

**TECHNICAL AND ECONOMIC FOUNDATIONS FOR THE CONSTRUCTION AND RECONSTRUCTION OF ENTERPRISES PRODUCING CONSTRUCTION MATERIALS AND PRODUCTS**

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**Abstract**

The construction materials industry represents one of the key sectors of the national economy. The continuous growth of construction volumes, along with the increasing demand for energy-efficient and environmentally sustainable materials, necessitates the expansion and modernization of production capacities within this sector. The development of a feasibility study (technical and economic justification) is an essential stage in the construction and reconstruction of enterprises, as it enables a preliminary assessment of project efficiency and viability.

This article examines the technical and economic foundations underlying the reconstruction and modernization of manufacturing enterprises.

**Keywords:** Enterprise, construction materials and products, construction stages, preparatory stage, design stage, operation stage, reconstruction, modernization.

**Introduction****Concept of Technical and Economic Justification**

A technical and economic justification (feasibility study) is a comprehensive scientific, technical, and economic document prepared to support decision-making regarding the establishment, reconstruction, or expansion of an enterprise or production facility. It serves as a fundamental document in the development of new technologies, engineering solutions, and business plans, as well as in the improvement of existing systems.

The feasibility study outlines the project's objectives, technical parameters, economic indicators, cost structure, and expected benefits. It provides a systematic evaluation of the project's efficiency and implementation prospects.

For enterprises producing construction materials and products, a feasibility study is required in the following cases:

- expansion of production capacity;
- diversification into new areas of activity;
- implementation of construction, industrial, or energy-related projects;
- attraction of investments;

- support of large-scale projects at various stages of implementation. Such initiatives may originate either from the enterprise itself or from external stakeholders. The feasibility study report is primarily intended for management and serves as a basis for informed decision-making.

### **Stages of Construction of Construction Materials Production Enterprises**

The construction of an industrial enterprise consists of several key stages:

#### **Preparatory Stage**

At this stage, initial data are collected and analyzed. The main activities include:

- a) assessment of raw material resources (quarries, deposits, quality analysis);
- b) analysis of market demand for products;
- c) evaluation of transport, energy, and communication infrastructure;
- d) technical and economic assessment of the construction site selection.

The outcome of this stage includes site selection documentation, preliminary technical specifications, and baseline data for the feasibility study.

**Feasibility Study Stage.** At this stage, the technical and economic viability of the project is determined.

The following tasks are carried out:

- ✓ comparison of technological alternatives (e.g., dry, wet, or semi-dry processes);
- ✓ selection of core equipment and production lines;
- ✓ determination of production capacity and construction scale;
- ✓ estimation of capital investments, production costs, profit, and profitability;
- ✓ evaluation of environmental and social impacts.

#### **Design Stage**

This stage involves the preparation of detailed technical documentation for the enterprise.

**Construction and Installation Stage.** During this phase, practical construction activities are performed:

- ✓ site preparation (earthworks, foundation construction);
- ✓ erection of buildings (main, auxiliary, and administrative facilities);
- ✓ installation of technological equipment;
- ✓ development of engineering infrastructure (electricity, water, gas, heating systems);
- ✓ implementation of construction supervision and safety measures.

Strict compliance with regulatory standards is essential to ensure construction quality.

**Commissioning and Testing Stage.** After completion of construction and installation works, the enterprise undergoes testing procedures. Following successful testing, the facility is considered ready to operate at its designed capacity and is accepted by the state commission.

**Operation Stage.** At this stage, the enterprise begins full-scale production. Continuous analysis of economic performance is conducted to ensure efficiency.

### Project Management Structure

Effective construction management involves the participation of several key entities:

- **Client (Investor):** initiates and finances the project;
- **Design Organization:** develops technical documentation;
- **Contractor:** executes construction and installation works;
- **Technical Supervision Service:** ensures quality and safety control.

The success of the project depends on the coordinated interaction among these participants. The construction of such enterprises is a complex, multi-stage process requiring both technical precision and economic justification.

### Concept of Reconstruction and Modernization

In addition to constructing new enterprises, improving the performance of existing facilities through reconstruction and modernization is essential for maintaining competitiveness and efficiency.

**Reconstruction.** Reconstruction refers to the comprehensive redevelopment of existing production facilities. It includes expansion of production areas, upgrading technological processes, replacement of obsolete equipment, and installation of additional production lines.

The primary objectives of reconstruction are:

- increasing production capacity;
- improving product quality;
- reducing production costs;
- upgrading infrastructure.

### Modernization

Modernization involves the renewal and optimization of production processes through the introduction of advanced, energy-efficient, and environmentally friendly technologies. It typically includes targeted technical improvements such as:

- replacement of outdated equipment with modern alternatives;
- implementation of automation systems;
- enhancement of process efficiency.

The main goals of modernization are:

- efficient use of energy and raw materials;
- reduction of waste and environmental impact;
- automation of production processes;
- improvement of product quality.

### Differences Between Reconstruction and Modernization

Criterion	Reconstruction	Modernization
Scope	Large-scale expansion	Process optimization and renewal
Objective	Addition of new production lines	Technical upgrades and automation
Investment	Requires significant capital	Requires relatively lower investment

### Technical and Economic Indicators

The key indicators used in evaluating construction and reconstruction projects include:

Indicator	Unit	Description
Design capacity	thousand tons/year	Annual production volume
Capital investment	million UZS	Total cost of construction and equipment
Production cost	UZS/ton	Cost per unit of output
Profit (net income)	million UZS/year	Difference between revenue and expenses
Profitability	%	(Profit / Capital investment) × 100
Payback period	years	Time required to recover investment

### Additional Considerations

During construction and reconstruction processes, the following aspects must also be addressed:

- ✓ recycling and utilization of industrial waste;
- ✓ reduction of dust and gas emissions;
- ✓ implementation of water- and energy-saving technologies;
- ✓ promotion of local employment and social infrastructure development.

### Conclusion

The construction and reconstruction of enterprises producing construction materials and products play a crucial role in ensuring sustainable economic development. The preparation of a comprehensive feasibility study enhances project efficiency, ensures rational use of resources, and supports environmental safety.

Therefore, it is essential to maintain a balanced integration of technical, economic, and environmental criteria at every stage of project implementation.

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