceptable limits and that the expected benefits to society are achieved.

**Basic Principle: Transparency**

*Objective: Infrastructure development for nuclear energy systems is done in a manner that provides openness and transparency, and acceptance by the public.*

Mechanisms will be established from the point of consideration of a nuclear power programme onwards to permit the suitable involvement of stakeholders and the public in decision making processes.

**Basic Principle: Protection of People and the Environment**

*Objective: Development of infrastructure for nuclear energy systems includes legal and regulatory arrangements and competencies necessary to protect people and the environment at levels consistent with IAEA safety standards.*

IAEA safety standards relating to protection of people and the environment, and their implementation as national laws and regulations will be considered from the beginning of a nuclear power programme.

**Basic Principle: Security**

*Objective: Development of infrastructure for nuclear energy systems includes provisions for suitable protection against theft or malevolent acts.*

IAEA security publications relating to nuclear security and their implementation as national laws and regulations, will be considered from the beginning of a nuclear power programme, and are a fundamental part of the infrastructure.

**Basic Principle: Non-Proliferation**

*Objective: Infrastructure development for nuclear energy systems includes provisions to prevent the proliferation of nuclear weapon technologies.*

Legally binding international requirements for the non-proliferation of nuclear weapon technologies, and their implementation as national laws and regulations should be considered from the beginning of a nuclear power programme as a fundamental part of the infrastructure.

**Basic Principle: Long Term Commitment**

*Objective: Development of infrastructure for nuclear energy systems is done with consideration of the entire lifetime of nuclear facilities, including suitable decommissioning and waste disposal plans.*

All elements of infrastructure will be assessed from initial considerations onward as to how they can be maintained for the long term, including decommissioning and suitable disposal of waste.

**Basic Principle: Resource Efficiency**

*Objective: Infrastructure development for nuclear energy systems includes the optimal use of resources for the exploitation of nuclear technologies.*

Resource efficiency will be a cross-cutting consideration for the infrastructure to support a nuclear energy programme.

**Basic Principle: Continual Improvement**

*Objective: Develop nuclear energy systems in such a manner as to continually improve the infrastructure, taking into account lessons learned both nationally and internationally.*

The nuclear field is unique in that “an accident anywhere is an accident everywhere”. Thus, there is an incentive for freely sharing the means to improve within the field. This is particularly important for newcomer States in the nuclear field, so that they can learn from relevant international experience.

**2.4 OBJECTIVES FOR MANAGEMENT SYSTEMS**

**Basic Principle: Benefits**

*Objective: Organizations in the nuclear field establish and implement a management system which includes the arrangements and processes necessary to achieve all the goals of the organization in an integrated manner.*

The management system will be aligned with all the goals of the organization and bring all the requirements for managing the organization together in a coherent manner into one integrated management system. This set of interrelated or interacting elements will aid in establishment of policies and objectives, and enable those objectives to be achieved in a safe, efficient and effective manner.

**Basic Principle: Transparency**

*Objective: The management system considers the expectations of interested parties and the system is implemented in such a way as to foster a culture of openness and transparency at all levels in the organization.*

The implementation of the management system includes the establishment of proper values and norms that will ensure open and transparent communication with all interested parties. A proper implementation in these aspects is facilitated by good leadership capabilities at all levels in order to develop a sustainable culture that will promote openness and transparency.

**Basic Principle: Protection of people and the environment**

*Objective: The management system is designed to fulfill the requirements that must be met for the protection of people and the environment during all stages of the lifetime of nuclear energy systems.*

The management system will include and integrate the requirements established in IAEA safety standards and other internationally recognized standards.

**Basic Principle: Security**

*Objective: The management system is designed to fulfill all requirements that must be met for the security of nuclear energy systems in all stages of their lifetime.*

The management system must be designed and implemented in a way that fosters an awareness of and consideration for the security aspects of activities and systems in all stages of the lifetime of nuclear energy systems.

**Basic Principle: Non-Proliferation**

*Objective: The management system implements the arrangements necessary to support the procedures needed for the accounting for and control of nuclear material, ensures that all necessary arrangements are in place to comply with national safeguard obligations and are effectively fulfilled in a timely manner.*

The management system will be designed and implemented in a way that ensures respect for the procedures necessary to prevent the diversion of material for use in nuclear weapons.

**Basic Principle: Long Term Commitment**

*Objective: The management system recognizes and plans for the entire lifetime of nuclear technologies and their long term consequences.*

The establishment and implementation of the management system encourages strategic planning throughout the lifetime of nuclear energy systems.

**Basic Principle: Resource efficiency**

*Objective: The management system ensures effective resource planning and utilization throughout the entire lifetime of the nuclear power plant.*

The integrated management system is based on the identification of the processes necessary to meet all requirements and implement the vision, goals, strategy and policies for achieving the objectives of the organization. Managing the processes of the organization efficiently is critical to its success and a key element is the identification of all necessary resources. An integrated approach should facilitate, through implemented, assessed and continually improved processes, the optimal use of the resources, including personnel, infrastructure, the working environment, information and knowledge, and suppliers, as well as material and financial resources.

### **Basic Principle: Continual improvement**

*Objective: The management system systematically develops and implements plans for continual improvement.*

The management system will be reviewed at planned intervals to ensure its suitability and effectiveness and to identify whether there is a need to make changes or improvements in the policies, goals, strategies, plans, objectives and processes of the organization. A learning culture will be fostered through proper leadership and the commitment of senior management through their personal involvement, sponsorship and prioritization of continual improvement.

## **2.5 OBJECTIVES FOR HUMAN RESOURCES**

### **Basic Principle: Benefits**

*Objective: Organizations in the nuclear energy field develop and maintain the highest levels of performance and competence of their personnel commensurate with the risks associated with nuclear technologies.*

Organizations in the nuclear energy field must pay greater attention to the recruitment, selection, training and development of their human resources than do other industries. This is due to both the consequences of inadequate performance and the large investments of time and money necessary to develop the competences needed to perform to the high standards. Organizations will ensure that all staff are fully competent to undertake their respective roles to maintain the highest levels of performance.

### **Basic Principle: Transparency**

*Objective: Public communication activities are organized in such a way as to provide openness and transparency in the use of nuclear technologies.*

While there are some limitations on the disclosure of information relating to non-proliferation and security, these are a relatively small part of the overall activities in the field of nuclear energy. Information regarding other aspects of nuclear facilities will be shared with affected stakeholders, both internal and external to the nuclear field. Appropriate staff will be trained to ensure effective communication with the public.

### **Basic Principle: Protection of People and the Environment**

*Objective: Organizations in the nuclear field ensure that personnel develop and maintain the competences needed to comply with IAEA safety standards relating to the protection of people and the environment.*

The competences relating to the protection of people and the environment will be identified for all nuclear facilities and organizations, and suitable mechanisms put in place to ensure that all personnel assigned such tasks are competent to perform to the necessary standards.

### **Basic Principle: Security**

*Objective: Organizations in the nuclear field ensure that personnel develop and maintain the competences necessary to comply with national and IAEA guidelines related to nuclear security.*

The competences relating to nuclear security will be identified for all nuclear facilities and organizations, and suitable mechanisms put in place to ensure that all personnel assigned such tasks are competent to perform to the necessary standards.

**Basic Principle: Non-Proliferation**

*Objective: Organizations in the nuclear field develop and maintain the human resources needed to develop and implement appropriate safeguard arrangements, in such a way as to prevent the proliferation of nuclear weapon technologies.*

The competences related to preventing the proliferation of nuclear weapon technologies will be identified for all nuclear facilities and organizations, and suitable mechanisms put in place to ensure that all personnel assigned such tasks are competent to perform to the necessary standards.

**Basic Principle: Long Term Commitment**

*Objective: Organizations in the nuclear field plan for their future staffing, competence and performance related needs for the complete lifetime of their nuclear facilities.*

The lifetime of nuclear facilities can be 100 years or more from the consideration of the feasibility of a nuclear power programme to the final decommissioning of nuclear power plants. Thus, a long term view is necessary to ensure that adequately qualified personnel are provided for this entire lifetime.

**Basic Principle: Resource Efficiency**

*Objective: Organizations in the nuclear field organize their activities effectively so as to make optimal use of resources for the implementation of nuclear technologies*

Owing to the demanding and time consuming education, training, and qualification programmes needed for many positions in the nuclear field, it is important that these resources are maintained once they are developed.

**Basic Principle: Continual Improvement**

*Objective: Organizations and individuals in the nuclear field continually strive to improve their performance.*

The effectiveness of education, training and other methods of development of human resources will be continually monitored and the results used to improve performance.

## 2.6 OBJECTIVES FOR KNOWLEDGE MANAGEMENT

**Basic Principle: Benefits**

*Objective: Nuclear knowledge management strategies are formulated, adopted and implemented at a level aimed at enhancing the benefits of nuclear power to society at large.*

Nuclear energy, as a high technology endeavor, requires a solid scientific and technical knowledge basis to provide energy to society in a clean and affordable way. In this respect a well formulated and focused knowledge management strategy can ensure that the full benefits from using nuclear energy are assured and maintained through succeeding workforce lifetimes.

**Basic Principle: Transparency**

*Objective: Knowledge management programmes provide for the use of nuclear knowledge in a transparent way and also for its social acceptance.*

Knowledge management programmes in nuclear organizations will provide for a better understanding on the part of society, as well as communicating the scientific and technical knowledge basis of nuclear development.

### **Basic Principle: Protection of People and the Environment**

*Objective: Dedicated knowledge management programmes are applied, which are aimed at enhancing the safety of nuclear installations and the protection of people and the environment.*

Safety is critical to the successful operation of nuclear power plants as well as other nuclear installations. Sustained management of knowledge and skills provides the basis for achieving the highest possible level of safety and environmental protection.

### **Basic Principle: Security**

*Objective: Knowledge management programmes are designed and implemented to exclude thefts and other malicious acts affecting nuclear installations and materials.*

Proper knowledge management programmes and their application will provide for the stewardship of sensitive information and contribute to enhancing the security of nuclear installations.

### **Basic Principle: Non-Proliferation**

*Objective: Knowledge management programmes responsibly identify and protect confidential and classified knowledge and information and ensure that its use is in accordance with international obligations in relation to the non-proliferation of nuclear weapons and ensures continuity of safeguards information.*

Knowledge management programmes will take into consideration all aspects of non-proliferation related issues in scientific research and development. While knowledge sharing is a stimulus for innovation and development, knowledge protection in some specific areas is also an important element of the overall knowledge management strategy.

### **Basic Principle: Long Term Commitment**

*Objective: Knowledge management systems maximize the flow of nuclear knowledge from one generation to the next and attract, maintain and further develop a dedicated body of highly competent professional staff, in order to sustain nuclear competence over the entire lifetime of nuclear installations.*

Implementing a nuclear energy programme is a long-term commitment, involving the regular intergenerational transfer of accumulated knowledge and skills. This is achieved by means of a long term knowledge management strategy, which will need periodic updating.

### **Basic Principle: Resource Efficiency**

*Objective: Nuclear knowledge is managed as a basic economic resource, and includes three fundamental components: personnel, processes and technology; for all stages of the nuclear fuel cycle.*

Like other resources, knowledge requires a systematic and integrated management approach in order to achieve the most efficient use and expected results from its implementation. For this reason, the design and implementation of a nuclear knowledge management strategy will always be linked to economic efficiency and the best use of intellectual capital in the nuclear field.

### **Basic Principle: Continual Improvement**

*Objective: Knowledge management is applied as a key driver for continuous improvement.*

Knowledge management is a component of the scientific and technology developments in the nuclear field. This knowledge will be used in a continuous improvement strategy, and continuous improvement is a key element of any knowledge management strategy.

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**Annex I:**  
**SUMMARY TABLE OF OBJECTIVES FOR EACH NUCLEAR ENERGY BASIC PRINCIPLE (BP)**

Basic Principle	Energy System Analysis & Development of Strategies for Nuclear Energy	Economics	Infrastructure	Management Systems	Human Resources	Knowledge Management
BP- 1 Benefit	Energy systems analysis and development of strategies for nuclear energy consider options which lead to a system that delivers affordable, secure and clean energy services; and that the potential of nuclear energy for meeting future energy needs is analysed with its specific characteristics and requirements for technological and institutional development.	The economic analysis and evaluation of nuclear energy compare alternatives that cover the social costs and benefits on a lifetime basis, as well as the commercial and financial viability of nuclear energy projects.	National infrastructure for nuclear energy systems supports effective economical, safe, and secure implementation and operation, in a manner that provides societal benefits at an affordable cost and with acceptable risks.	Organizations in the nuclear field establish and implement a management system which includes the arrangements and processes necessary to achieve all the goals of the organization in an integrated manner.	Organizations in the nuclear energy field develop and maintain the highest levels of performance and competence of their personnel commensurate with the risks associated with nuclear technologies.	Nuclear knowledge management strategies are formulated, adopted and implemented at a level aimed at enhancing the benefits of nuclear power to society at large.
BP-2 Transparency	The energy systems analysis are presented and discussed in an open and transparent manner, engaging stakeholders and the public, by organizations in the nuclear field.	The economic assessment of nuclear energy is conducted in an open and transparent manner, with results reported to the public.	Infrastructure development for nuclear energy systems is done in a manner that provides openness and transparency, and acceptance by the public.	The management system considers the expectations of interested parties and the system is implemented in such a way as to foster a culture of openness and transparency at all levels in the organization.	Public communication activities are organized in such a way as to provide openness and transparency in the use of nuclear technologies.	Knowledge management programmes provide for the use of nuclear knowledge in a transparent way and also for its social acceptance.
BP-3 Protection of	The energy systems analysis of the member states give credit for strengthening and	The economic assessment of nuclear energy includes the costs associated with	Ddevelopment of infrastructure for nuclear energy systems includes	The management system is designed to fulfill the requirements that must be	Organizations in the nuclear field ensure that personnel develop and	Dedicated knowledge management programmes are applied, which are

Basic Principle	Energy System Analysis & Development of Strategies for Nuclear Energy	Economics	Infrastructure	Management Systems	Human Resources	Knowledge Management
people and the environment	achieving higher levels of protection of the public and the environment from adverse impacts of energy conversion and use.	the protection of people and the environment.	legal and regulatory arrangements and competencies necessary to protect people and the environment at levels consistent with IAEA safety standards.	met for the protection of people and the environment during all stages of the lifetime of nuclear energy systems.	maintain the competences needed to comply with IAEA safety standards relating to the protection of people and the environment.	aimed at enhancing the safety of nuclear installations and the protection of people and the environment.
BP-4 Security	The energy systems analysis addresses security concerns relating to different energy options and includes in there analyses necessary improvements in technical, regulatory and institutional areas.	The economic assessment of nuclear energy includes the costs associated with strengthening nuclear security.	Development of infrastructure for nuclear energy systems includes provisions for suitable protection against theft or malevolent acts.	The management system is designed to fulfill all requirements that must be met for the security of nuclear energy systems in all stages of their lifetime.	Organizations in the nuclear field ensure that personnel develop and maintain the competences necessary to comply with national and IAEA guidelines related to nuclear security.	Knowledge management programmes are designed and implemented to exclude thefts and other malicious acts affecting nuclear installations and materials.
BP-5 Non-Proliferation	The energy systems analysis includes the assessment of proliferation concerns and non-proliferation benefits.	The economic assessment of nuclear energy includes the costs associated with preventing the proliferation of nuclear weapon technologies.	Infrastructure development for nuclear energy systems includes provisions to prevent the proliferation of nuclear weapon technologies.	The management system implements the arrangements necessary to support the procedures needed for the accounting for and control of nuclear material, ensures that all necessary arrangements are in place to comply with national safeguard obligations and are effectively fulfilled in a timely manner.	Organizations in the nuclear field develop and maintain the human resources needed to develop and implement appropriate safeguard arrangements, in such a way as to prevent the proliferation of nuclear weapon technologies.	Knowledge management programmes responsibly identify and protect confidential and classified knowledge and information and ensure that its use is in accordance with international obligations in relation to the non-proliferation of nuclear weapons and ensures continuity of safeguards information.

Basic Principle	Energy System Analysis & Development of Strategies for Nuclear Energy	Economics	Infrastructure	Management Systems	Human Resources	Knowledge Management
BP-6 Long Term Commitment	The energy systems analysis includes the evaluation of technical, economic, institutional and regulatory requirements and commitments on a long term basis and covering the entire fuel cycle.	The economic assessment of nuclear energy includes the costs associated with the entire life cycle of the nuclear facilities, including decommissioning and waste disposal.	Development of infrastructure for nuclear energy systems is done with consideration of the entire lifetime of nuclear facilities, including suitable decommissioning and waste disposal plans.	The management system recognizes and plans for the entire lifetime of nuclear technologies and their long term consequences.	Organizations in the nuclear field plan for their future staffing, competence and performance related needs for the complete lifetime of their nuclear facilities.	Knowledge management systems maximize the flow of nuclear knowledge from one generation to the next and attract, maintain and further develop a dedicated body of highly competent professional staff, in order to sustain nuclear competence over the entire lifetime of nuclear installations.
BP-7 Resource Efficiency	The energy systems analysis includes the assessment of the efficiency of resource use, and the identification of technical innovations to improve the efficiency of resource use.	The economic assessment of nuclear energy fully takes into account the use of natural and economic resources.	Infrastructure development for nuclear energy systems includes the optimal use of resources for the exploitation of nuclear technologies.	The management system ensures effective resource planning and utilization throughout the entire lifetime of the nuclear power plant.	Organizations in the nuclear field organize their activities effectively so as to make optimal use of resources for the implementation of nuclear technologies	Nuclear knowledge is managed as a basic economic resource, and includes three fundamental components: personnel, processes and technology; for all stages of the nuclear fuel cycle.
BP-8 Continual improvement	The energy systems analysis provides for the continual improvement of the sustainability of energy services in terms of safety, affordability, reliability, security and environmental compatibility.	Nuclear energy systems strive for continuous improvement regarding economics and safety.	Develop nuclear energy systems in such a manner as to continually improve the infrastructure, taking into account lessons learned both nationally and internationally.	The management system systematically develops and implements plans for continual improvement.	Organizations and individuals in the nuclear field continually strive to improve their performance.	Knowledge management is applied as a key driver for continuous improvement.

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## **STRUCTURE OF THE IAEA NUCLEAR ENERGY SERIES**