ADDIS ABABA UNIVERSITY

ADDIS ABABA INSTITUTE OF TECHNOLOGY

DEPARTEMENT OF CIVIL ENGINEERING

Contract, Specification and Quantity Survey
(CENG 5101)

CHAPTER-1

General Introduction on the Construction Industry

October 2011
(NASIR B.)
CONTENTS

- Construction Project
- Construction Industry
- Life Cycle of Construction Project
- Main Parties in Construction Project
- Resource for Construction Industry
- Construction Management Process
- The Ethiopian Construction Industry
  - Historical Aspect
  - Current Status of the Industry
  - Challenges in the sector
  - Recent Trends and future prospects
INTRODUCTION

1. Construction Project

- A construction is a process of constructing something by man for one purpose or another. It may be a road, bridge, a dam, a dwelling place, an airport, a commercial building, etc.

- In planning for the various types of construction, the methods of procuring professional service, awarding construction contracts, and financing the constructed facility can be quite different.

- The broad spectrum of constructed facilities may be classified into four major categories, each with its own characteristics:

A. Residential Housing Construction:

- Includes single-family houses, multi-family dwellings, and high rise apartments.

- The residential housing market is heavily affected by general economic conditions, tax laws, and the monetary and fiscal policy.
INTRODUCTION

1. Construction Project

B. Institutional and Commercial Building Construction:
- Encompasses a great variety of project types and sizes, such as schools and universities, medical clinics and hospitals, recreational facilities and sport stadiums, retail chain stores and large shopping centers, warehouses and light manufacturing plants, and skyscrapers for office and hotels.
- Because of the higher costs and great sophistication in comparison with residential housing, this market segment is shared by fewer competitors.

C. Specialized Industrial construction:
- Involves very large scale projects with a high degree of technological complexity, such as oil refineries, steel mills, chemical processing plants and nuclear plants.
INTRODUCTION

1. Construction Project

C. Specialized Industrial construction:
   - Long range demand forecasting is the most important factor since such projects are capital intensive and require considerable amount of planning and construction time.

D. Infrastructure and heavy construction:
   - Includes projects such as highways, mass transit systems, tunnels, bridges, pipelines, drainage systems and sewage treatment plants.
   - Most of these projects are publicly owned and therefore financed by either through bonds, taxes, grants or aids.
   - This category of construction is characterised by a high degree of mechanisation.
INTRODUCTION

2. Construction Industry

- Construction Industry (CI) is an industry which is involved in the planning, execution and evaluation of all types of civil works.

- Construction Industry can be categorized into three major sectors:
  1. Transport and Communication Sector - Road, Railway, Airway, and Telecommunication related physical works.
  2. Water and Energy Works – Hydropower development, transmission lines, wind power, irrigation projects.

- CI is among the leading industry in producing employment and contribute to the over all national development.

- CI is the most important enabler for social, economic and political development of countries.
INTRODUCTION

2. Construction Industry

- CI especially in developing countries like Ethiopia consumes much of the national budget.

<table>
<thead>
<tr>
<th>Region</th>
<th>Value</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Total</td>
<td>3.41 Trillion $</td>
<td></td>
</tr>
<tr>
<td>Asia</td>
<td>1,113 Billion $</td>
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<tr>
<td>Europe</td>
<td>1,017 Billion $</td>
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<td>North America</td>
<td>885 Billion $</td>
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<td>Latin America</td>
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<td>Middle East</td>
<td>101 Billion $</td>
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<tr>
<td>Africa</td>
<td>56 Billion $</td>
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<tr>
<td>1. US</td>
<td>$819 B (8.2%)</td>
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<tr>
<td>2. Japan</td>
<td>$618 B (13.9%)</td>
<td></td>
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<tr>
<td>3. Germany</td>
<td>$253 B (11.4%)</td>
<td></td>
</tr>
<tr>
<td>4. China</td>
<td>$181 B (17.0%)</td>
<td></td>
</tr>
<tr>
<td>5. UK</td>
<td>$109 B (7.7%)</td>
<td></td>
</tr>
<tr>
<td>Ethiopia</td>
<td>$402 M (59.8%)</td>
<td></td>
</tr>
</tbody>
</table>
INTRODUCTION

2. Construction Industry

- CI – is the most important enabler for social, economic and political development of countries.

- Specifically this fact is true for least developing countries like Ethiopia because projects are:
  - Inter-sectoral
  - Demands huge capital budget
# INTRODUCTION

2. Construction Industry

- Inter-sectoral relationship

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Building</th>
<th>Other Civil Works</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>Offices, Storages, Equipment Shades</td>
<td>Irrigation Schemes, Rural Access Roads</td>
</tr>
<tr>
<td>Education</td>
<td>Offices, Stores Class rooms, Libraries, Laboratories, etc</td>
<td>Internal and External Roads and Installations</td>
</tr>
<tr>
<td>Energy</td>
<td>Offices, Storages, Garages</td>
<td>Hydro Power Schemes, Electricity &amp; Power Stations and lines</td>
</tr>
<tr>
<td>Industry &amp; Commerce</td>
<td>Factories, Offices, Workshops, Storages</td>
<td>Internal and External Installations</td>
</tr>
<tr>
<td>Health</td>
<td>Offices, Clinics, Hospitals</td>
<td>Internal and External Roads &amp; Installations</td>
</tr>
<tr>
<td>Transportation &amp; Communication</td>
<td>Offices, Storages, Stations</td>
<td>Airports, Roads, Telecommunication lines</td>
</tr>
<tr>
<td>Water Resources</td>
<td>Offices, Storages</td>
<td>Water supply &amp; sewerage distribution lines, Treatment plants</td>
</tr>
<tr>
<td>Defense</td>
<td>Offices, camps, Training centers</td>
<td>Defense Schemes</td>
</tr>
</tbody>
</table>
# INTRODUCTION

## 2. Construction Industry

- Demand Huge Capital Budget

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Sectors: -</td>
<td>2581.7(89%)</td>
<td>2437.3(85.1%)</td>
<td>3496.6(90.7%)</td>
<td>2263.8(85.2%)</td>
<td>2254.8(79.5%)</td>
</tr>
<tr>
<td>Ethiopian Road Authority</td>
<td>99.4(32.7%)</td>
<td>1447.9(49.8%)</td>
<td>2344.7(60.8%)</td>
<td>1090.1(41%)</td>
<td>1594.1(56.2%)</td>
</tr>
<tr>
<td>Ethiopian Civil Aviation Authority</td>
<td>265.7(8.7%)</td>
<td>397.3(13.7%)</td>
<td>344.4(8.9%)</td>
<td>411.8(15.5%)</td>
<td>31.8(1.1%)</td>
</tr>
<tr>
<td>Ministry of Water Resource</td>
<td>90(3%)</td>
<td>84(3%)</td>
<td>82(2%)</td>
<td>315(2%)</td>
<td>143(5%)</td>
</tr>
<tr>
<td>Social Sectors</td>
<td>215.0(7.1%)</td>
<td>246.0(8.5%)</td>
<td>142.3(3.7%)</td>
<td>249.2(9.4%)</td>
<td>242.1(8.5%)</td>
</tr>
<tr>
<td>Ministry of Education</td>
<td>165.1(5.4%)</td>
<td>196.5(6.8%)</td>
<td>116.6(3.0%)</td>
<td>177.5(6.7%)</td>
<td>198.6(7%)</td>
</tr>
<tr>
<td>Total</td>
<td>96.10%</td>
<td>93.60%</td>
<td>94.40%</td>
<td>94.60%</td>
<td>88.00%</td>
</tr>
<tr>
<td>Public Construction Projects</td>
<td>42.00%</td>
<td>62.40%</td>
<td>66.90%</td>
<td>59.80%</td>
<td>60.20%</td>
</tr>
<tr>
<td>Annual Average</td>
<td></td>
<td></td>
<td></td>
<td>58.20%</td>
<td></td>
</tr>
</tbody>
</table>
2. Construction Industry

Nature of Construction Industry:
- Requires big capital investment thus is highly affected by the economy of the nation.
- Construction is a team output and requires motivated and skilled workers.

Uniqueness of Construction Industry:
- Fragmented Industry
- Long production cycle
- Transient organization nature
- Unpredictable work load
- Subject to Environmental Impact
The project life cycle of a construction project may be viewed as a process through which a project is implemented from cradle to grave.
INTRODUCTION

4. Main Parties in Construction Project

- The practice of planning, designing, constructing, and operating a facility is most usually a collective effort of different groups of professionals and trades.

- Depending on the size, complexity, and purpose of a particular construction project, the project team may include:
  - A client or an owner: Individuals, government, real estate developers etc.
  - Financial institutions or other investors that provide the funding
  - Local planning and code authorities
  - Consultants or Licensed architects and engineers who provide design work and prepare construction documents
  - Contractors who provide construction services and install systems
  - Marketing or leasing agents
  - Facility managers who are responsible for operating the facility.
INTRODUCTION

4. Main Parties in Construction Project
4. Main Parties in Construction Project

I. Client

- The client is the most important party who is active from inception to completion and event to post-occupancy maintenance.
- Clients may be classified as *Public sector clients* and *private sector clients*.

A. Public sector clients

  - Central Government Offices (Ministries)
  - Local Authorities (Regional or Town)
  - Public Corporations

B. Private sector clients

  - These are private individuals & private companies.
INTRODUCTION

4. Main Parties in Construction Project

Duty of the Client

- Demand for the product. For example for the building project:
  - Availability and cost of land,
  - Location & accessibility
  - Price
  - Required Infrastructure
  - Legal constraints
  - Current & future development
  - Soil characteristics of land
  - Site preparation (right of way)
  - Permits
4. Main Parties in Construction Project

II. Consultant

- The main role of the consultant is to interpret the client’s project requirement into a specific design.
- The consultants’ team shall:
  - Ascertain, interpret and formulate the client’s requirement into an understandable project.
  - Design the project to much requirements and constraints (imposed by statutory obligations, technical feasibility, environmental factors, site conditions, cost, etc)
  - Assess client’s cost limit to decide on materials & the like.
  - Prepare contract documents.
  - Supervise the project and constantly inform the client on the progress
  - Approve payments
  - Resolve contractual disputes
  - Issue provisional and final acceptance certification
INTRODUCTION

4. Main Parties in Construction Project

III. Contractor

- These are groups established mainly as commercial companies, that contract to construct development projects.

- Responsibility of contractors:
  - Carry out a full site investigation prior to submission of tender,
  - Submit tender,
  - Plan, Program, Control the construction process.
  - Notify the consultant about delays, discrepancies,
  - Effect all payments to his employees, suppliers, subcontractors,
  - Rectify all defects on completion of works, etc
  - Provide post occupancy repair & maintenance if required.
4. Main Parties in Construction Project

III. Public Sector Agencies

A. Statutory Authorities
   - These bodies offer technical advice during design and construction in their respective areas.
   - E.g. EEPCO, AAWSA, Fire Authority - requires meeting their specific requirements. Thus early information to these authorities is required.

B. Municipalities and Government Authorities
   - These bodies offer the basic Land permit and building permit.
INTRODUCTION

5. Resource for the construction Industry

- The following resources are vital for construction industry:
  - Human Resources (Labor or Workmen)
  - Financial Resources (Fund)
  - Information Resources
  - Physical Resources (Materials, Equipment and Other Assets)
  - Services and Management

A. Human resource (Labour or Workmen)

- These include professional, skilled, semi skilled and unskilled laborers.

- Human resources can be understood in two values: **Capacity** and **Capability**.
  - **Capacity** - refers to the *quantity* of labor for the scope defined.
  - **Capability** - refers to *knowledge, technology know-how and skill* as per the demands of the scopes ability.
5. Resource for the construction Industry

A. Human resource (Labour or Workmen)
   - Construction Managers need to be capable of:
     - Communication- Inter-personal, group interaction-skills
     - Problem solving / Conflict resolution / Negotiation Skills
     - Facilitating / Decision- making Skills
     - Writing skills for Proposals / Reports / ToRs / MoUs; and
     - Hard Skills- Planning, Implementing, Leading and Monitoring tools.

B. Financial Resources (Fund)
   - Usually funds are available from among Governmental institution, Private institutions and Donors in the form of loan or assistance.

C. Information Resources
   - Information can be understood in two terms: data whether processed or not; and its technology.
5. Resource for the construction Industry

D. Physical Resources

i. Materials

- Material covers 55-70% of the total construction cost.

ii. Equipments

- Though their initial cost is high using equipments are far more better than using labor.

iii. Other assets

- Physical Infrastructures and Owned Land are assets which can be collaterals for capital base enhancement and credit facilities and are useful to develop the scarce financial resources and getting into business access.
INTRODUCTION

5. Resource for the construction Industry

E. Service and Management

i. Service

- Services such as acquisition of land, provisions of water supply, electric power, communication systems, etc., are very much necessary in the construction industry.

ii. Management

- Management has come to employ a disciplined approach to the use of available resources.
6. Construction Project Management Process

- Project management is the **Planning**, **Organizing**, **Monitoring** and **Controlling** of all aspects of a project, to achieve the project’s objective.
INTRODUCTION

6. Construction Project Management Process

1. Project Integration Management
   - Develop Project Charter
   - Develop Preliminary Project Scope Management
   - Develop Project Management Plan
   - Direct and Manage Project Execution
   - Monitor and Control Project Work
   - Integrated Change Control
   - Close Project

2. Project Scope Management
   - Scope Planning
   - Scope Definition
   - Create WBS
   - Scope Verification
   - Scope Control

3. Project Time Management
   - Activity Definition
   - Activity Sequencing
   - Activity Resource Estimating
   - Activity Duration Estimating
   - Schedule Development
   - Schedule Control
INTRODUCTION

6. Construction Project Management Process

4. Project Cost Management
- Cost Estimating
- Cost Budgeting
- Cost Control

5. Project Quality Management
- Quality Planning
- Perform Quality Assurance
- Perform Quality Control

6. Project Human Resource Management
- Human Resource Planning
- Acquire Project Team
- Develop Project Team
- Manage Project Team
6. Construction Project Management Process

7. Project Communication Management
- Communications Planning
- Information Distribution
- Performance Reporting
- Manage Stakeholders

8. Project Risk Management
- Risk Management Planning
- Risk Identification
- Quantitative Risk Analysis
- Risk Response Planning
- Risk Monitoring and Control

9. Project Procurement Management
- Plan Purchase and Acquisition
- Plan Contracting
- Request Seller Responses
- Select Sellers
- Contract Administration
- Contract Closure
INTRODUCTION

7. The Ethiopian Construction Industry

7.1 Historical Aspect: The Construction Development

- Previous monarchies had contributed to the development of constructions in Ethiopia.
- Historic chronicles of the 17th and 18th centuries showed that there were a number of small roads, palaces and river improvement works.
- Among the Emperors Atse Fasil, Atse Theodros and Atse Menilik were noted for their major contributions.
- Modern construction however had started during the region of Emperor Menilik II (The road from Asmara to Addis Ababa).
- Italy during its invasion (1936-1941) had also contributed to the development of the construction industry. It had constructed about 6000km of roads.
- After Italian invasion, the first Ministry called “Ministry of Communication and Public Works” was established during the Imperial regime.
INTRODUCTION

7. The Ethiopian Construction Industry

7.1 Historical Aspect: The Construction Development

- The construction development can be reviewed into five distinct periods based on the historical paradigm shifts in the construction industry in Ethiopia:
  
  i. **Pre 1968**: Foreign Companies dominated construction Industry.
  
  ii. **1968-1982**: Emergence of Small scale Domestic construction companies,

  iii. **1982-1987**: Parastatal companies dominated Construction Industry,

  iv. **1987-1991**: Fragmentation between Design services & Construction works,

  v. **1991-2001** Parastatal Domination legally abolished, and
INTRODUCTION

7. The Ethiopian Construction Industry

7.1 Historical Aspect: The Construction Development

I. Pre 1968: Foreign Companies dominated construction Industry

- The construction industry was dominated by foreign contractors.
- Most civil works were procured under International Competitive Bidding (ICB).
- Public Institution including Ministry for Public Works (MoPW) and the Imperial Highway Authority (IHA-1951) were established.

II. 1968 – 1982: Emergence of Small Scale Domestic Construction companies

- This period was recognized by the then Imperial government together with foreign financiers’ commitment and initiative towards building the capacity of the construction industry.
- Conductive proclamations for the construction industry were promulgated.
- BERTA Construction Plc., National Engineers Plc., Ethiopian Building and Road construction, Ethiopian Earthmoving Equipment were established.
INTRODUCTION
7. The Ethiopian Construction Industry

7.1 Historical Aspect: The Construction Development

III. 1982-1987: Parastatal Companies Dominated Construction Industry

• Confiscation of developing domestic private construction companies and became under state control in 1982.
• This led the promotion of state-owned construction companies aggressively.
• Number of state-owned construction enterprises were established under the defunct MoC:
  • EBCA, ETCA, BNCE, BtCE, NE&C, BERTA Construction.
• Competitive construction industry was crippled.


• The period was characterized by the establishment of consultancy offices for the design and contract administration services as independent entities.
• The Design Bid Build procurement method had its roots well founded under this period.
• Small scale private consultants and contractors emerged due to the change of economic policy.
• Building Design Enterprise (BDE in 1985) and Transport Construction Design Enterprise (TCDE in 1986) were established.
7. The Ethiopian Construction Industry

7.1 Historical Aspect: The Construction Development

V. 1991-2001: Parastatal Dominated construction Industry was Legally Abolished

- Local and foreign private investors were allowed to participate in all areas of construction activities
- State-owned construction and consulting companies were reorganized as autonomous enterprises for subsequent privatization
- Regional governments established their bureaus for works & urban development
- Direct awards to state-owned construction companies were minimized to create competitive environment which was an encouraging development
- A new ministry called Ministry of Works and Urban Development (MoWUD) was established.
- Ethiopian Building Codes and Standards (EBCS 1 – EBCS 11), 1995 was formulated
7. The Ethiopian Construction Industry

7.2 Current status of the construction sector

- Current status of the construction industry is distinguished by:
  
  i. Lack of clear developmental objectives for the industry;
  
  ii. Inadequate co-ordination of planning between the industry and infrastructure programs in the various sectors of the economy;
  
  iii. Heavy dependence on foreign resources such as materials, equipment and expertise, which continue to be supplied to a major extent by foreign consultants and contractors;
  
  iv. Transport bottlenecks to the distribution of construction materials and equipment;
  
  v. Control of the construction sector by small-to-medium sized firms and parastatal construction enterprises operating at low levels of capacity and with inadequate working capital;
  
  vi. Inadequate and ineffective organizations representing the interests of contractors, consultants and engineers;
INTRODUCTION

7. The Ethiopian Construction Industry

7.2 Current status of the construction sector

vii. inadequate numbers of suitably qualified and experienced personnel, at all levels: engineers, technicians, mechanics, operators and foremen etc.;

viii. inadequate relevant local construction regulations and standards

ix. inadequate consideration given to the use of local resources (including community participation in labor-based works); and

x. little consideration given to the concept or cost of maintenance as a component of investment costs.
INTRODUCTION

7. The Ethiopian Construction Industry

7.2 Current status of the construction sector

- The general state of the domestic construction industry in Ethiopia is characterized by the following five major deficiencies:
  
  I. An inadequate capital base;
  II. Old and limited numbers of equipment;
  III. Low levels of equipment availability and utilization;
  IV. Deficiencies in technical, managerial, financial and entrepreneurial skills; and
  V. Insufficient and ineffective use of labor-based construction and maintenance technology.
INTRODUCTION

7. The Ethiopian Construction Industry

7.3 Challenges in the construction sector

- Some of the major challenges faced in the Ethiopian construction industry are:
  - Lack of equipment and material
  - Obstacles posed by government regulations
  - Scarcity of finance
  - Big projects off-limits to domestic firms
  - Inefficient custom and clearance
  - Lack of skilled labor
  - Construction project delays: Delays are endemic to construction projects in Ethiopia.
7. The Ethiopian Construction Industry

7.3 Challenges in the construction sector

- Cement Crisis:

Retail prices of cement from Mugher, Messebo and Imports (May 2008 - May 2009)
INTRODUCTION

7. The Ethiopian Construction Industry

7.4 Recent Trends and Future Prospects

I. Road Construction

- The Road Sector Development Plan (RSDP) has been implemented over a period of thirteen years and in three separate phases, as follows:
  - RSDP I – Period from July 1997 to June 2002 (5 year plan)
  - RSDP II – Period July 2002 to June 2007 (5 year plan)
  - RSDP III – Period July 2007 to June 2010 (3 year plan)

<table>
<thead>
<tr>
<th>Phases of the Program</th>
<th>Financial (in Million ETB)</th>
<th>%</th>
<th>Physical (in km)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Budget</td>
<td>Disb.</td>
<td>Plan</td>
<td>Acco.</td>
</tr>
<tr>
<td>RSDP I (Five Years)</td>
<td>9812.9</td>
<td>7284.5</td>
<td>8908</td>
<td>8709</td>
</tr>
<tr>
<td>RSDP II (Five Years)</td>
<td>15985.8</td>
<td>18112.8</td>
<td>8486</td>
<td>12006</td>
</tr>
<tr>
<td>RSDP III (Three Years)</td>
<td>34643.9</td>
<td>34957.8</td>
<td>20686</td>
<td>19250</td>
</tr>
<tr>
<td>Total RSDP (Thirteen Years)</td>
<td>60442.6</td>
<td>60355.1</td>
<td>38080</td>
<td>39965</td>
</tr>
</tbody>
</table>
INTRODUCTION

7. The Ethiopian Construction Industry

7.4 Recent Trends and Future Prospects

I. Road Construction

- **RSDP IV** is prepared as part of Governments’ overall Growth and Transformation Plan.

- Implementation of RSDP IV is major strategic pillar of the Growth and Transformation Plan.

- RSDP IV consists of:
  - *Rehabilitation* of 728 kilometers of trunk roads,
  - *Upgrading* of 5,023 kilometers of trunk and link roads,
  - *Construction* of 4,331 kilometers of new link roads
  - *Heavy maintenance* of 4,700 kilometers of paved and gravel roads and
  - *Routine maintenance* of 84,649 kilometers of road network
7. The Ethiopian Construction Industry

7.4 Recent Trends and Future Prospects

I. Road Construction

- The program also consists of the following regional and Wereda road components
  - Construction of **11,212 kilometers** of new rural roads through the RRAs; and
  - Construction of **71,523 kilometers** of Wereda roads through the Wereda road offices

- Cost Estimate
  - The total cost of implementing RSDP IV is estimated to be ETB **125,276.7 million**.
INTRODUCTION

7. The Ethiopian Construction Industry

7.4 Recent Trends and Future Prospects

II. Railway Construction

- Officially several Railroad projects have been launched by Ethiopian Railway Corporation (ERC).
- ERC is presently managing a 5,000 km proposed national railway network study and the Addis Ababa Light Rail Transit (AALRT) Project.

A. Addis Ababa Light Rail transit Project (AA LRT):

- The 1st Phase of the LRT project comprises an East-West line from Ayat to Torhailoch (17.35Km) and a North-South line from Menelik II Sq. to Kality (16.90 Km).
- The Total Length of Phase I will be 34.25 Km.
- Cost: 3 million USD per Kilometre
INTRODUCTION

7.4 Recent Trends and Future Prospects

II. Railway Construction
INTRODUCTION

7. The Ethiopian Construction Industry

7.4 Recent Trends and Future Prospects

II. Railway Construction

B. Federal Railway Projects

- Ethiopia has launched the construction of a 5,000 Km railway complex which aims to link the capital, Addis Ababa, to various regions of the country.
- According to the GTP 2,000 Km of the total will be constructed in the next five years.
- The first phase of construction will be the construction of five railway tracks, which will create job opportunities for over 300,000 citizens nationwide, and will cost the nation an estimated 6 billion Birr (US$336 million) annually.
## INTRODUCTION

7. The Ethiopian Construction Industry

### II. Railway Construction

<table>
<thead>
<tr>
<th>Project Phase</th>
<th>Route</th>
<th>Via</th>
<th>Distance (Km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I</td>
<td>Route 1</td>
<td>Addis Ababa (Sebeta)<em>Mojo_Awash_Dire Dewa</em> Djibouti</td>
<td>656</td>
</tr>
<tr>
<td></td>
<td>Part of Route 3</td>
<td>Addis Ababa(Sebeta)_Ejaji_Seka_Bedele</td>
<td>366</td>
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<tr>
<td></td>
<td>Part of Route 6</td>
<td>Weldia_Mile_Djibouti_Railway</td>
<td>256</td>
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<tr>
<td></td>
<td>Part of Route 5</td>
<td>Awash_Kombolcha_Mekele</td>
<td>556.2</td>
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<tr>
<td>Phase II</td>
<td>Route 4</td>
<td>Ejaji_Nekemt_Asossa_Kurmuk</td>
<td>460</td>
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<td></td>
<td>Route 2</td>
<td>Mojo_Shashemene_Konso_Woyito_ Konso_ Moyale</td>
<td>905</td>
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<tr>
<td></td>
<td>Route 7</td>
<td>Wereta_Azezo_Metema</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>Route 8</td>
<td>Adama_Indeto_Gasera</td>
<td>248</td>
</tr>
<tr>
<td></td>
<td>Extension</td>
<td>Extension to Sudan Via Boma (not part of the project)</td>
<td>115</td>
</tr>
</tbody>
</table>
INTRODUCTION

7. The Ethiopian Construction Industry

II. Railway Construction
INTRODUCTION

7. The Ethiopian Construction Industry

7.5 Recent Trends and Future Prospects

III. Hydropower Development

- The Ethiopian government has for long recognized that economic progress will depend principally on the development of the hydropower resources of the country.

- Ethiopia has a vast hydropower potential, which is estimated to be about 45,000 MW.

- Even though Ethiopia considers itself the Powerhouse of Africa, so far very little percentage (less than 5%) of the vast potential has been harnessed.

- In 2009 less than 10% of Ethiopians had access to electricity and the country was plagued by power outages.

- In order to overcome this situation, the government has embarked on an ambitious dam construction program.
INTRODUCTION

7. The Ethiopian Construction Industry

7.5 Recent Trends and Future Prospects

III. Hydropower Development

- *Three hydropower plants* with a combined capacity of 1.18 GW were commissioned in 2009 and 2010 alone, more than doubling the previous installed capacity of the country.
- The financial costs of large dams that have been completed since 2009 and are scheduled to be completed until 2014 is estimated at about US$ 6 billion, or about 20% of annual GDP.
- The construction of even more large dams is foreseen in a Master Plan that aims to bring the capacity to 15 GW.
### INTRODUCTION
#### III. Hydropower Development

<table>
<thead>
<tr>
<th>Name</th>
<th>Installed Capacity</th>
<th>Commissioning</th>
<th>Basin</th>
<th>Contractor</th>
<th>Financing</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fincha</td>
<td>134 MW</td>
<td>1973</td>
<td>Fincha (Blue Nile)</td>
<td>Salini (bid)</td>
<td>World Bank</td>
<td>$331m</td>
</tr>
<tr>
<td>Gilgel Gibe I</td>
<td>180 MW</td>
<td>2004</td>
<td>Omo river</td>
<td>Salini (bid)</td>
<td>World Bank</td>
<td>$331m</td>
</tr>
<tr>
<td>Tekeze</td>
<td>300 MW</td>
<td>2009</td>
<td>Tekeze (Atbara)</td>
<td>Sinohydro Corporation (bid)</td>
<td>Chinese</td>
<td>$365m</td>
</tr>
<tr>
<td>Beles</td>
<td>460 MW</td>
<td>2010</td>
<td>Lake Tana (Blue Nile)</td>
<td>Salini (no bid)</td>
<td>Ethiopian government</td>
<td></td>
</tr>
<tr>
<td>Gilgel Gibe II</td>
<td>420 MW</td>
<td>2010</td>
<td>Omo River (no dam, fed by GG I)</td>
<td>Salini (no bid)</td>
<td>Italy and EIB</td>
<td>Euro 370m</td>
</tr>
<tr>
<td>Gilgel Gibe III</td>
<td>1870 MW</td>
<td>2012-13</td>
<td>Omo River</td>
<td>Salini (no bid)</td>
<td>Italy</td>
<td>Euro 1.55bn</td>
</tr>
<tr>
<td>Fincha Amerti Nesse (FAN)</td>
<td>100 MW</td>
<td>2013</td>
<td>Fincha (Blue Nile)</td>
<td>China (CGGC)</td>
<td>Exim Bank of China</td>
<td>$276m</td>
</tr>
<tr>
<td>Halele Worabese</td>
<td>440 MW</td>
<td>2014</td>
<td>Omo river</td>
<td>Sinohydro Corporation</td>
<td>FairFund?</td>
<td>Euro 470m</td>
</tr>
<tr>
<td>Gilgel Gibe IV</td>
<td>2000 MW</td>
<td>2014</td>
<td>Tributary of the Omo River</td>
<td>Sinohydro Corporation</td>
<td>Chinese</td>
<td>$1.9bn</td>
</tr>
<tr>
<td>Chemoga Yeda</td>
<td>278 MW</td>
<td>2013</td>
<td>tributary of the Blue Nile, near Debre Markos</td>
<td>Sinohydro Corporation</td>
<td>Chinese</td>
<td>$555m</td>
</tr>
<tr>
<td>Genale Dawa III</td>
<td>256 MW</td>
<td>Awarded in 2009</td>
<td>between Oromo and Somali state</td>
<td>Chinese (CGGC)</td>
<td>Chinese</td>
<td>$408m</td>
</tr>
</tbody>
</table>
INTRODUCTION

7. The Ethiopian Construction Industry

III. Hydropower Development

- Other projects included in the 25-year Master Plan of the national power utility EEPCO are:
  - *Genale IV Project*, with 256 MW electric power generation capacity; to be completed before 2015, project cost 296 million Euro.
  - *Geba I and II projects*, with 366 MW electric power generation capacity; to be completed in 2015, project cost 384 million Euro.
  - *Gojob Project*, with 150 MW electric power generation capacity; to be completed in 2015
  - *Karadobi 1600 MW*; prefeasibility study by Norconsult-Lahmeyer financed by a grant from Norway is complete; the dam will be located on the Blue Nile and it is expected to export power to Sudan and possibly to Egypt, project cost 1548 million Euro.
  - *Mandaya 2400-2800 MW*, located on the Blue Nile, project cost 1920 million Euro.
INTRODUCTION

7. The Ethiopian Construction Industry

III. Hydropower Development

Possible interconnection lines with neighboring countries
INTRODUCTION

7. The Ethiopian Construction Industry

7.4 Recent Trends and Future Prospects

IV. Wind power Development

- EEPCo has been planning the implementation of wind parks since 2005 in several areas, which are estimated to comprise of up to 200 MW to the year 2012.

- EEPCo has decided to use wind power for the several advantages that it posses:
  - Being renewable,
  - Being reliable and affordable,
  - Being complementary to hydropower plants: rainy season – low wind; dry season – high wind potential, and
  - combing wind and hydro adds value to the hydro plant, i.e. longer operation time, also at the end of dry season (water saving through wind).
INTRODUCTION

7. The Ethiopian Construction Industry

7.4 Recent Trends and Future Prospects

IV. Wind power Development

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of the project</th>
<th>Electric power generation capacity in MW</th>
<th>Year of completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ashengoda Wind Power Project</td>
<td>120 (€210 million)</td>
<td>2012</td>
</tr>
<tr>
<td>2</td>
<td>Adama Wind Power Project</td>
<td>51 ($117 million)</td>
<td>2011</td>
</tr>
<tr>
<td>3</td>
<td>Adama II Wind Power Project</td>
<td>51</td>
<td>2013</td>
</tr>
<tr>
<td>4</td>
<td>Assela Wind Power Project</td>
<td>100</td>
<td>2013</td>
</tr>
<tr>
<td>5</td>
<td>Ayisha Wind Power Project</td>
<td>300</td>
<td>2012</td>
</tr>
<tr>
<td>6</td>
<td>Debre Birhan Wind Power Project</td>
<td>400</td>
<td>2013</td>
</tr>
<tr>
<td>7</td>
<td>Messobo Wind Power Project</td>
<td>42</td>
<td>2012</td>
</tr>
</tbody>
</table>
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7. The Ethiopian Construction Industry
7.4 Recent Trends and Future Prospects

IV. Wind power Development

The four major search areas for wind power
INTRODUCTION

7. The Ethiopian Construction Industry

7.4 Recent Trends and Future Prospects

VI. Irrigation Projects

- Based upon the various river basin master plans and land and water resources surveys, the aggregate *irrigation potentials* of Ethiopia have been estimated to be **2,523,000 million hectares**, net.

- The total area irrigated till 1991 was 176,015 ha, this figure had increased to 197,250 ha in 1998.

<table>
<thead>
<tr>
<th>Description</th>
<th>Small-scale schemes</th>
<th>Large- and medium-scale schemes</th>
<th>Total area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-term 1st 5 years: (2002-2006):</td>
<td>40,319</td>
<td>13,044</td>
<td>53,363</td>
</tr>
<tr>
<td>Medium-term 2nd 5 years: (2007-2012):</td>
<td>40,348</td>
<td>39,701</td>
<td>80,049</td>
</tr>
<tr>
<td>Long-term 3rd 5 years: (2012-2016):</td>
<td>46,471</td>
<td>94,729</td>
<td>141,200</td>
</tr>
<tr>
<td>Total area to be developed during 2002-2016:</td>
<td>127,138</td>
<td>147,474</td>
<td>274,612</td>
</tr>
<tr>
<td>Currently developed (approximate):</td>
<td>98,625</td>
<td>98,625</td>
<td>197,250</td>
</tr>
<tr>
<td>Grand total irrigated area by 2016:</td>
<td>225,763</td>
<td>246,099</td>
<td>471,862</td>
</tr>
</tbody>
</table>
INTRODUCTION

7. The Ethiopian Construction Industry

7.4 Recent Trends and Future Prospects

VI. Irrigation Projects

- The Federal investment plan for the short, medium and long terms would require a total investment of **US$ 1,114.3 million** over 15 years.

<table>
<thead>
<tr>
<th>Project Type</th>
<th>ST (US$)</th>
<th>MT (US$)</th>
<th>LT (US$)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Federal Projects</td>
<td>114.7</td>
<td>268.1</td>
<td>700.9</td>
<td>1,083.7</td>
</tr>
<tr>
<td>1.1 Implementation</td>
<td>90.6</td>
<td>223.0</td>
<td>686.7</td>
<td>1,003.0</td>
</tr>
<tr>
<td>1.2 Studies &amp; designs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Program Scheme</td>
<td>8.0</td>
<td>16.3</td>
<td>4.3</td>
<td>28.6</td>
</tr>
<tr>
<td>b) Nile Initiative Schemes (w/o Tana Shore Schemes)</td>
<td>16.1</td>
<td>28.8</td>
<td>-</td>
<td>44.9</td>
</tr>
<tr>
<td>c) Multi-purpose Schemes</td>
<td>-</td>
<td>-</td>
<td>9.9</td>
<td>9.9</td>
</tr>
<tr>
<td>2. Regional Projects</td>
<td>193.2</td>
<td>188.8</td>
<td>217.4</td>
<td>599.4</td>
</tr>
<tr>
<td>2.1 Implementation</td>
<td>188.3</td>
<td>184.0</td>
<td>211.9</td>
<td>584.2</td>
</tr>
<tr>
<td>2.2 Studies &amp; Designs</td>
<td>4.9</td>
<td>4.8</td>
<td>5.5</td>
<td>15.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>307.9</strong></td>
<td><strong>456.9</strong></td>
<td><strong>918.3</strong></td>
<td><strong>1,683.1</strong></td>
</tr>
</tbody>
</table>
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7. The Ethiopian Construction Industry

7.4 Recent Trends and Future Prospects

VII. Housing Developments

- Currently nearly 11.7 million people, which are 16% of the total population, live in urban area.
- The annual urban population growth rate is estimated to be 4.3%.
- When the housing development was first launched there were shortages of 900,000 houses.
- In order to alleviate the acute shortage of housing the Federal government in its *Housing Development Projects* (2006/07-2009/10) had set a target to construct 400,000 houses in five major regions, Dire Dawa and Addis Ababa with a total budget of 15.8 billion birr within 4 years time.
- The government has achieved to construct only 151,043 houses, which is half of what has been set in the target.
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7. The Ethiopian Construction Industry

7.4 Recent Trends and Future Prospects

VII. Housing Developments

- Number of blocks to be constructed for housing in the next five years

<table>
<thead>
<tr>
<th>Project Year</th>
<th>No. of Blocks to be constructed</th>
<th>No. of Consulting office required</th>
<th>No. of contractors required</th>
<th>No. of Small Scale Enterprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010/11</td>
<td>30,000</td>
<td>32</td>
<td>1,922</td>
<td>4,306</td>
</tr>
<tr>
<td>2011/12</td>
<td>30,000</td>
<td>32</td>
<td>850</td>
<td>1,455</td>
</tr>
<tr>
<td>2012/13</td>
<td>35,000</td>
<td>32</td>
<td>850</td>
<td>1,455</td>
</tr>
<tr>
<td>2013/14</td>
<td>35,000</td>
<td>32</td>
<td>850</td>
<td>1,455</td>
</tr>
<tr>
<td>2014/15</td>
<td>40,000</td>
<td>32</td>
<td>1,000</td>
<td>2,243</td>
</tr>
</tbody>
</table>
INTRODUCTION

7. The Ethiopian Construction Industry

7.4 Recent Trends and Future Prospects

VIII. University Capacity Building Projects

- The Ministry of Education (MoE) slotted a staggering *eight billion birr* for the construction of *ten new universities* in the country.
- This addition will raise the number of universities in the country to 32 from the current 22.
- Number of blocks to be constructed in the new universities

<table>
<thead>
<tr>
<th>Project Year</th>
<th>No. of Blocks to be constructed</th>
<th>No. of Consulting office required</th>
<th>No. of contractors required</th>
<th>No. of Small Scale Enterprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010/11</td>
<td>676</td>
<td>7</td>
<td>666</td>
<td>420</td>
</tr>
<tr>
<td>2011/12</td>
<td>325</td>
<td>7</td>
<td>370</td>
<td>280</td>
</tr>
<tr>
<td>2012/13</td>
<td>150</td>
<td>7</td>
<td>415</td>
<td>280</td>
</tr>
<tr>
<td>2013/14</td>
<td>110</td>
<td>7</td>
<td>415</td>
<td>280</td>
</tr>
<tr>
<td>2014/15</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>