

Other Priority Sectors

CONSTRUCTION SECTOR

BACKGROUND

19.1. Construction activity creates physical assets in a number of sectors of the economy. Construction sector has two key segments: (i) Buildings, falling into one of the following categories: residential, commercial, institutional and industrial; and (ii) Infrastructure such as road, rail, dams, canals, airports, power systems, telecommunication systems, urban infrastructure including water supply, sewerage, and drainage and rural infrastructure. Assets once created also need to be maintained. Many upstream economic activities depend upon the construction sector. It is roughly estimated that 40–45 per cent of steel; 85 per cent of paint; 65–70 per cent of glass and significant portions of the output from automotive, mining and excavation equipment industries are used in the construction industry.

19.2. Construction accounts for nearly 60–80 per cent of the of project cost of roads and housing and a significant portion in case of other infrastructure sectors. Construction materials such as cement and steel, bricks and tiles, sands and aggregates, fixtures

and fittings, paints and chemicals, petrol and other petro-products, timber, minerals, aluminium, glass and plastics account for nearly two-third of the construction costs. The forward and backward multiplier impact of the construction industry is significant.

CONSTRUCTION SECTOR AND THE INDIAN ECONOMY

19.3. The Construction sector has been contributing around 8 per cent to the nation's GDP (at constant prices) in the last five years (2006–07 to 2010–11). As indicated by Table 19.1, GDP from Construction at factor cost (at constant prices) increased to ₹3.85 lakh crore (7.9 per cent of the total GDP) in 2010–11 from ₹284798 crore (8 per cent of the total GDP) in 2006–07. The growth in construction sector in GDP has primarily been on account of increased spending on physical infrastructure in the last few years through programmes such as National Highway Development (NHDP) and PMGSY/Bharat Nirman.

EMPLOYMENT IN THE CONSTRUCTION INDUSTRY

19.4. With around 31000 enterprises involved in the construction industry in 2011, the industry is the

TABLE 19.1
Construction Sector-Macro Aggregates

Macro-variable	2006–07	2007–08	2008–09	2009–10	2010–11
GDP from Construction (lakh crore)	2.85	3.15	3.33	3.56	3.85
Share of GDP (%)	8.0	8.1	8.0	7.9	7.9
Growth rate for GDP in Construction (%)	10.3	10.7	5.4	7.0	8.1

Source: Handbook of Statistics, RBI 2010–11.

second largest employer in the country after agriculture. Over 95 per cent of the enterprises numbering around 29600 employ less than 200 persons; over 3 per cent or around 1050 enterprises employ between 200 and 500 persons and only a little over 1 per cent or 350 enterprises have more than 500 employees. The employment figures have shown a steady rise from 14.5 million in 1995, 31.5 million in 2005 to 41 million in 2011. Between 1995 and 2005, there was a substantial drop in the proportion of skilled engineers in the workforce from 4.71 per cent to 2.65 per cent. This trend seems to have been arrested if not reversed with the number of engineers in 2011 at 2.56 per cent, that is, 1.05 million. The number of technicians and foremen is 1.12 million which represents 2.74 per cent of the workforce which shows an improvement over the 2005 when their proportion was 1.85 per cent. The number of skilled workers at 3.73 million constitutes 9.1 per cent of the total workforce which is marginally lower than their proportion of 10.57 per cent in 2005. Apart from clerical staff of 0.93 million, that is, 2.26 per cent, the rest of the workforce of 41 million in 2011 is comprised of unskilled workers whose number stood at 34.2 million representing 83.3 per cent which is almost at par with the proportion of 82.45 per cent in 2005. A large part of the industry remains unorganised which negatively impacts on the quality of delivery. Amongst the workforce, there is predominance of migrant labour which increases their vulnerabilities. There is a need to go in for state-centric surveys to capture the flow and pattern of migration rather than depending upon macro level data.

DEVELOPMENTS DURING THE TENTH AND ELEVENTH PLANS

19.5. Some notable achievements during the previous plan periods have been:

- Construction Sector was declared as an industrial concern under the IDBI Act in March 2000 in order to increase the flow of institutional credit to the sector.
- Implementation of national Human Resource Development (HRD) initiatives in the non-formal sector, including the workers' level to the upper levels of engineering and managerial categories
- Setting up of the Arbitral Institutions for resolution of business disputes in construction industry
- Setting up of disaster identification and mitigation centres which helped in development of a cadre of professionals well-trained to take disaster mitigation activities
- Development of institutions and implementation plans for safety and quality related issues
- Obtaining state-of-the-art global technology through strategic association between industry, government and international bodies
- Effective dissemination of information, regarding good work practices, and development of an action frame work for quality and safety audits, assessment and certification as well as training of man-power both for practice and research
- Improvement in procurement practices for the public sector, and also development of regulatory manuals to ensure quick and effective procurement procedures
- Electronic tendering process, online publishing of tender notices and related procedures are becoming more and more common.
- Setting up of models of public-private partnership in construction activity
- Development of consultancy and advisory services in the areas of project and construction management, procurement services, regulatory issues, and technology. Institutional Arbitration has taken firm root with the operationalisation of Construction Industry Arbitration Council. Nineteen cases have been undertaken so far. This is expected to From a very insignificant base (around 5000 during the Tenth Plan) of vocationally trained and certified personnel for the construction industry, around 350000 personnel were trained and certified in the Eleventh Plan by CIDC.
- Specialised institution (Construction Industry Vocational Training Council) was set up at the national level to provide training to vocational and supervisory trades of the construction industry.
- Safety record of the industry has shown improvement. The accident frequency rate in 2011

declined to 0.006 accidents per million man-hours worked from 0.009 in 2007. This is due to professionalisation of big contractors.

- On account of better training opportunities and enhanced mechanisation, productivity per person in the industry has increased from ₹78440 in 2007 to ₹98620 in 2011.
- A national level comprehensive Green Rating Initiative has been made ready and is ready to be launched.
- National level awards (Vishwakarma Awards) instituted by CIDC for outstanding performance have received good response. The awards cover all levels from artisans to life-time achievement awards for industry captains. Awards are also given for projects, with categories including Safety, Health, Environment, Special Features and so on.
- Construction cost indices, sponsored by MOSPI have received good response from project owners.

CONSTRAINTS IN THE CONSTRUCTION INDUSTRY

19.6. Despite the achievements during the previous plans, construction industry faces many constraints. Although 41 million people are employed in this sector, less than 6 per cent has the benefit of structured training and skill building. Skill upgradation schemes launched by the state and Central Governments are not adequate and only a handful of large firms organise training programmes. Construction firms are regulated under multiple laws and there is no unified regulatory framework. There is lack of efficient and stable regime for dispute resolution in contracts leading to costly and time-consuming disputes between the promoters of the project and contractors. Although the flow of bank credit has improved to the construction industry, institutional finance still remains inadequate. High cost of finance translates into high costs for the industry and the economy. Presently construction industry suffers from poor state of technology leading to inefficiencies, wastage and low value added. Investment in R&D is 0.03–0.05 per cent of the investment in construction as against 1.5–2 per cent in South East Asian countries and 4–6 per cent in developed economies. These and other constraints require to be redressed during the Twelfth Plan period.

STRATEGIES FOR THE TWELFTH PLAN PERIOD

Key drivers of growth of construction industry

19.7. Forecasts for the market size of construction industry for the Twelfth Plan period indicate that the aggregate output of the industry during the period 2012–13 to 2016–2017 is likely to be 52.31 lakh crores increasing from 7.67 lakh crores in 2012–13 to 13.59 lakh crores in 2016–17. As noted earlier, growth in construction industry is linked to the growth in the infrastructure sector and the building industry. The output of the industry is likely to be contributed almost equally by the buildings and infrastructure segments respectively. The thrust on capacity expansion in the infrastructure sector will continue in the Twelfth Plan. Apart from steady growth in construction related to industrial buildings, the industry catering to commercial real estate in the non-residential sector is likely to grow at an accelerated pace due to a vibrant and growing service industry such as IT and related sectors, hospitality and tourism industry and logistic services. The real estate sector faces challenges despite strong growth in the past. The current trend in real estate market is that after making investments in land, the project construction is mainly retail financed, that is, through advances or milestone based payments from owners. In affordable housing projects retail financing would be a challenge as the ability of the retail investors would be very limited. This issue becomes more significant in the category of affordable housing for low income group and economically and weaker segments of the society.

HUMAN RESOURCE STRATEGIES FOR THE TWELFTH PLAN

19.8. Construction industry faces acute shortage of skilled workers especially in mechanised trades. Even in the case of engineers, there is reduction of share of new trainees in Construction Engineering Streams (Civil, Electrical, and Mechanical Engineering). This is due to reduced intake by colleges following the lack of placement opportunities for civil engineers. The trend has started reversing but needs stepping up considerably. On account of natural attrition and the need of skills of contemporary trades, Construction Industry needs infusion of at least 6 million persons

per year. The total training capacity is woefully inadequate. Against a requirement of over 3.5 million trained tested and certified workers, the capacity available is about 0.5 million per annum. The ITIs, both in private and public sector are not able to offer many trades relevant to construction Industry. Schemes such as NREGS have further reduced the state of fresh entrants since the unskilled or semi-skilled workforce is no more desirous of migrating as they are able to source employment locally. Skill upgradation schemes launched by the Governments both at State and Central Government level are inadequate and industry sponsored apprenticeship is not easily available. Only a handful of large firms organise training programmes. NSKDF (National Skill Development Fund) schemes are not attractive since the funds are provided to training providers as loan which have to be recovered from recipients who are generally too poor to be able to pay for training. Apart from shortage of workers, the industry is facing shortage of contractors, especially in specialised areas. Most of the construction materials continue to be manufactured in the informal sector which makes it difficult to induct modern technology.

19.9. Construction Industry Development Council (CIDC)—an industry association formed with the initiative of the Planning Commission—is actively involved in imparting training and skill up-gradation of the workers in the industry. It has taken steps in association with a few states such as Madhya Pradesh, Rajasthan, Bihar and Haryana for training and certification of construction workers. These states have made available the physical infrastructure of the ITIs situated in their States, where training in self-financing mode is being conducted by CIDC and skill certification is given by CIDC. This scheme needs to be extended to other states after auditing the scheme and removing any deficiencies. Ministry of Labour and DG (ET), NCVT (National Council of Vocational Training), have taken measures to launch skill certification initiatives through CIDC and also under MES/SDI schemes. Resources from the SDI (Skill Development Initiative) Scheme can be used for training the workers in construction industry. Some firms in the construction industry such as L&T

have undertaken their captive training programmes. More firms should be encouraged to do so. These efforts need to be up-scaled and accelerated. One source of funds for doing this can come from The Building and other Construction Workers Welfare Cess Act, 1996 which aims to garner resources, through a cess but does not lay down specific norms for expenditure of the sums, thus collected. It is proposed that a portion of this fund could be utilised to meet the financing requirements of workers training through a nominated and authorised nodal agency. A dedicated fund for human resource development in the construction industry could be set up for taking these ideas forward. This fund known as Construction Skill Development Fund (CSDF) could be set up with ₹200 crores per year from above source and a matching amount from the industry to facilitate training of at least 200000 workers per year.

19.10. The next major issue needing attention is continuous skill upgradation and reversing the attrition of engineers from the Construction Industry. Engineering Council of India, the apex body, having representation of several engineering professional organisations has made several proposals to the Government of India, in this context, which may be studied and acted upon. It is proposed that an Engineers Bill be enacted to look into issues of professional development of practicing engineers and Industry be encouraged through some tax incentives, which could be availed for HRD initiatives launched by them. Curriculum for Construction should be developed and harmonised. Steps must be taken to establish Department of Construction Engineering in Colleges and Universities. As per a CIDC survey, nearly 85 per cent of engineering graduates are unemployable on graduation. This position can be improved by internship after or during graduation. A pilot project undertaken by CIDC with an Engineering University saw employability going up significantly. A continuing programme for industry orientation and experience for teachers is essential for improving employability further. Workshops are needed at every state capital in collaboration with engineering institutions to evolve a mechanism to improve the engineering curricula and also introduce

apprenticeship. A structured interface is required between the industry bodies and the Ministry of HRD, UGC and AICTE on these issues.

SAFETY AND RELATED ISSUES OF CONSTRUCTION WORKERS

19.11. Apart from training, welfare for workers should be a major area of action during the Twelfth Plan. Workers in the construction industry are vulnerable to inherent risks to their life and limbs. Temporary relationships between employer and employee, uncertain working hours, lack of basic amenities and inadequacy of welfare facilities are some of the difficulties faced by the employees. The Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996 was enacted recognising the need for a comprehensive Central legislation for regulating the safety, health, welfare, and other conditions of service for construction workers. However, only a few states have implemented the provisions of the Act, such as setting up welfare boards. Twelfth Plan will aim at accelerating this process of implementation of the provisions of the Act. As a substantial segment of the construction industry workforce, women workers need to be accorded special focus in both skill training as well as stipulated social benefits.

19.12. A major issue concerns with the Provident Fund for Construction Workers. It has been pointed out by the industry representatives that large sums of monies are being deposited with the PF Trust every year, use and withdrawal of these monies by the beneficiaries, is near absent. Proceeds of this deposit are estimated at about ₹25000 crores by industry bodies but would require official authentication. Such unutilised funds need to be distributed amongst the beneficiaries and used for the welfare of the workers. Industry representatives have suggested that a sub-trust for construction industry should be created. Another source of funds is The Building and other Construction Workers Welfare Cess Act, 1996 through which since 1996, a cess amounting to 2 per cent of the contract value being executed by any contractor is being deducted as the mandatory workers welfare cess. It is believed by industry bodies that sums with various State Governments now aggregate

to ₹22500 crores and are reportedly lying unutilised. These funds could be used for skill upgradation and improving the living conditions of the workers.

REGULATORY FRAMEWORK IN THE CONSTRUCTION INDUSTRY

19.13. Construction has been declared as an industry but has presently no regulatory framework on an all India basis. For example, although the National Building Code and Common General Conditions of Contract have been evolved, they have not been mandated as applicable either by the Central Government or any of the states. Presently no common construction law exists and the construction activities are administered through 32 different laws, rules and statutes. For example, there are 27 different statutes dealing with labour alone, starting with the Children (Pledging of Labour) Act, 1938 to the Employees Provident Fund and going to the Miscellaneous Provisions (Amendment) Act, 1996. To deal with the multiplicity of laws, it has been suggested by the construction industry to have a Common Construction Law which would harmonise the existing statutes related to construction sector. It has also been suggested that a nodal regulatory authority in the shape of Central Construction Authority at the national level and State Authorities at the state levels should be formed to administer and monitor the Construction Law. The proposed authority could act as a nodal agency of the Government on all issues related to the construction sector. It has also been suggested that the related statutes of Japan and Singapore could be studied for adoption in India. These suggestions would need to be discussed widely and debated before a firm view could be taken on them. This exercise would be taken up during the Twelfth Plan period.

19.14. Apart from the actions to be taken by the Government, the Industry itself should adhere to the principles of self-regulation with the help of industry associations such as Builders Association of India, CREDAI, CFI and others. The focus of self-regulation should be labour welfare measures, adherence to environment norms, ethical work practices, joint apprenticeship programmes and so on.

CONTRACTING SYSTEMS AND DISPUTE RESOLUTION

19.15. There are shortcomings in the present contracting procedures as pointed out by various industry bodies. The procedures are costly and cumbersome for both the project owners as well as the contractors. It has been estimated that the total cost of procuring, supervising and monitoring incurred by the project owner comes to about 22 per cent of the cost of asset created. Lack of standardisation of contract procedures and evaluation criteria is another difficulty associated with contracting process. Whereas the special conditions could vary, core conditions could be standardised to avoid subjective interpretation of clauses leading to disputes. In this connection, it would be useful to study the Uniform Contract Conditions and a model bidding document for domestic contracts finalised by the Ministry of Statistics and Programme Implementation, Government of India and promote a wider adoption of the same. There is also a prevailing view that the contract conditions are not equitable. Elements such as performance guarantees and other requirements lead to an increase in the cost of the project. Time and cost over-runs are often caused by ambiguities in conditions governing damages to contractors due to delays by project owners, resource mobilisation through advances and cost escalations. In case of PPP contracts for the road sector, Planning Commission has come out with standardised model concession agreements which have facilitated the implementation of these projects.

19.16. It has been suggested that the criteria of awarding works to the lowest cost bidder adopted by the procuring agencies in the public sector hinders in the process of adoption of better technology, best practices and quality. It might result in cost cutting practices by contractors and preventing passing on the benefits to the workers. In this respect, it has been suggested that 'Effective Lowest Price' rather than the 'Lowest Price' as adopted by the Ministry of National Development, Government of Singapore may be considered for adoption. Technology capacity of contractors should be made part of contract requirement for different categories of projects—based on their value and it should also

be part of pre-qualification process. Efforts could be made to include contractors' proposals as part of contract conditions. Availability of some minimum percentage of skilled and certified manpower with Contractors should be made part of contract requirement for different categories of projects based on value. Incentive for better efficiency should be made part of the contract requirements. A system of incentives for timely completion and better performance needs to be integrated in procurement procedures by all public agencies. Instead of pre-qualifying the agencies time and again, departments desirous of engaging the contractors can resort to choosing contractors on the basis of their grading, followed by a periodical surveillance. Intensification and universalisation of the e-tendering system is also required to be undertaken.

ARBITRATION AND DISPUTE RESOLUTION

19.17. The enactment of Arbitration and Conciliation Act 1996 provided for an effective framework for resolution of disputes without depending on the overburdened judicial system of the country. Despite these improvements, the arbitration process continues to be predominantly ad-hoc leading to a situation where according to a CIDC survey, ₹135000 crores remains blocked in the construction sector over disputes. There is an increasing tendency to appeal on grounds of 'misconduct' on the part of arbitrators particularly taking the view that they are not being approved by any responsible organisation. There is no provision for a neutral body to administer and supervise arbitration. Besides, there is no quality control of arbitrator's qualifications and expertise, no assistance is available in managing arbitrator's fees and there is lack of close supervision of arbitrator's progress. A solution to the above problems is to use the Institutional Arbitration system according to which appointment of arbitrators is done from international, national or regional panels. Other features of this system are: having a code of ethics which binds the arbitrators and a pre-determined level of fees. This system is hoped to improve the quality of arbitrators, manage arbitral fees and maintain close supervision and monitoring of arbitrator's progress. During the Twelfth Plan, steps would be taken to operationalise these recommendations.

ENVIRONMENT AND ENERGY

19.18. Construction sector is one of the highest consumers of natural resources and energy amongst the various industries. The industry needs to give particular attention to the following aspects: management of water resources and amelioration of water pollution; efficient use of materials and energy and environmental management during implementation phase and post completion phase. All construction projects undertake mandatory Environment Impact Assessment as per the guidelines of Ministry of Environment and Forest and the concerned State Governments. It is now being increasingly realised in the construction industry that sustainable development concepts, applied to the design, construction and operation of buildings, can enhance both the economic well-being and environmental health of communities. If sustainable design principles are incorporated into building projects, benefits include resource and energy efficiency, healthy buildings and materials, ecologically and socially sensitive land use, transportation efficiency, and strengthened local economics and communities. Under National Bankers Mission, for example, the Government is funding establishment of bamboo mat-making centres and giving training to local women workers in bamboo growing areas of the North-eastern States of India. These centres will supply the bamboo mats for further processing at industrial units for production of bamboo mat corrugated sheets for roofing of buildings. With a view to promote green building materials, the Government of India in their successive budgets after 1993 have been providing excise duty concessions on the materials manufactured from recycling of agro-industrial wastes and by-products. It has also set up an interdisciplinary organisation. Building Materials and Technology Promotion Council was set up in the Urban Development Ministry to address the issues of environment friendly and energy efficient building materials and technologies.

19.19. Construction Industry needs to work in unison with Bureau of Energy Efficiency to develop Green Building Guidelines based on energy efficiency and use of renewable energy; direct and indirect environmental impact; resource conservation and

recycling; minimisation of waste; water-harvesting; indoor environmental quality and community and site related issues. Construction industry should develop typical green building guidelines for different geo-climatic regions. Energy Consumption Indices should be developed for different types of building occupancies, site conditions, and climatic zones. Governments at Central, State and Local levels should also encourage use of green construction. CIDC is now taking an initiative along with a few states to facilitate development of technologies and building guidelines and promoting practice of green construction. CIDC is also interacting with international agencies which have expertise in concepts and technologies relating to green building materials and construction systems. CIDC is collaborating with Building Construction Authority of Singapore to evolve a Green Mark for Buildings. This aims at assessing buildings in five key areas of environment energy efficiency, water efficiency, site development and building management, indoor environmental quality and environmental innovations. Green Marking will provide a meaningful differentiation of buildings in the real estate market. The Government may also consider giving fiscal incentives for use of building materials produced from recycling of wastes and by-products from agricultural, forestry and industrial operations. Concrete steps will be taken during the Twelfth Plan period to promote the concept of green building.

TECHNOLOGY AND PRODUCTIVITY

19.20. Bulk of the construction industry suffers from poor state of technology. Inefficiency, wastage and low value added arise at two fronts: first, due to low technology used in the manufacturing of construction material and second due to low technology used during construction itself. It is important that productivity enhancement of construction industry is driven both by a demand for high quality as well as supply for the same. In order to reduce cost of works in rural roads sector, it is important to develop and use 'marginal materials' instead of traditional costly materials. As part of technology up gradation, there is need to enhance the use of IT and IT-based solutions for the construction industry. It is proposed that a

National Construction Research and Development Fund be created with a grant from the Government and matching contribution from the industry.

19.21. The productivity of the industry has shown a positive trend in recent years as seen from Table 19.3 earlier on account of better training and higher mechanisation. However, compared to other countries, for example, China, US, Europe, on an average, it is 35–45 per cent lower after factoring in purchase power parity. With rapid advances in technology and much better training especially at the lower and middle levels, productivity is expected to rise substantially.

QUALITY AND STANDARDS

19.22. Quality of construction has been recognised by the industry as a weakness. In recent years, some companies by actively supporting training and certification of workers, supervisors and managers have tried to improve on the quality dimension. The skill upgradation programme by CIDC is also a sustained effort in that direction. Use of technology like Ready Mixed Concrete and pre-fab techniques along with more intensive use of information technology has also helped. Many construction companies are working to obtain ISO 9000 series certification. Bureau of Indian Standards has started formulating performance standards which will gradually supercede prescriptive standards. There are two good global examples for quality certification in the construction sector from Singapore and UK respectively. Singapore has introduced a scheme called The Construction Quality Assessment System or CONQUAS which was developed by the Building and Construction Authority (BCA) in co-operation with major public sector agencies and various leading industry professional bodies to measure workmanship quality in a completed building. Since the launch of CONQUAS in 1989, more than 1500 public and private building projects have been assessed by BCA. The contract value of these projects exceeded US\$50 billion. The scheme covers three main aspects of the general building works: structural, architectural and Mechanical and Electrical. Developers are using CONQUAS increasingly to

promote and market their property developments. For instance, it is common for promoters to specify target CONQUAS Score in the tender contracts as targets for contractors. Similarly, contractors that are capable of delivering a consistently high CONQUAS Score would be in demand and command a higher premium. The other international scheme is the Agreement Certificates which is a Quality Appraisal Scheme of the British Board of Agreement (BBA). BBA's Agreement Certificate Scheme provides authoritative and independent information on performance of building products. The main focus of the Agreement process is the evaluation of the extent to which the product allows compliance with relevant Building Regulations and other statutory requirements. These two examples are very relevant for the industry in India to consider and adopt. During the Twelfth Plan period steps would be initiated to launch such schemes.

19.23. In the area of standards, Bureau of Indian Standards (BIS), is the statutory and apex organisation for laying down of standards and their adherence, but does not having any mandate for enforcement. Even the standards are recommendatory in nature, which prevent stake holders to strictly conform and follow. BIS needs to be granted necessary authority and powers to ensure serious adherence to Indian standards. The issue of shifting from Prescriptive to Performance Standards as well as formulation of standards on green and intelligent building design should be given high priority

R&D IN CONSTRUCTION SECTOR

19.24. R&D in construction sector needs to be built around a vision of delivering inclusive growth supported by collaboration between the research providers and the research users. In the field of construction sector in India the principal institutions involved in research include Central Building Research Institute (CBRI), Building Materials and Technology Promotion Council (BMTPC), Institute of Steel Development and Growth (INSDAG), Central Institute of Plastics Engineering and Technology (CIPET), National Council for Cement and Building Materials (NCB), Central Road Research

Institute (CRRI) and Research Designs and Standards Organisation (RDSO). The challenge for the construction industry in the coming years is to establish a framework which supports innovation, research, development, demonstration and use of knowledge for benefits to society at large. Such a framework would be built around integration of various technologies into viable assets; develop designs and practices for meeting the needs of climate control; develop new materials and construction techniques; asset management deploying ICT right from conceptualisation to construction; automation in design, construction and operation and risk mitigation. Apart from R&D in construction technology, adequate focus is required on construction materials to help answer questions like: which alternatives have the lowest resource inputs and environmental emissions and wastes throughout their life cycle?

19.25. R&D vision shall motivate towards an innovative sustainable and productive construction industry and shall ensure collaboration and alignment amongst policymakers and all sections of the construction industry supply chain. A clear objective and identification of well-defined research projects would accelerate development of an innovative mind-set and in time should cause users to demand change. Since the country has a variety of geophysical conditions with varying materials available locally, technology should be adaptable to local conditions. To enable that, regional technology centres with autonomous functioning coupled with accountability are required under a national level umbrella organisation which in turn should also be accountable. One of the aforementioned organisations, along with the participation of policymakers, associations, academic institutions and industry be mandated to spearhead the collaborative effort needed to drive the R&D initiatives in Construction Industry. Industrially advanced countries too depend on collaboration amongst all stakeholders to decide on policies and their implementation framework. It is also suggested that spending on research for construction industry, require special incentives (for example, 150 per cent tax exemptions) to encourage such research.

CONSTRUCTION MACHINERY AND TECHNIQUES

19.26. Construction equipment accounts for 21–23 per cent of the total project cost and as such, variations in equipment pricing have a huge impact on the project costs. The prices of construction equipment vary according to the product. As per estimates by Off-Highway research, the sale of construction equipment is expected to reach 84000 units by 2014, of which infrastructure and real estate sectors will account for 70 per cent. This translates into a CAGR of about 20 per cent over the next five years (2009–14) in sales of construction equipment. Over the years, the equipment used in construction has improved significantly to provide better productivity, safety and accuracy. Mechanisation ensures greater efficiency and reduces the need for skilled labour. It also enables access to hazardous areas where manual intervention is not possible. Developments in this area include: evolving sustainable construction practices; enhanced usage of precast products; close proximity radiography; concrete production and placement; earth moving and mining; automation to enhance productivity and safety; facilitate availability and deployment of construction equipment through incentives and penetration of good practices into rural construction sector and low cost housing.

PROJECT EXPORT IN CONSTRUCTION INDUSTRY

19.27. Indian Construction Industry had been very active in the overseas market, especially the Gulf in the decades of seventies and eighties, when Indian companies ventured out to fill the demand for construction activities, fuelled by oil boom. Between 1975 and 1980, Indian companies handled construction work worth nearly US\$ 5 billion. Out of this nearly US\$ 1.5 billion was repatriated back to India, mainly in the form of profits, wages and construction material exported abroad. But this trend did not last, and by mid and late 1980s the volume of contracts secured, fell down sharply. From US\$443 million in 1986–87 the contracts came down to just US\$98 million in 1995–96. Though this was mostly due to the prevalent political situation in the Gulf region, even then it was a major drop for the industry. There is a strong need to reverse this trend

through strong government support in aggressively marketing Indian products and services in construction in the overseas market. In order to boost export of both services and goods from Indian Construction Sector it is important to evolve and set up an institutional mechanism for maintaining operational and effective linkages with Indian Missions abroad. In selected countries with a high potential for project export the commercial sections of the missions may be strengthened by placing a Industry's representative to create awareness and provide strengthening of Indian Construction Industry and to facilitate industry constituents from India to participate in bidding process of selected projects and also explore possibilities of promoting joint ventures in India and abroad. This would also attract greater FDI and new technologies in the domestic construction sector.

FINANCE AND RELATED ISSUES IN THE CONSTRUCTION SECTOR

Flow of Funds into the Construction Sector

19.28. Even though the construction sector is attracting both domestic (gross bank credit) as well as foreign direct investment, more resources are needed for the sector to fulfil the ever rising pressures of enhancing the housing and infrastructure sectors in the country. Institutional financing of construction sector still remains an underdeveloped area.

Table 19.2 shows the flow of bank credit to construction sector during 2006–07 to 2010–11. In the year, 2010–11, around ₹50135 were lent by banks to the construction industry which was 1.4 per cent of the gross bank non-food credit disbursed during the year. Table 15.1.5 depicts the year wise and cumulative FDI flows into construction activities including roads and highways sector. The cumulative FDI inflows from April 2000 to August 2011 into construction activities stood at around US\$ 9417 million or ₹42072 crore, which is nearly 6 per cent of the total cumulative FDI inflow into the country during same period. Please refer to Table 19.2.

EXISTING SHORTCOMINGS IN INSTITUTIONAL FINANCING FOR CONSTRUCTION INDUSTRY

19.29. The Indian construction industry is faced with high operation, maintenance, and financial costs. As the magnitude of housing shortage in the country is huge requiring substantial investments in housing and related infrastructure, the Banks, Financial Institutions and Housing Finance Companies have not lent to the poorer segments of the population for affordable housing segments. The priority sector lending by Banks for affordable housing loans up to ₹5 lakh constitute only 22.75 per cent, of the total lending to housing sector according to the housing loan data received from the 26 leading public sector banks including SBI for the year 2010–11. Further,

TABLE 19.2
Flow of Bank Credit to Construction Sector

	2006–07	2007–08	2008–09	2009–10	2010–11
Gross Bank Non-Food Credit	1801	2205	2602	3040	3667
Bank Credit to Construction Industry	20	28	39	44	50
Percentage share (%)	1.1.	1.3	1.5	1.5	1.4

Source: Annual Reports, RBI.

TABLE 19.3
Flow of FDI in Construction Activities (including Roads and Highways)

	2007–08	2008–09	2009–10	2010–11	Cumulative(April 2000–August 2011)
In ₹ Crore	6989	8792	13469	4979	42072
In USD million	1743	2028	2852	1103	9417 (6% of total FDI inflows)

Source: DIPP, MoC&I.

as per latest BSR report of RBI for the period ended March 2010, loan sizes up to ₹5 lakh constitutes 24.16 per cent of the total outstanding housing loans of ₹306307 crore. It can thus be safely concluded that a very low proportion of the low ticket loans have actually gone to the EWS/LIG individuals. Mortgage penetration is already low in India and mechanisms are only now developing to maintain credit histories. Informal sector workers in particular have variable income streams and in some cases, might not have access to a bank account.

19.30. Key reasons for the reluctance on the part of banks/FIs to lend to the construction industry include: (i) lenders do not understand the working dynamics of the construction industry; (ii) lack of adequate safeguarding mechanisms to assure the banks about the credibility of the industry and (iii) banks have better options to lend their precious money to sectors with assured returns at much lower risks. There is no appropriate institutional set up to absorb the flow of funds to the construction sector. Apart from non-availability of credit for the sector, non-availability of bankable DPRs in the construction sector and huge time and cost overruns of the construction projects are some of the reasons for projects in the construction sector not taking off in a sustainable manner. Another shortcoming in the construction sector in India is that the State Governments do not make funds available after they approve the projects. There is no law to ensure that a contract cannot be awarded unless finances are arranged. A programmatic approach for large construction programmes at the State level requiring a planned approach with resources tied up needs to be encouraged.

STRATEGIES TO IMPROVE FLOW OF FUNDS TO CONSTRUCTION INDUSTRY

19.31. Although the industry is not fixed capital intensive, it is working capital-intensive in terms of gross working capital requirements with high payment receivable risk. Five types of financing requirements can be identified in respect of the Construction Industry: (i) working capital requirements; (ii) Capital requirements for modernisation of equipments and/or expansion of industry;

(iii) Project specific bridge loans; (iv) Loans for BOT projects; and (v) Equity for BOT and real estate project. The funds requirement of the construction industry is approximately USD 1 trillion with the modernisation requirements of the construction industry estimated to be to the tune of US\$150–200 billion. Further, as per the High Powered Expert Committee (HPEC) Report for estimating the investment requirement for urban infrastructure services, the investment requirement for urban infrastructure over the 20-year period (2012–31) is estimated at ₹39.2 lakh crore at 2009–10 prices.

19.32. The construction sector remains in need of financial support while sizable funds available with Banks and Financial Institutions remain unutilised. Lenders do not have a reasonably sound and reliable system for risk assessment in the construction sector. In order to have a sustained and enhanced flow of credit to the construction sector, greater transparency, better corporate governance, sharing of experiences and specific regulations are required. Innovative financing methods or instruments are required to enhance the flow of funds and institutional credit to the construction sector. Various strategies for this are:

- Enhancing flow of finance through grading of construction companies
- Construction industry-specific lending norms
- Credit enhancement product or agency which would provide bridge finance to the construction sector on lines of the ₹300 crores partial guarantee facility launched recently by IIFCL for the infrastructure sector
- Setting up of a Mortgage Refinance Company which would be a financial institution owned by the banks with the sole purpose of supporting banks to do construction mortgage lending by refinancing banks' mortgage portfolios
- Setting up of a Construction Bank especially dedicated to suit the sector's financial needs on lines of countries like China, Singapore and Ethiopia
- Indian Infrastructure Equipment Bank which would make use of construction equipment owned by Companies by putting them to productive use when they are unutilised

- Compulsory Escrow accounting for Construction Projects in order to provide credit cushion to the investors
 - Letter of Credit may be opened in the name of the contractor at the time of award of project by the Client to ensure that the payment is made as soon as the project milestone approval is received
 - Working capital advance may be provided to contractors in order to kick-start the construction project
 - 'Delayed Payment Act' for Construction Projects which would make it mandatory for the clients or big contractors to pay the small contractors the money along with the prevailing interest rate, the cases where contractors are not paid by the clients in time
 - Lending and Non-Performing Assets (NPA) norms for construction sector may be reviewed and reformed
 - Sector-specific (for example, housing, real estate, Power, Roads, Ports, and so on) innovative financing instruments may be developed to enhance the flow of funds to the specific sectors
 - Innovative financing instruments/products like 'Insurance Product', 'Housing Warranty' and 'green construction finance' (and green rating other than LEED and GRIHA) may be explored for enhanced and orderly flow of institutional credit to the construction sector
 - The possible credit enablement mechanisms/ financial instruments for affordable housing are given the Box 19.1
 - Developing Housing Warranty Scheme as being offered to the consumers in the Developed Countries, (for example, Japan, North America and so on) could be a potent instrument for covering risk elements at micro level for houses and buildings/ structures
 - Developing Insurance Products to mitigate construction business risks to cover the risk elements Bidding Indemnity Policy (BIP); Delay in meeting obligation by client policy (DIMO Policy); Settlement of Claims Policy (SOC Policy); Loss of Profit Policy (LOP Policy); Transit Insurance Policy (TI Policy); Loss of Performance of Construction Equipment (LOPCE Policy); Force Majeure Loss Policy (FML Policy); Financial Risk Coverage Policy (FRC Policy)
 - Fiscal incentives such as allowing resource mobilisation through tax-free bonds
 - Accessing International Financial Markets through External Commercial Borrowings (ECB), Infrastructure Debt Funds (IDFs), Global Depository Ratios (GDR) and other debt instruments
 - Infrastructure Debt Funds (IDFs) to deepen the corporate bond market to make it attractive for these investors
 - Foreign Private Equity and Venture Capital Funds
 - Regulatory reforms required for PE and VC for fulfilling their role as growth enablers a host of regulatory changes
 - Builders and Real Estate Developers involved in construction sector may be incentivised to take up affordable housing construction through grant of additional FAR/FSI/TDR and appropriate fiscal incentives
 - State Plan Document should have a Chapter on construction sector which would clearly mention the construction financing requirements in the state
 - Single Window Clearance to reduce the hassles and delays in the approval process resulting in delay in completion of projects
- 19.33. Obviously, such a vast financial requirement cannot be addressed by a single enterprise or institution. Government initiatives must be in coordination with all the constituents of the construction industry for dedicated flow of credit to the sector. Workable Action Plans incorporating the above suggestions would be made during the Twelfth Plan period.

TOURISM

TOURISM AS A MEANS TO FASTER, MORE INCLUSIVE AND SUSTAINABLE GROWTH

19.34. The tourism sector has a major role to play to promote faster, sustainable and more inclusive economic growth—the goal of the Twelfth Five Year Plan. It has better prospects for promoting pro-poor growth than many other sectors. This is because tourism involves a collection of activities, services and industries comprising transportation,