

SUSTAINABLE CONSTRUCTION POLICY AND MARKET IN VIETNAM

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1) Executive Summary

In 2015, the construction sector grew by 10.82% compared to last year, this is the highest rate since 2010, while the average growth of GDP is 6.68%.

- Cycle of Vietnam's construction industry has been strongly affected by the cycle of economic growth usually lasts from 3 to 10 years.
- In the period 2000-2009, the growth rate of the construction industry reached 9.6% per year and gained 5.1% per year the period of 2010-2014
- Private enterprises are always more than 80% of the production structure of the construction industry in the period of 2011-2015
- The Housing Law (amendment) 2014, the Real Estate Law (amendment) 2014 and supported stimulus policies, the situation of the property market is warming up that led to the rise of the segment of civil building.
- Expectations of the signed agreements and upcoming agreement of FTAs will boost FDI in Vietnam and promote the development of the industrial construction
- From now to 2020, Vietnam needs to attract about VND 202,000 billion/year for the development of transport infrastructure and approximately VND 125,000 billion / year for electricity infrastructure projects.
- The legal framework for PPPs increasingly improved, creating conditions for attracting private investment in the field of public investment.

2) Main Issues with Construction Industry and Market

Period 1986-1990: The government started implementing the guidelines and the policy of "innovation", construction industry has made important changes. From the planning design, housing design to switch to the new mechanism is urban construction planning. Besides, the initial implementation of procurement modality has actively promoted enterprises to rearrange labor force, increase investment in technical infrastructure, construction machinery to improve high quality and efficient projects.

Period 1991-2000: During this period, the property market has gone through the first round of the housing fever in 1993-1994, and this was a remarkable period of growth of the construction industry with an average growth rate of 10.5% per year. Besides, this is a period of changes of substance in the development of the construction industry. Many policy mechanism is formed to make up fairly uniform legal framework. The company continued to invest strongly in depth to technological innovation, production capacity and competitiveness. The speed of executive work of large projects in infrastructure, industry, civil is quicker 2-3 times than previous period.

Period 2001- present: the national economy in this period has started further integration into the regional – international economy. And Vietnam has becomes WTO membership since 2006. The real estate fever in 2000-2001 and 2007-2008 has also created a strong impact on the growth of the construction industry.

Construction Law, Housing Law and Business Law of Real Estate, Urban Planning Act were enacted to create a legal framework for the improvement of the management of planning, urban development of municipality, housing and estate market.

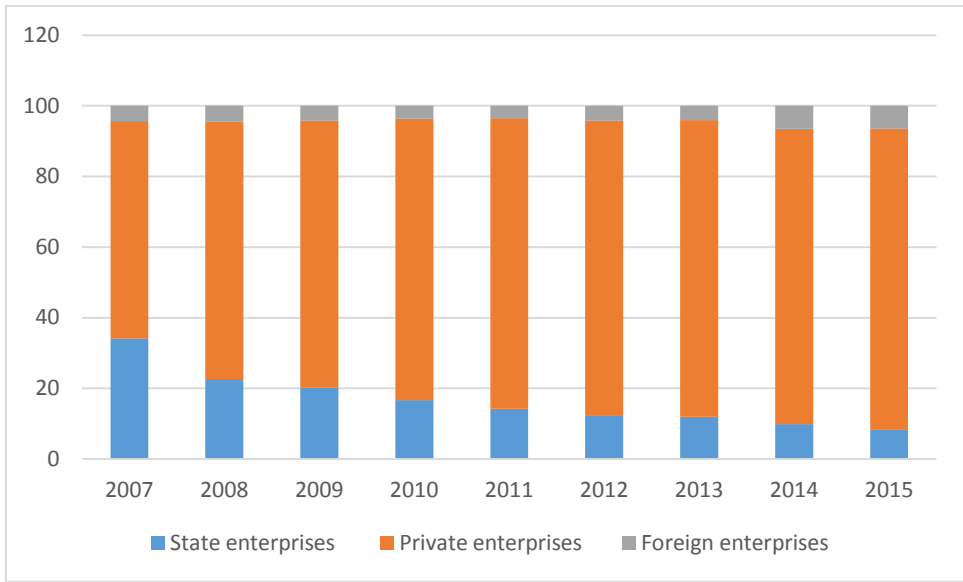
The quality and qualification of construction has also been significantly improved. So far, the Vietnam construction enterprises have mastered designed technology and construction of high-rise buildings, large span buildings, underground works, and complex geological works. They are capable of competing with the foreign enterprises.

In the period 2011-2015, the private enterprise groups has always accounted for over 80% of the production structure of the construction industry, contributing an important role to promote the growth of the industry. Private sources not only contribute to the growth of the civil construction sector, but also engaged in infrastructure development through contract BT, BOT, BOO and PPP. However, the legal framework for public-private partnerships (PPP) are limited, so we cannot promote capital investment in the infrastructure sector.

Table 1: Share of economic components in construction industry

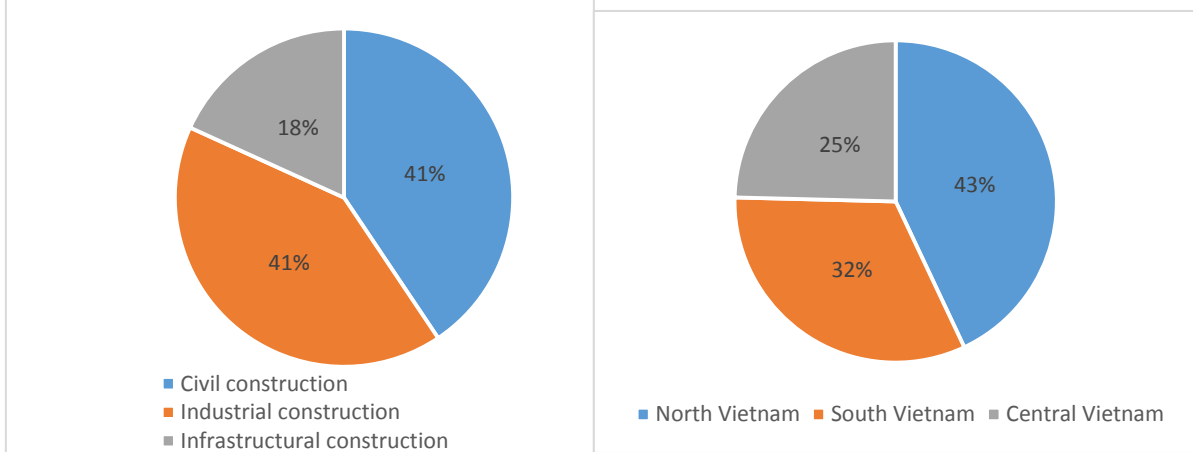
Year	State enterprises (%)	Private enterprises (%)	Foreign enterprises (%)
2007	34.2	61.5	4.3
2008	22.7	72.9	4.4
2009	20.2	75.7	4.1
2010	16.7	79.7	3.6
2011	14.2	82.3	3.5
2012	12.4	83.5	4.1
2013	12.0	84.0	4.0
2014	9.9	83.6	6.5
2015	8.4	85.2	6.4

Chart 1: Share of economic component in construction industry



Civil Works and Infrastructure Works are always high share in the structure of construction industry value. In particular, the infrastructure sector accounted for 41.2% of its value, followed by civil construction accounted for 40.6% and the remaining 18.3% of industrial construction. In terms of geographical region, Hanoi capital city and Ho Chi Minh City are two attractive centers of investment capital in the country. Now, the North was leading the country on spending for construction (43%), followed by a 32.4% of South and the Central was 24,6%.

Chart 2: The Structure of Construction Industry Value



3) Efforts Made According to the Conditions Surrounding Construction Industry

This issue will be analyzed by the value chain of the construction industry that is made up of three main factors: market inputs, the process of construction, the construction market.

3.1 Market of Inputs: Building materials (steel, cement, brick, stone...), workers and construction machinery

The cost of construction project includes about 60 -70% of cost of building materials in which steel and cement accounted 60 – 70%; 10 – 20% of worker cost and 10 -20% of construction machinery cost.

Market of construction materials

Vietnam steel industry is still growing at a rate of 2 digits, reaching an average of 15% / year over the period 2011-2015. Total steel output produced by domestic enterprises in 2015 is near 15 million tons. The strength of the steel industry in Vietnam is still construction steel products, with 40% of reinforcement bar in total steel production industry. *The weakness of Vietnam's steel industry is most enterprises with small-scale production, production technology was only the world average, and most of them only participate at the stage is near the end of the value chain; therefore, low added value, lead to revenue and profit is not high.*

The situation of production and consumption of cement in 2014, 2015 is stability. In 2015, the total output of cement and clinker consumption reached about 72.71 million tons, domestic consumption was 56.5 million tons, increased by 11.1% compared to 2014.

Program development of unburned building materials up to 2020 under Decision No. 567/QĐ-TTg dated 28/04/2010 of the Prime Minister and Directive No. 10/CT-TTg dated 16/04/2012 of Prime Minister on the increased use of non-baked materials, has 50 provinces eliminating manual brick kilns, furnaces using fossil fuels, 25 provinces issued Directive to increase production and use of unburned materials. The implementation of the project "Strengthening the production and use of adobe bricks in Vietnam", to cut the annual rate of increase in greenhouse gas emissions by decreasing the use of fossil fuels and soil to make brick, through the intensification of production, sale and use of adobe bricks in Vietnam.

Workers

The labor structure of the construction industry tends to increase during 2005-2014, from 5.4% in 2005 to 6.3% in 2014. Currently, the number of workers in the construction industry reached 3.3 million workers, 4th ranking in the country. According to the Vietnam Association of Contractors (VACC), about 80% of construction workers are now doing seasonal work, have not been trained, lack of expertise and do not meet the requirements of professionalism on site. Compared with other countries in the region, Vietnam's labor productivity is only half the average of the Southeast Asian countries. And comparison with other sectors, the labor productivity of the construction industry ranked only 16th, so the income of workers in the construction industry was also lower than many other economic sectors, and other countries in the region.

From 2011 to 2014, workers in construction industry were unpaid wages accounted for a high proportion. As of 31 December 2014, the total number of construction companies owed wages of workers to reach 85 units, account for 17.2% of all enterprises, with nearly VND 395.3 billion¹.

¹Doanh nghiệp ngành xây dựng nợ lương người lao động hàng trăm tỷ đồng

<http://laodong.com.vn/cong-doan/doanh-nghiep-nganh-xay-dung-no-luong-nguoi-lao-dong-hang-tram-ty-dong-288517.bld>

Construction industry is leading the field of occupational accidents causing deaths. In 2015, there were more than 35.2% of all fatal accidents in which 37.9% of total deaths in construction sector. Besides, labor accidents and number of deaths due to occupational accidents and the number of fires has increased.²

Construction machinery

Every year, Vietnam imported 15,000 construction machines of which 95% are older machines with average import turnover US\$ 300-400 million. The price of older machine is only 25% of new machines, and suitable to Vietnam construction situation, so the old models are pretty much used by small and medium building contractors. However, the use of the old machine also has disadvantages, such as complicated procedures, the frequent failures, and performance is not equal to the new device. The old machinery can pollute the environment.

3.2 Evaluating Process of construction

General construction process will include four main phases: (1) Design, (2) Procurement, (3) foundation construction, (4) raw building, (5) finishing.

Architectural Design

Due to building qualifications is growing, which leads to increase requirements on building design. Therefore, the application of technology is increasingly enhanced.

The design is only about 5-10% of the cost of the construction package, but it affects more than 70% of the quality and efficiency of work. Besides, the design changes during construction is one of the main causes leading to delays and cost increases. Therefore, efforts in design will mitigate risk and improve the efficiency of work.

Bidding

Nowadays, there are two bidding mode (1) EPC (Engineering – Procurement - Construction) or DB (Design - Build), (2) Design – Bid – Build.

EPC is a form to be not applied so much yet in Vietnam, because of restrictions on the ability of domestic contractors.

Bid Forms of Design - Bid - Build is applied very popular in Vietnam so far. However, this method revealed many shortcomings in big projects to require higher synchronization.

The main form of bidding in Vietnam include: (1) open tendering, (2) restricted bidding, and (3) appointment of contractors.

In terms of the taken time and the nature of the bidding package will have two main types of contracts used in the construction: (1) fixed price contract, (2) contract price adjustment.

The only low bidding price interest has led to construction companies to bid low, and then because of the low price, they neglect works or hire sub-contract to weak capacity to implement. Also, it appears the contractors find ways to adjust bids, making progress in a lot of traffic projects slowed down and investment costs also increased 2-3 times.

Building Foundations: new technologies have been applied in the construction of the foundation.

²Lĩnh vực xây dựng chiếm 35,2 % vụ tai nạn lao động chết người

<http://dantri.com.vn/viec-lam/linh-vuc-xay-dung-chiem-352-vu-tai-nan-lao-dong-chet-nguoi-2016031123135069.htm>

Construction stage and foundation treatment has a decisive role in ensuring the quality of works, especially the high-rise buildings. *The current contractors are always towards new technologies to reduce the cost and execution time. The new methods are being applied very effectively, such as top-based methodology, technology of vacuum consolidation, technology of beams sand pile, top-down execution technology. Many new buildings have adopted these advanced approaches.*

Raw building

For civil construction, common housing framework system includes five main components: (1) the pillar (for transmitting power to the ground), (2) beams (used to connect and transmit power down the head pillar), (3) the floor (or sheets are poured onto the beam system, where lift objects in the house), (4) walls (including surrounding walls and partition walls), and (5) the stairs (the connection between the floors).

The technology and construction methods are now focusing on 2 main parts: floor and wall to minimize weight and materials needed for the project.

Some new methods for flooring execution applications in the world such as Waffel Flooring Unit System, or Bubble Deck Slab has been applied in Vietnam.

Since 2011, the government has issued a mandatory regulations of high-rise buildings (from 9 storeys or more) to use 30% of unburned materials for wall construction. There are 2 kinds of unburned materials that may be mentioned now as adobe brick and lightweight concrete: unbaked bricks (autoclaved aerated concrete - AAC, Technology of lightweight concrete (foam concrete). However, this non-traditional bricks accepted by market is very slow due to many reasons such as skills of bricklayers with new materials, the compatibility of the design for these materials.

For the construction of industry and infrastructure, that has some new methods used quite popular now intended to reduce the volume and time of construction such as prefabricated steel houses and precast concrete.

Finishing: Finishing is the last stage of works created aesthetic quality as well as safety facilities of construction that requires more professional skills to the needs of social development.

Interior design

In the past the construction industry has not focused on this issue, today's interior design is finding creative design solutions for interior space.

4. **Construction market:** including the three main markets of civil construction, industrial construction, and infrastructural construction.

Civil construction market

Civil construction market affected and influenced heavily by housing and real estate markets. Of these 5 main factors affecting the market include: (1) demographics (age structure, income, population growth, and urbanization rate), (2) interest rates, (3) health economy (GDP growth, unemployment, inflation and consumer's belief), (4) policy support from the government, and (5) FDI inflows.

Table 2: The national urban development stage of 2012 – 2020

	2013	2015	2020
Ratio of urbanization (%)	33,5	38	45
Average Housing Floor Area (m²/person)	23,1	26	29
Permanent house ratio (%)	60	65	75

Source: UDA, MOC

Interest rates for loans and savings fell 8% and 6% that is the lowest in recent years. Besides, the home loan will be reduced interest rates which stimulates the recovery of the property market.

Gross domestic product (GDP) in 2015 rose 6.68% estimates compared to 2014, with strong growth from industry and construction sector. According to the evaluation of General Statistics Office, in 2016 Vietnam's economy likely grew between 6% - 6.2%/ year.

Besides the economic situation is improving and with low interest rates, many of the rules and policies which are beneficial to property market has also been enacted in recent years. Property Business ranked 2nd among the sectors which attract foreign direct investment (FDI) in Vietnam nearly US\$2.4 billion, accounting for 10.5%, followed by manufacturing and distribution of electricity, gas, hot water, steam and air conditioning to reach \$ 2.8 billion, accounting for 12.4%.

Industrial Construction Market

Industry construction depends on investment demand and expand production of domestic and foreign enterprises. Therefore, the demand in the construction industry will depend upon the health of the economy and FDI into Vietnam.

FDI in the processing industry, large manufacturing stimulate the demand of construction of plants. Investment inflows into the field of processing and manufacturing which is always high proportion, averaging around 70% in the FDI structure with the number of new projects. The demand built factories rising sharply, particularly in the sectors benefiting from the free trade agreements, such as textiles, fisheries...at the beginning of 2016, several major projects have been granted investment certificates as the project's Garment Factory of Maple Co., Ltd. (Singapore) with a total investment estimated US\$ 110 million, project of Aureumaex Precision Plastics plant of US\$ 21 million ...In addition, the plan of investment projects of Amata (Thailand) in Quang Ninh and Dong Nai, with scale up to billions of dollars, opening a plant of Hyosung, Korea with US\$ 500 million in Vietnam or the project raised 500 million investment in Vietnam, Jabil Circuit (United States) ...

Infrastructural Construction Market

In the period to 2020, the capital amount needed to attract investment in infrastructure in Vietnam is huge, about VND 202,000 billion per year for transport infrastructure and approximately VND 125,000 billion per year for electricity infrastructure projects. To attract sufficient funds, the government is attempting to improve the legal framework for PPPs and investment policy of ODA.

In February 2015, the Government issued Decree No. 15/2015 / ND on investment in public - private partnership (PPP), to create a clear, uniform legal framework to promote private sector to invest in infrastructure projects and public services in Vietnam.

SWOT ANALYSIS OF CONSTRUCTION INDUSTRY

<p style="text-align: center;">Strengths</p> <p>Policy system supported construction industry, real estate, initially had a positive impact on construction industry such as Construction Law, Housing Law (revised), Real Estate Business Law (as amended) and the related Decrees opened up many opportunities for the development of the construction industry, especially in the field of infrastructure; With the aim of promoting economic growth, government funds are strongly willing to spend for key infrastructure projects; Large amount of labor, cheap, skill; The ability to absorb new construction technology from the developed countries.</p>	<p style="text-align: center;">Weaknesses</p> <p>Construction capacity of enterprises in the sector is not uniform; State enterprises have many advantages to participate in bidding for infrastructure projects with investment capital of the State that will reduce the effectiveness of bidding and can cause a great influence on later for construction works because these incompetent contractors undertake execution; A large amount of workers are not trained, mainly due to migration from rural areas; Cumbersome administrative procedures made difficult for the construction work and construction, created not less barriers to investors; The small-scale enterprises with poor bidding capacity and outdated technology use accounts for a large proportion in the construction industry; Weak management capability of building and highly specialized human resources do not meet all the demand; Construction quality has been uneven, revealing many weaknesses; Status of capital increase and prolong time of execution continues.</p>
<p style="text-align: center;">Opportunities</p> <p>The trend of urbanization is increasing along with the demand for construction of houses, buildings, urban infrastructure; The severe power shortage in the dry season opens great demand for the development and expansion of electricity generation;</p>	<p style="text-align: center;">Threats</p> <p>The monopoly of the government in important areas such as the energy sector does not create transparent and certain risk for private investors and foreign countries; Power shortages and weak infrastructure has negatively affected the development</p>

<p>Real estate market in the country continues showing signs of recovery Construction material prices still remain low ground; Although loan interest tends to increase again but low; Vietnam participates in free trade agreements to open opportunities for moving factories from neighboring countries to Vietnam, especially from China, rise of FDI into Vietnam; The legal framework for PPPs increasingly improved, created conditions to attract private investment in the infrastructure sector.</p>	<p>capacity of the processing industry in Vietnam and FDI inflows; Low labor productivity increased investment costs of FDI. Heavily dependent on raw materials prices; Qualification of consultancy, supervision and project management is still poor; The large contractors from abroad entries in Vietnam to increase competitive pressures for domestic companies; Concerned about reducing supply on the real estate market housing, the negative impact to the field of civil engineering; The global economic slowdown is affecting investment demand and the economy.</p>
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4) Future Development for Sustainable Construction Policy and Market

In terms of the demand for socioeconomic development in the next time and national policies, civil construction and industrial construction, infrastructural construction are positive prospects in the coming years.

Civil construction: Housing Law (revised 2014), Property Business Law (amended in 2014) allows organizations and foreign individuals to buy houses in Vietnam that will be an important driving force in the market of Real Estate in Vietnam.

By 2020, Vietnam will have about 4.2 million workers with housing demand equivalent to about 33.6 million m². In which, Vietnam is estimated requirement about 430,000 apartments for low-income people, 17.8 million m² respectively with about VND 100,000-120,000 billion.

Industrial Construction: The capital amount of investment in manufacturing industry are the highest proportion in the structure of FDI (40-50%), equivalent to the average amount disbursed US \$ 4-5 billion per year. In 2015, Vietnam has negotiated and joined the free trade agreements, such as EVFTA (Vietnam - EU), VKFTA (Vietnam - Korea), TPP Regional Comprehensive Economic Partnership (RCEP). This has promoted increasingly the capital amount of FDI into Vietnam. Therefore, the prospects of the industrial construction was assessed positively in 2016 and the coming years.

Construction of infrastructure: According to General Statistics Office of Viet Nam, Vietnam has about 40% of the road transport system with very low quality. Therefore, the estimated capital amount required to upgrade the road network to reach USD 48-60 billion up to 2020, equivalent to an annual investment needs at about VND 202,000 billion per year. In addition, the Government also plans to build 26 airports (10 international airports 16 domestic airports) to 2020. In which, the most prominent project is the Long Thanh

International Airport at Dong Nai province with a total investment of \$ 10 billion approximately.

Currently, Vietnam is relatively serious shortage of power. Therefore, the Planning Electricity 7, the government has planned to develop another 75,000 MW power generation capacity, more than double the total installed capacity currently. Total investment for this plan in the 2011-2020 period is estimated at about 48.8 billion dollars, equivalent to the investment needs of VND 125,000 billion per year.

In the period 2016-2020, investment demand for road transport is about VND 202.000 billion per year and the electricity sector is VND 125,000 billion per year. Therefore, the huge investment is pressure in the near future. So, if efforts improve the legal framework for PPP to take effect, the attraction to private investment will intensify, contribute to the growth of the construction industry.

5) Conclusion

Since the innovative country, the construction sector of Vietnam has significant change, human resources of the construction industry is abundant, cheap, and there are certain skills. Businesses have rapid technological innovation. Investment funds for projects of the country continue to be on promoting infrastructure works, electrical works, Vietnam joined the free trade agreements to also attract FDI. Promulgating a decree on PPP has encouraged private capital to investment. Since the enactment of the bidding law has prompted companies in the industry to perfect themselves in order to survive and develop. State enterprises have many advantages to participate in bidding for infrastructure projects with investment capital of the State that will reduce the effectiveness of bidding and can cause a great influence on later for construction works because these incompetent contractors undertake execution;

Projects must comply with the assessment of environmental impact is reflected in the construction law, environmental law, planning law and Decree 18/2015 / ND-CP of protection, environmental assessment etc. Since 2011, the government has issued a mandatory regulations of high-rise buildings (from 9 storeys or more) to use 30% of unburned materials for wall construction. There are 2 kinds of unburned materials that may be mentioned now as adobe brick and lightweight concrete: unbaked bricks (autoclaved aerated concrete - AAC, Technology of lightweight concrete (foam concrete). Program development of unburned building materials up to 2020 under Decision No. 567 / QD-TTg dated 28/04/2010 of the Prime Minister and Directive No. 10 / CT-TTg dated 16/04/2012 of Prime Minister on the increased use of non-baked materials, has 50 provinces eliminating manual brick kilns, furnaces using fossil fuels, 25 provinces issued Directive to increase production and use of unburned materials.

Compared with other countries in the region, Vietnam's labor productivity is only half the average of the Southeast Asian countries. And comparison with other sectors, the labor productivity of the construction industry ranked only 16th, so the income of workers in the construction industry was also lower than many other economic sectors, and other countries

in the region. The construction industry is leading occupational accidents and the state of unpaid wages. The project of the construction industry in recent years is also quite complex on compensating clearance, causing prolonged litigation. Although, the construction sector has contributed greatly to the process of industrialization and modernization of the country, accelerating the process of rapid urbanization.

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1. Executive Summary

- The growth rate of the construction industry 2000-2009: 9.6% per year and 2010-2014: 5.1%
- 2011-2015: Private enterprises are always more than 80% of the production structure of the construction industry
- The Housing Law & the Real Estate Law (amendment) 2014 rise the segment of civil building
- The agreement of FTAs will boost FDI in Vietnam and promote the development of the industrial construction
- The legal framework for PPPs increasingly improved, creating conditions for attracting private investment
- From now to 2020, the development of transport infrastructure needs: VND 202,000 billion/year & approximately VND 125,000 billion / year for electricity infrastructure projects

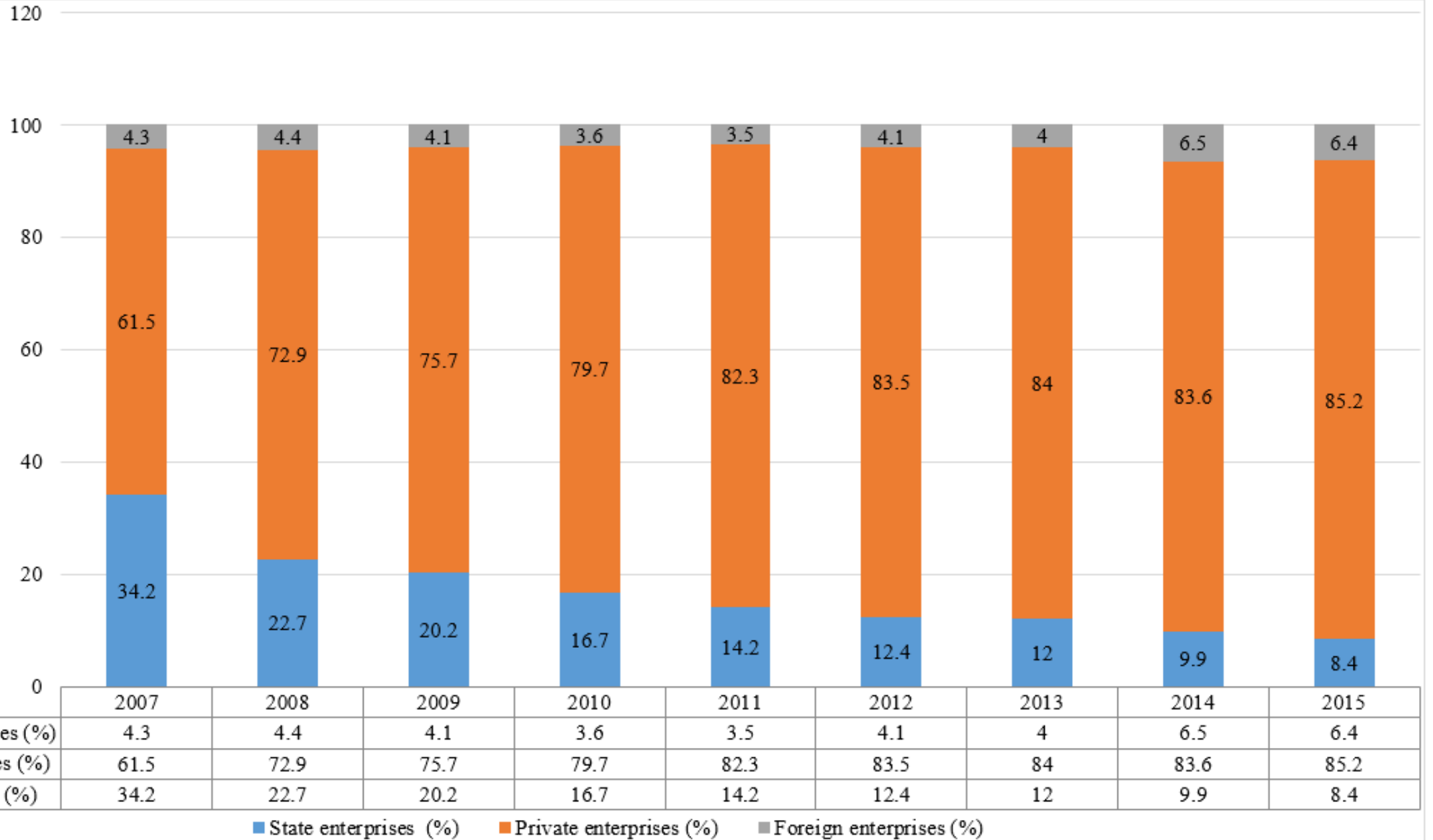
2. Main Issues with Construction Industry and Market

- 1986-1990: policy of "innovation" made construction industry have important changes
- 1991-2000:
 - Property market fever in 1993-1994; Construction industry with an average growth rate of 10.5% per year
 - Many policy mechanism made fairly uniform legal framework
 - Companies continued to invest strongly in depth to technological innovation, production capacity and competitiveness
 - The speed of executive work of large projects in infrastructure, industry, civil is quicker 2-3 times than previous period.

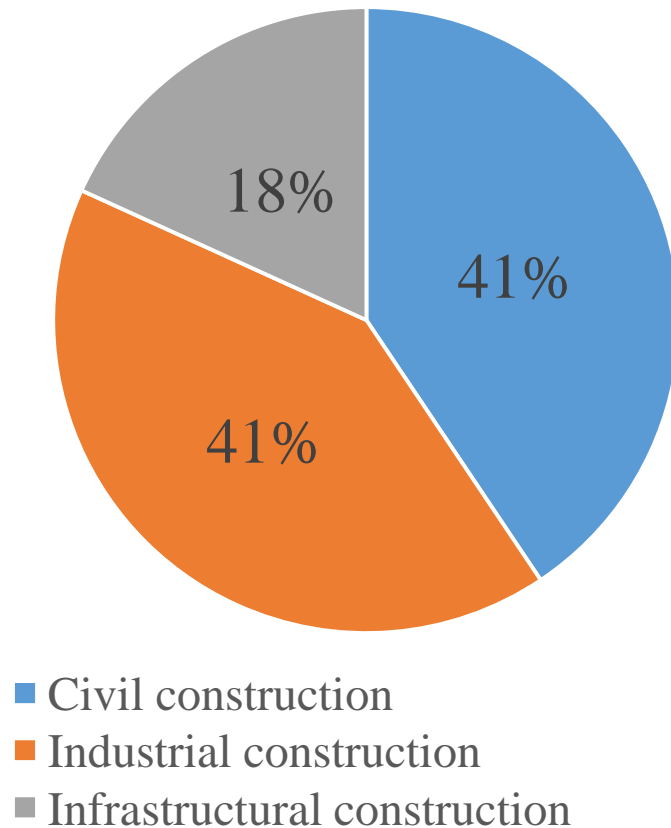
Period 2001- present

- further integration into the regional – international economy, Vietnam has becomes WTO membership since 2006
- Real estate fever in 2000-2001 and 2007-2008 has strongly impacted on the growth of the construction industry
- Construction Law, Housing Law and Business Law of Real Estate, Urban Planning Act enacted - improvement of the management of planning, urban development of municipality, housing and estate market
- Vietnam construction enterprises have mastered designed technology and construction of high-rise buildings, large span buildings, underground works, and complex geological works; competing with the foreign enterprises

Share of economic component in construction industry

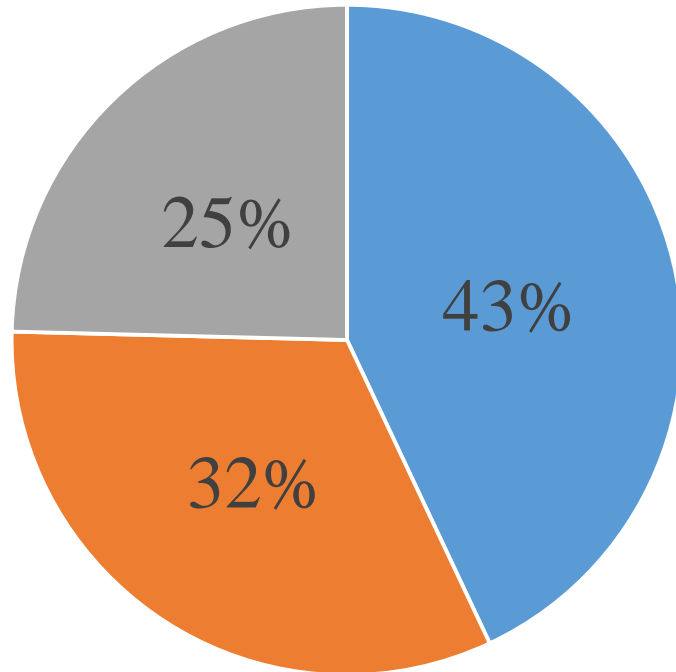


Structure of Construction Industry Value by sector



- Civil Works and Infrastructure Works are always high share in the structure of construction industry value

Structure of Construction Industry Value by region



■ North Vietnam ■ South Vietnam
■ Central Vietnam

- the North was leading the country on spending for construction (43%), followed by a 32.4% of South and the Central was 24,6%.
- Hanoi capital city and Ho Chi Minh City are two attractive centers of investment capital in the country

3. Efforts Made According to the Conditions Surrounding Construction Industry

- **Market of Inputs:** Building materials (steel, cement, brick, stone...), workers and construction machinery
- **Process of construction:** (1) Design, (2) Procurement, (3) foundation construction, (4) raw building, (5) finishing
- **Construction market:** Civil construction market; Industrial Construction Market; Infrastructural Construction Market

3.1 Market of Inputs

- The cost of construction project includes
 - 60 -70% of cost of building materials in which steel and cement accounted 60 – 70%;
 - 10 – 20% of worker cost
 - 10 -20% of construction machinery cost.
- **Construction materials**
 - Vietnam steel industry is still growing at a rate of 2 digits, reaching an average of 15% / year over the period 2011-2015
 - most steel enterprises with small-scale production, production technology was only the world average, at the stage of near end of the value chain; low added value, not high profit
 - production and consumption of cement in 2014, 2015 is stability

Market of Inputs (cont.)

- Program development of unburned building materials up to 2020 under Decision No. 567/ QD-TTg dated 28/04/2010 of the Prime Minister and Directive No. 10/CT-TTg dated 16/04/2012 of Prime Minister on the increased use of non-baked materials, has 50 provinces eliminating manual brick kilns, furnaces using fossil fuels, 25 provinces issued Directive to increase production and use of unburned materials. The implementation of the project "Strengthening the production and use of adobe bricks in Vietnam", to cut the annual rate of increase in greenhouse gas emissions by decreasing the use of fossil fuels and soil to make brick, through the intensification of production, sale and use of adobe bricks in Vietnam.

Market of Inputs (cont.)

- **Workers**

- Construction industry reached 3.3 million workers, 4th ranking in the country
- 80% of construction workers are now doing seasonal work
- Vietnam's labor productivity is only half the average of the Southeast Asian countries
- 2011 to 2014, workers in construction industry were unpaid wages accounted for a high proportion
- Construction industry is leading the field of occupational accidents causing deaths

Market of Inputs (cont.)

- **Construction machinery**

- Every year, Vietnam imported 15,000 construction machines of which 95% are older machines with average import turnover US\$ 300-400 million
- The price of older machine is only 25% of new machines, and suitable to Vietnam construction situation, so the old models are pretty much used by small and medium building contractors
- the use of the old machine also has disadvantages, such as complicated procedures, the frequent failures, and performance is not equal to the new device and pollute the environment.

3.2 Process of construction

- **Architectural Design**

- Grown building qualifications required enhanced building design with application of technology
- The design is only about 5-10% of the cost of the construction package, but it affects more than 70% of the quality and efficiency of work.
- The design changes during construction is one of the main causes leading to delays and cost increases.

- **Bidding**

- EPC is not applied so much yet in Vietnam
- Design - Bid - Build is applied very popular in Vietnam
- *The only low bidding price interest has led to construction companies to bid low, and then because of the low price, they neglect works or hire sub-contract to weak capacity to implement. Also, it appears the contractors find ways to adjust bids, making progress in a lot of traffic projects slowed down and investment costs also increased 2-3 times.*

Process of construction (cont.)

- **Building Foundations:** new technologies have been applied in the construction of the foundation
- **Raw building**
 - Since 2011, the government has issued a mandatory regulations of high-rise buildings (from 9 storeys or more) to use 30% of unburned materials for wall construction
 - the construction of industry and infrastructure use some new methods intended to reduce the volume and time
- **Finishing & Interior design:** today's interior design is finding creative design solutions for interior space.

3.3 Construction market

- **Civil construction market**

- Civil construction market affected and influenced heavily by housing and real estate markets;

- Of these 5 main factors affecting the market include:

- (1) demographics (age structure, income, population growth, and urbanization rate),

- (2) interest rates: loans and savings fell 8% and 6%

- (3) health economy (GDP growth: 6.68% in 2015 and 6.2% in 2016, unemployment, inflation and consumer's belief),

- (4) policy support from the government

- (5) FDI inflows: nearly US\$2.4 billion in property.

Table 2: The national urban development stage of 2012 – 2020

	2013	2015	2020
Ratio of urbanization (%)	33,5	38	45
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Construction market (cont.)

- **Industrial Construction Market**

- 70% in the FDI structure with the number of new projects in construction of plants
- 2016, several major projects: Garment Factory of Maple Co., Ltd. (Singapore): US\$ 110 million, project of Aureumaex Precision Plastics plant of US\$ 21 million ...In addition, the plan of investment projects of Amata (Thailand) in Quang Ninh and Dong Nai, with scale up to billions of dollars, opening a plant of Hyosung, Korea with US\$ 500 million in Vietnam or the project raised 500 million investment in Vietnam, Jabil Circuit (United States) ...

Construction market (cont.)

- **Infrastructural Construction Market**

- Up to 2020, capital demand of investment about VND 202,000 billion for transport infrastructure and VND 125,000 billion for electricity infrastructure projects per year;

- The Government issued Decree No. 15/2015 / NĐ on investment in public - private partnership (PPP), to create a clear, uniform legal framework to promote private sector to invest in infrastructure projects.

4. Future Development for Sustainable Construction Policy and Market

- **Civil construction:**

- New policies and new legal support driving force in the market of Real Estate
- By 2020: 4.2 million workers need 33.6 million m².

- **Industrial Construction:**

- Proportion capital for manufacturing industry proportion in structure of FDI (40-50%), equivalent to the average amount disbursed US \$ 4-5 billion per year;
- In 2015, Vietnam has negotiated and joined the free trade agreements to promote FDI into Vietnam;
- The prospects of the industrial construction was assessed positively in 2016 and the coming years.

Future Development for Sustainable Construction Policy and Market (cont.)

- **Construction of infrastructure:**

- 40% of the road transport system with very low quality require to upgrade the road network to reach USD 48-60 billion up to 2020 equivalent to an annual investment needs at about VND 202,000 billion per year
- Plans to build 26 airports (10 international airports 16 domestic airports) to 2020 and Long Thanh International Airport with a total investment of \$ 10 billion approximately
- Planning Electricity 7, develop another 75,000 MW power generation capacity, total investment for this plan in the 2011-2020 period is estimated about 48.8 billion dollars, equivalent to the investment needs of VND 125,000 billion per year
- In the period 2016-2020, investment demand for road transport is about VND 202.000 billion per year and the electricity sector is VND 125,000 billion per year.
- if efforts improve the legal framework for PPP to take effect, the attraction to private investment will intensify, contribute to the growth of the construction industry; the huge investment is pressure in the near future

5) Recommendation

- Projects must comply with the assessment of environmental impact is reflected in the construction law, environmental law, planning law and Decree 18/2015 / ND-CP of protection, environmental assessment etc
- Standardized workforce of construction industry through training, improved wages regime, ensuring safe conditions for workers
- The government has to issue policies to promote sectors private sector development.