

<b>MINISTRY OF CONSTRUCTION</b> -----	<b>SOCIALIST REPUBLIC OF VIETNAM</b> Independence - Freedom - Happiness -----
No:811/QD-BXD	<i>Hanoi, August 18, 2016</i>

## DECISION

ON INTRODUCTION OF CLIMATE CHANGE ACTION PLAN APPLICABLE TO CONSTRUCTION  
INDUSTRY FOR THE PERIOD 2016 -2020

### THE MINISTER OF CONSTRUCTION

*Pursuant to the Government's Decree No.62/2013/ND-CP on functions, rights, responsibilities and organizational structure of the Ministry of Construction dated June 25, 2013;*

*Pursuant to the Decision No.158/QD-TTg dated December 02, 2008 by the prime Minister on approval for Climate change national action plan;*

*Pursuant to the Decision No.1183/QD-TTg dated August 30, 2012 by the prime Minister on approval for Climate change national action plan for the period 2012-2015;*

*Pursuant to the Decision No.2139/QD-TTg dated December 05, 2011 by the Prime Minister on approval for climate change action plan*

*Pursuant to the Decision No.1474/QD-TTg dated October 05, 2012 by the Prime Minister on introduction of climate change action plan for the period 2012-2020;*

*Pursuant to the Decision No.30/QD-BXD dated January 01, 2015 by the Minister of Construction on approval for climate change action plan in 2015;*

*At request of the Director of the Department of Science and Technology,*

### HEREBY DECIDES:

**Article 1.** To issue the climate change action plan for the period 2016 -2020 applicable to construction industry ( enclosed with a List of prioritized actions) together with this Decision.

**Article 2.** Heads of affiliates of the Ministry of Construction shall be responsible for the implementation of action plan and prioritized action specified hereof.

**Article 3.** This Decision replaces the Decision No.209/QD-BXD dated March 04, 2014 by the Minister of Construction on climate change action plan applicable to construction industry for the period 2014-2020. This Decision enters into force from the date of its signature. The Chief of the Ministry Office and Heads of relevant agencies shall be responsible for the implementation of this Decision. /.

	<p style="text-align: center;"><b>PP. MINISTER DEPUTY MINISTER</b></p> <p style="text-align: center;"><b>Phan Thi My Linh</b></p>
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## **CLIMATE CHANGE ACTION PLAN BY CONSTRUCTION INDUSTRY, PERIOD 2016-2020**

*(Issued together with the Decision No.811/QD-BXD dated August 18, 2016 by the Minister of Construction)*

### **1. PURPOSES AND OBJECTIVES**

#### **1.1. Purposes**

To be able to effectively respond to climate change, Acts of God and sea level rise; to effectively utilize resources and energy; to mitigate impacts of climate change and to promote sustainable and environmentally-friendly development.

#### **1.2. Objectives**

1.2.1. Assess climate change impacts and make predictions of climate change and sea level rise impacts on construction industry as the basis for mitigation measures.

1.2.2. Incorporate climate change action plan into strategies and plans for urban development, building material manufacturing, etc; synchronize mechanism and policies on climate change action plan according to the construction industry and socio-economic development.

1.2.3. Enhance ability to adapt, mitigate and cope with climate change and sea level rise to ensure the safety of construction works and technical infrastructures.

1.2.4. Promote green works and infrastructures, use green building materials, technology and products and high-efficient devices in construction, urban development for sustainable development and mitigation of climate change and sea level rise impacts.

1.2.5. Effectively and economically use energy and resources, promote renewable energy, and minimize exhaust that may cause greenhouse effect.

### **2. ACTION PLAN**

#### **2.1. Assessment and prediction of impacts of climate change and sea level rise on construction industry**

2.1.1. Construct climate change and sea level rise scenarios and update climate change and sea level rise scenarios to construction industry by different climate according two phases: a) short- term scenarios up to 2030; b) long-term scenarios to 2050 and vision towards 2100.

2.1.2. Anticipate the construction industry development in the period of 2030 – 2050, identify subjects under the impact of climate change and sea level rise in construction industry, planning; urban technical

infrastructure, economic zones, industrial zones, hi-tech parks, housing and building, building materials and construction science and technology. Identify key actions to proactively react to climate change and sea level rise for the period 2016-2020 according scenarios prepared by the Ministry of Natural Resources and Environment; assess and recapitulate achievements of implementation of the action plan and predict climate change and sea level rise scenarios up to 2030.

2.1.3. Forecast potential impacts of climate change and sea level rise on (i) planning, (ii) construction investment, (iii) urban development management, urban infrastructures, and rural residential zones, technical infrastructures in economic and industrial zones; housing, buildings and social infrastructures; building materials; and construction technology in the century XXI.

## **2.2. Review and amendments to legal documents, construction technical regulations, standards and guidance in relation to climate change and sea level rise**

2.2.1. Review and amend legal documents, technical guidance on urban classification, urban development management, construction planning, urban planning, technical infrastructures, investment in housing, building and social and technical infrastructures and building materials in with due account taken of climate change and sea level rise.

2.2.2. Adjust and supplement provisions on climate change and sea level rise response on technical regulations and standards in respect of urban classification, urban development management, urban and rural residential area planning, construction planning, technical infrastructure planning, housing, building and social infrastructure design and construction according to climate change scenarios. Focus on regulations and standards on climate and hydrology data, flood map, workload and impact of climate change, design and construction technology, water supply and drainage inside and outside construction site, waste water and solid waste treatment plants, cemetery and urban traffic planning

2.2.3. Introduce and provide guidance on application of technical standards and regulations on planning and construction of technical infrastructures, urban planning, production of building materials, energy-saving devices for adaption and mitigation of climate change and sea level rise impact. By 2020, develop regulations and standards on construction planning and eco urban management; standards on design and construction of energy-efficient construction works, green works, and green works for climate resilience and green building materials for energy efficiency, greenhouse gas emission and pollution reduction.

## **2.3. Research and application of measures for climate change and sea level rise adaption to construction industry**

2.3.1. Review and adjust planning for urban construction, rural residential zones, industrial zones, economic zones in coastal regions where may be under impact of sea level rise and Acts of God (storms, flood, erosion), mountainous, hilly and slope lands where may be under impacts of inundation and landslide to adapt to climate change. Provide instructions to incorporate sea level rise climate change adaption into construction and urban planning. Introduce key appropriate actions against climate change and sea level rise (protection, resilience, evacuation). Develop urban planning and urban infrastructure planning by improving climate resilience and reducing environmental pollution

2.3.2. Introduce adaption and mitigation measures applicable to renovation and construction of urban technical infrastructures, rural residential zones and industrial zones ( water supply systems, transport infrastructures, energy supply systems, lighting systems, sewerage and solid waste collection and treatment systems), especially for urban located in Mekong Delta, lowland, coastal areas and regions where drought or saltwater intrusion may occur.

2.3.3. Research and apply technical solutions and state-of-the-art technologies to design and construction of construction works; monitoring systems and early warning systems to mitigate negative impacts of storms, whirlwind, flood, landslide and drought, especially in regions where Acts of God frequently occur such as the Central Coast of Vietnam, mountainous regions in the North, highlands and Mekong Delta;

focus on researching and applying appropriate technical solutions to housing in rural areas, wetlands, Mekong Delta, mountainous regions and central coast, and housing for the poor

## **2.4. Research and application of climate change mitigation measures to construction industry**

2.4.1. Prepare necessary forms and measure greenhouse gas in the field of building materials manufacturing such as cement, bricks, tiles, glass; construction works, solid waste and municipal wastewater. Prepare plans and roadmaps for executing greenhouse gas reduction plans in construction industry.

2.4.2. Research and apply new technologies to reduce gas emission by reducing fuel consumption, reducing or replacing fossil fuel.

2.4.2. Do accounting and assess energy and water consumption in housing, office buildings, public utilities, commercial centers, service centers; research and apply design and architecture solutions to construction and renovation of construction works for energy saving, especially to focal construction works on the List compiled by the Prime Minister and those with the total floor area of exceeding 2,500 m<sup>2</sup>.

2.4.3. Research and apply cutting edge technologies to reduce greenhouse gas emission in construction of urban technical infrastructures, environmentally-friendly urban architecture; urban social-ecological systems.

2.4.4. Introduce incentive policies for development and utilization of renewable energy, low-carbon materials in production and construction; manufacture green building materials; compile technical standards and procedures for labeling energy used for building material manufacturing.

2.4.5. Effectively research and apply appropriate technologies to wastewater and solid waste treatment in municipal and rural residential zones.

## **3. IMPLEMENTATION OF ACTION PLAN**

### **3.1. With respect to policies and mechanism**

3.1.1. Step up the review, amendment and completion of legal documents, mechanism and policies as the legal basis for the comprehensive implementation of climate change and sea level rise action plan in construction industry.

3.1.2. Compile and execute policies to facilitate the involvement of private sectors, diversification and attraction of both domestic and overseas sources for effective implementation of the action plan.

3.1.3. Promote entities in consulting services and backup services to participate in implementing the action plan.

### **3.2. With respect to science and technology**

3.2.1. Draw up plans for scientific research and economic development in respect of climate change and sea level rise ( meteorology and hydrology, storms and seismic zoning maps, and flood maps according to published scenarios) and execute relevant actions as the basis for development, prediction and assessment of consequences of Acts of God, climate change, introduction of disciplinary action plans and technical solutions for prevention and mitigation climate change and sea level rise impacts.

3.2.2. Research technical solutions and technologies for the manufacture of green building materials, construction works, infrastructures, eco cities according to natural conditions and socio-economic current

status.

3.2.3. Find out ways to incorporate climate change and sea level rise factors into strategies, plans, legal documents, technical standards, regulation and guidance on construction.

3.2.4. Apply information technology and GIS to creation and management of climate change and sea level rise database; create greenhouse gas measurement systems and database on greenhouse gas emission sources that cause greenhouse effect in construction industry.

### **3.3. With respect to international cooperation**

3.3.1. Draw up plans on attracting sponsorships; effectively use international organizations' funding for climate change and sea level rise adaption and mitigation.

3.3.2. Promote regional and international cooperation, information exchange, bilateral and multilateral cooperation in mitigation of climate change and sea level rise impacts;

3.3.3. Learn from experiences, apply and transfer technology and mitigation measures within the construction industry.

### **3.4. With respect to finance**

3.4.1. Science and technology budgets shall be partially allocated for research and development programs in relation to reaction to climate change and sea level rise in construction industry. Besides, the action plan implementation shall also be funded from the Climate Change Action Program and Green Development for the period 2016-2020, economic development funds, local budgets and sponsorships by international organizations and other entities.

3.4.2. Bilateral and multilateral cooperation shall be promoted to attract and mobilize finance for implementation of the action plan in construction industry.

### **3.5. With respect to propagation, dissemination and education of climate change and enhancement of ability to respond to climate change**

3.5.1. Disseminate and raise construction officials 'awareness of relevant policies and standpoints of the Communist Party, Government and heads of construction industry;

3.5.2. Set up networks, database and websites on climate change and sea level rise, draw up plans on applying adaption and mitigation measures

3.5.3. Organize seminars, conferences and provide officials with training courses and advanced training courses on climate change, its impacts, adaption and mitigation measures

3.5.4. Intensify and diversify training courses, improve construction entities 'ability to respond to climate change

3.5.5. Effectively invest in measuring equipment and gas monitoring devices

## **4. IMPLEMENTATION**

4.1. Affiliates of the Ministry of Construction; enterprises participating in construction industry, Departments of Construction, Departments of Planning and Architecture of provinces shall implement or review their action plans and arrange finance and human resources for the fulfillment of assigned actions

and annually submit a status report to the Ministry of Construction by the end of December of every year.

4.2. The Departments of Science and Technology and Environment shall take charge of and cooperate with relevant agencies, bodies, institutes of the Ministry of Construction to request the Ministry of Construction to consider approving the action plan and executing actions presented in the Annex attached hereto; inspect and expedite the accomplishment of actions and submit periodic and surprise reports on action accomplishment.

4.3. The Department of Financial Planning shall take charge of and cooperate with the Department of Science and Technology and Environment, Departments of Urban Development and relevant entities to arrange finance from economic and science funding and other sources of finance to implement actions specified in the Annex attached hereto; arrange finance for piloting projects.

4.4. Any arising issue in connection to the implementation of Decision should be promptly reported to the Department of Science and Technology and Environment. /.

## ANNEX

### LIST OF PRIORITIZED ACTIONS AGAINST CLIMATE CHANGE 2016-2020

*(Issued together with the Decision No.811/QĐ-BXD dated August 18, 2016 by the Minister of Construction)*

Unit: billion dong

No.	Actions/ projects	Objectives	Contents	Period	Organization
Action 1			<b>Review and supplement technical regulations, standards on construction and legislative documents related to climate change and sea level rise issued by construction authorities</b>		
1.1	Review technical regulations and standards on construction in regions where Acts of God frequently occur <i>(Departments of Science, Technology and Environment) (**)</i>	Compile regulations and standards on construction works that are adaptable to Acts of God impacts	- Review and amend regulations and standards on construction in regions where Acts of God frequently occur;  - Provide guidance on construction techniques according to the reality	2016-2018	- <b>Vietnam Institute for Building Science and Technology (IBST)<sup>(*)</sup></b>  -Vietnam Construction Environment Association

1.2	Review technical standards on construction of technical infrastructures, civil and industrial works with the consideration of climate change and sea level rise impacts according to scenarios ( <i>Departments of Science, Technology and Environment</i> ) (**)	Compile technical standards corresponding to climate change and sea level rise occurrences	- Review technical standards on construction of technical infrastructures (water supply and drainage systems, solid waste treatment systems, housing and public utilities)	2016-2020	- <b>Vietnam Institute for Building Science and Technology (IBST)(*)</b>  -Vietnam Construction Environment Association
1.3	Review and amend construction legislative documents which incorporate climate change and sea level rise issues( <i>Construction Offices and Departments of Science, Technology and Environment</i> ) (**)	Compile legislative documents corresponding to climate change and sea level occurrences	- Review regulations and guidance which incorporate climate change and sea level rise released by the Ministry of Construction  - Incorporate climate change and sea level rise into construction planning	2016-2020	- Relevant bodies
Action 2			<b>Introduce measures for climate resilience applicable to construction industry</b>		

2.1	<p>Research and adjust urban planning and rural residential zones planning corresponding to climate change and sea level rise (especially in the central coast, the South region of Vietnam and Red River Delta) <i>(Departments of Urban Development)</i> (**)</p>	<p>Develop urban and rural residential zones corresponding to climate change and sea level rise</p>	<p>- Adjust urban and rural residential zone planning</p>	2016-2020	<p>- <b>Vietnam Institute for Urban and Rural Planning and Vietnam Institute for Environment Planning (*)</b>;</p> <p>- Departments of Construction of provinces</p>
2.2	<p>Research to adjust construction planning for inter-provinces, economic zones, hi-tech parks, specialized functional zones <i>(Departments of Architecture Planning)</i></p>	<p>Enhance ability to deal with climate change, sea level rise by industrial zones, economic zone, hi-tech parks and specialized functional zones, etc.</p>	<p>- Do planning for inter-provincial development, economic zones, hi-tech parks and specialized functional zones, etc. corresponding to climate change and sea level rise</p>	2016-2020	<p>- <b>Vietnam Institute for Urban and Rural Planning and Vietnam Institute for Environment Planning (*)</b>;</p> <p>- Departments of Construction of provinces</p>
2.3	<p>Adjust technical infrastructure planning in inter provincial regions, provinces and river basins in consideration of climate change and sea level rise <i>(Departments of Infrastructure)</i> (**)</p>	<p>Incorporate climate change and sea level rise into infrastructure planning</p>	<p>Adjust infrastructure planning according climate change and sea level rise scenarios</p>	2016-2020	<p>- <b>Vietnam Institute for Urban and Rural Planning and Vietnam Institute for Environment Planning (*)</b>;</p> <p>- Departments of Construction of provinces</p>

2.4	Introduce appropriate measures for dealing with heavy rain, high tide and sea level rise in coastal urban, actions against inundation and landslide in mountain cities ( <i>Departments of Infrastructure</i> ) (**)	Effectively control flood, inundation and landslide	- Provide technical infrastructure solutions (leveling, drainage, detention basins, levees, etc.)	2016-2018	<p>- <b>Vietnam Institute for Urban and Rural Planning</b> (*);</p> <p>- Vietnam Institute for Building Science and Technology (IBST)(*)</p> <p>- Departments of Construction of provinces</p>
2.5	Introduce measures for controlling and mitigating impacts of storms and flood in coastal regions in the North, central coast and the South of Vietnam ( <i>Departments of Science, Technology and Environment</i> ) (**)	Ensure the safety of people and property (such as housing and public utilities)	- Provide instructions on construction of housing and works in areas where may be flooded	2016-2018	<p>- <b>Vietnam Institute for Building Science and Technology (IBST)</b>(*)</p> <p>- Departments of Construction of provinces</p>
2.6	Introduce measures for water supply to urban, dry areas, saline areas due to climate change and sea level rise ( <i>Departments of Infrastructure</i> ) (**)	Supply sufficient domestic water to dry and flooded areas	- Introduce effective water supply measures applicable to urban, industrial zones and regions directly affected by drought, saltwater intrusion due to climate change and sea level rise	2016-2018	<p>- <b>Vietnam Water, Sanitation and Environment Joint Stock Company</b> (*)</p> <p>- Departments of Construction and water supply companies in provinces</p>

2.7	<p>Introduce technical guidance on construction in regions where Acts of God frequently occur <i>(Departments of Science , Technology and Environment)</i> (**)</p>	<p>Improve the ability to cope with Acts of Gods of God by construction companies</p>	<p>- Introduce guidance on construction in regions where Acts of God frequently occur</p>	2016-2018	<p>- <b>Vietnam Institute for Building Science and Technology (IBST)(*)</b>  - Vietnam Construction Environment Association</p>
2.8	<p>Research on anti-corrosion and heat-resistant building materials to apply to technical infrastructures by region <i>(Departments of Science , Technology and Environment, and Departments of Building Materials)(**)&lt;</i></p>	<p>Focus on proper building materials for infrastructure lifetime and durability</p>	<p>Research to find out anti-corrosion and heat-resistant building materials for use in technical infrastructures according climate characteristics (storms, flood, sea level rise or drought regions)</p>	2016-2020	<p>- <b>Vietnam Institutes for Building Materials(*)</b>  - Building material manufacturers</p>

2.9.	Investigate, survey and assess the impact of climate change and sea level rise on underground construction works and introduce control measures ( <i>Departments of Science , Technology and Environment, and Departments of Urban Development</i> ) (**)	Enhance the adaptability of underground works to climate change	<ul style="list-style-type: none"> <li>- Investigate, survey and assess the seriousness of impacts of climate change and sea level rise on underground construction works</li> <li>- Introduce control measures</li> </ul>	2016-2018	<ul style="list-style-type: none"> <li>- <b>(Department s of Infrastructure )(*)</b></li> <li>- Departments of Construction and relevant bodies)</li> </ul>
2.10	Investigate and survey urban ground elevation and introduce measures for managing urban infrastructure ground elevation corresponding to climate change and sea level rise ( <i>Departments of Science , Technology and Environment, and Departments of Urban Development</i> ) (**)	Intensify the management of ground elevation of urban infrastructures corresponding to climate change and sea level rise	<ul style="list-style-type: none"> <li>- Survey and investigate urban ground elevation management</li> <li>- Introduce control measures for elevation management corresponding to climate change</li> </ul>	2016-2018	<ul style="list-style-type: none"> <li>- <b>(Department s of Infrastructure )(*)</b></li> <li>- Departments of Construction and relevant bodies</li> </ul>

2.11	Investigate, survey and assess the impact of climate change and sea level rise on technical infrastructures in coastal industrial and economic zones and introduce control measures <i>(Departments of Science , Technology and Environment, and Departments of Urban Development)</i> (**)	Enhance the adaptability of technical infrastructures in coastal economic zones and industrial zones to climate change	<ul style="list-style-type: none"> <li>- Investigate, survey and assess the impact of climate change and sea level rise on technical infrastructures in coastal industrial and economic zones</li> <li>- Introduce control measures</li> </ul>	2016-2018	<ul style="list-style-type: none"> <li>- <b>(Department s of Infrastructure and Departments of Construction)</b> (*)</li> <li>- Departments of Construction and relevant bodies</li> </ul>
2.12	Implement “ Urban development responses to climate change, period 2013-2020 “scheme <i>(Departments of Urban Development)</i> (**)	Develop cities that have ability to adapt and respond to climate change	Execute 05 programs and action according the Scheme	2016-2020	<ul style="list-style-type: none"> <li>- <b>(Department s of Urban Development)</b> (*)</li> <li>- Departments of Construction</li> </ul>
<b>Action 3</b>			<b>Study mitigation measures applicable to construction industry</b>		
3.1	Research and carry out construction and assessment of green construction works and green cities <i>(Departments of Science , Technology and Environment)</i> (**)	Save energy and water, reduce greenhouse gas emission, promote sustainable urban development	<ul style="list-style-type: none"> <li>- Introduce green works and green cities construction solutions</li> <li>- Conduct assessment and recognition of green works and green cities</li> </ul>	2016-2018	<ul style="list-style-type: none"> <li>- <b>Vietnam Institute of Architecture</b> (*)</li> <li>- Vietnam Construction Environment Association and Departments of Construction</li> </ul>

3.2	Study and draw up guidance on green infrastructure planning ( <i>Departments of Science , Technology and Environment and Departments of Infrastructure</i> ) (**)	Focus on green infrastructure planning and construction	<ul style="list-style-type: none"> <li>- Learn from green infrastructure planning experiences</li> <li>- Incorporate climate change and sea level rise issues into green infrastructure planning</li> </ul>	2016-2020	<ul style="list-style-type: none"> <li>- <b>Vietnam Institute for Urban and Rural Planning (*)</b>;</li> <li>- Departments of Construction of provinces</li> </ul>
3.3	Introduce guidance on assessment and selection of urban construction land and incorporate climate change scenarios into planning ( <i>Departments of Science , Technology and Environment and Departments of Infrastructure</i> ) (**)	incorporate climate change scenarios into infrastructure planning	Set up and supplement criteria and procedures for selection and assessment of construction land to minimize climate change negative impacts	2016-2018	<ul style="list-style-type: none"> <li>- <b>Vietnam Institute for Urban and Rural Planning (*)</b>;</li> <li>- Departments of Construction of provinces</li> </ul>
3.4	Research and apply energy-efficient solutions and use renewable energy in housing and public entities; effectively utilize and re-use water ( <i>Departments of Science, Technology and Environment</i> ) (**)	Reduce energy and water consumption by construction	<ul style="list-style-type: none"> <li>- Compile standards on energy and water efficiency</li> <li>- Pilot and broadly apply appropriate solutions</li> </ul>	2016-2020	<ul style="list-style-type: none"> <li>- <b>Vietnam Institute for Science and Technology *</b></li> <li>- Vietnam Construction environment Association, University of Science and Vietnam Water Supply and Sewerage Association</li> </ul>

3.5	<p>Research and apply model design and solutions for housing and public utility construction in Northern Coast, Central Coast and Mekong delta (<i>Housing and Real Estate Market Management Agency</i>)<sup>(**)</sup></p>	<p>Produce adaptable housing design for climate change and sea level rise adaption</p>	<ul style="list-style-type: none"> <li>- Produce adaptable housing design for coastal regions</li> <li>- Construction solutions</li> <li>- Apply adaptable housing design to coastal regions</li> </ul>	2016- 2020	<ul style="list-style-type: none"> <li>- <b>Vietnam Institute of Architecture</b> (**)</li> <li>- Departments of Construction of provinces</li> </ul>
3.6	<p>Research and apply solutions to reduction of CO<sub>2</sub>emitted by cement and building material manufacturing (<i>Departments of Science , Technology and Environment, and Departments of Building Materials</i>)<sup>(**)</sup></p>	<p>Reduce CO<sub>2</sub>emission in building material manufacture</p>	<ul style="list-style-type: none"> <li>- Investigate and survey production technology and draw up CO<sub>2</sub> emissionr eduction plans</li> <li>- Introduce energy efficiency solutions, reduce or replace fossil fuel used in building material manufacture</li> <li>- Introduce and execute greenhouse gas reduction plans</li> <li>- Pilot and transfer technology</li> </ul>	2016-2019	<ul style="list-style-type: none"> <li>- <b>Vietnam Institutes for Building Materials</b>(*)</li> <li>- Cement , glass ceramic manufacturers</li> <li>- Consulting firms</li> </ul>

3.7	Research and design domestic waste management models for relief of environmental pollution and greenhouse gas emission ( <i>Departments of Science , Technology and Environment</i> (* <sup>*</sup> ))	Reduce environmental pollution in both urban and countryside	<ul style="list-style-type: none"> <li>- Apply waste management and facilitate the involvement of private sector in waste management</li> <li>- Take actions against greenhouse gas emission</li> <li>- Plot waste management models</li> </ul>	2016-2017	<ul style="list-style-type: none"> <li>- <b>(Departments of Infrastructure)</b>(*)</li> <li>- Vietnam Institute for Urban and Rural Planning, and Departments of Construction of provinces</li> </ul>
3.8	Research and apply appropriate solid waste treatment technologies ( <i>Departments of Science , Technology and Environment, and Departments of Infrastructure</i> ) (**))	Provide environment protection, reduce greenhouse gas emission	<ul style="list-style-type: none"> <li>- Research and employ appropriate solid waste and sewerage treatment technologies</li> <li>- Design and invent, commissioning and employ technological equipment,</li> </ul>	2016- 2020	<ul style="list-style-type: none"> <li>- <b>Enterprises</b> (* )</li> <li>- Vietnam Institute for Urban and Rural Planning, Vietnam Construction Environment Association, Departments of Construction</li> </ul>
3.9	Research and propose water reservation multifunctional systems applied in urban ( <i>Departments of Science , Technology and Environment</i> ) (**))	Construct water reservation multifunctional systems	<ul style="list-style-type: none"> <li>- Research and propose water reservation multifunctional systems applied in urban</li> </ul>	2016-2017	<ul style="list-style-type: none"> <li>- <b>(Departments of Infrastructure)</b>(*)</li> <li>- People's Committees of provinces</li> </ul>

3.10	Investigate, survey and assess brackish and saltwater solutions and propose applicable technologies applied to coastal urban and Mekong Delta <i>(Departments of Science , Technology and Environment) (**)</i>	Desalinate saltwater and brackish water in coastal cities and the Mekong Delta	<ul style="list-style-type: none"> <li>- Investigate, survey and assess saltwater and brackish water solutions</li> <li>- Propose applicable technologies applied to coastal urban and Mekong Delta</li> </ul>	2016-2018	<ul style="list-style-type: none"> <li>- <b>(Department s of Infrastructure )(*)</b></li> <li>- People's Committees of provinces</li> </ul>
3.11	Assess the feasibility and propose appropriate solutions and technologies for re-use of rainwater <i>(Departments of Science , Technology and Environment) (**)</i>	Find out ways to re-use rainwater	Assess the feasibility and propose appropriate solutions and technology for re-use of rainwater	2016-2018	<ul style="list-style-type: none"> <li>- <b>(Department s of Infrastructure )(*)</b></li> <li>- People's Committees of provinces</li> </ul>
3.12	Measure greenhouse gas and introduce plans and roadmaps for reducing greenhouse gas emission <i>(Departments of Science , Technology and Environment, and Departments of Building Materials) (**)</i>	Reduce greenhouse gas emission	<ul style="list-style-type: none"> <li>- Introduce greenhouse gas measurement form, establish reporting and data consolidation procedures</li> <li>- Introduce plans and roadmaps for reducing greenhouse gas emission</li> </ul>	2016-2020	<ul style="list-style-type: none"> <li>- <b>Enterprises and consulting firms (*)</b></li> <li>- Institutes for Building Materials</li> </ul>

3.13	Research and produce green building materials and products <i>(Departments of Science , Technology and Environment, and Departments of Building Materials) (**)</i>	Produce durable building materials and products	<ul style="list-style-type: none"> <li>- Research and produce green building materials and products</li> <li>- Pilot production</li> </ul>	2016-2020	<ul style="list-style-type: none"> <li>- <b>Environmental enterprises (*)</b></li> <li>- Vietnam Institutes for Building Materials</li> </ul>
3.14	Measure greenhouse gas <i>Departments of Science , Technology and Environment, and Departments of Building Materials) (**)</i>	Calculate volume of greenhouse gas emission from construction	<ul style="list-style-type: none"> <li>- Release measurement forms under international standards</li> <li>- Measure at sources of greenhouse gas emission</li> <li>- Analyze and aggregate greenhouse gas emission figures and reports</li> </ul>	2016-2020	<ul style="list-style-type: none"> <li>- <b>Enterprises and consulting firms (*)</b></li> <li>- Institute for Building Materials and Vietnam Cement Industry Corporation</li> </ul>
3.15	Execute action plans for reducing greenhouse gas emission in cement production <i>(Departments of Science , Technology and Environment, and Departments of Building Materials) (**)</i>	Reduce greenhouse gas emission	<ul style="list-style-type: none"> <li>- Complete and operate MRV (measuring-reporting and verification) systems</li> <li>- Take measures against greenhouse gas emission</li> <li>- Implement the action plan and manage the implementation</li> </ul>	2016-2020	<ul style="list-style-type: none"> <li>- <b>Institutes for Building Materials and consulting firms (*)</b></li> <li>- Institute for Building Materials and Vietnam Cement Industry Corporation</li> </ul>

3.16	Assess overall demand for technologies for reducing carbon emission in construction industry to set the national carbon emission limit and commitments to Paris Pact ( <i>Building Material Offices</i> ) <sup>(**)</sup>	Estimates required sources of personnel, finance and technologies to fulfill commitments to Paris Pact and keep carbon emission under set forth limit	<ul style="list-style-type: none"> <li>- Establish criteria for technology assessment</li> <li>- Aggregate and assess current status of building material production technology, construction technologies and waste treatment technologies</li> <li>- Propose necessary personnel, finance and technologies to fulfill commitments to Paris Pact and keep carbon emission under set forth limit</li> </ul>	2016-2020	<ul style="list-style-type: none"> <li>- <b>Vietnam Institute for Building Science and Technology, Departments of Infrastructures</b></li> <li>- Vietnam Institute for Building Materials, Vietnam Cement Industry Corporation and relevant Associations</li> </ul>
Action 4			<b>Establish policies on training in climate change and sea level rise adaption</b>		
4.1	Compile and provide training documents on climate change, adaption and mitigation measures for officials in construction industry	Improve official's awareness of climate change and sea level rise	<ul style="list-style-type: none"> <li>- Compile and provide training documents for officials in construction industry</li> <li>- Provide administrative officers and technicians of Ministry and Departments of Construction with training courses</li> </ul>	2016-2018	<ul style="list-style-type: none"> <li>- <b>Academy of Manager for Construction and City(*)</b></li> <li>- Vietnam Construction Environment Association</li> </ul>

4.2	<p>Add specialist knowledge of climate, hydrology, environment, climate change, sea level rise and control and mitigation measures to syllabi of universities of urban management and planning, architecture and construction (<i>Departments of Science, Technology and Environment</i>) (**)</p>	<p>Broaden student's knowledge of climate and climate change</p>	<ul style="list-style-type: none"> <li>- Add documents on climate change, sea level rise to reference to existing syllabi of universities of Architecture and construction</li> <li>- Broaden knowledge of green works</li> <li>- Practice in field of green works and green cities</li> </ul>	2016-2017	<ul style="list-style-type: none"> <li>- <b>Hanoi University of Architecture</b> (*)</li> <li>- Ho Chi Minh University of Architecture</li> <li>- Universities of Construction</li> <li>- Vietnam Construction Environment Association</li> </ul>
4.3	<p>Disseminate information on Acts of Gods, climate change, sea level rise and their impacts on construction industry (<i>Departments of Science, Technology and Environment, and Building Material Offices</i>) (**)</p>	<p>Raise public awareness of control and mitigation of Acts of God impacts</p>	<p>Disseminate and educate officials and employees of disciplinary entities and public on control and mitigation of Acts of Gods consequences and action against climate changes</p>	2016-2018	<ul style="list-style-type: none"> <li>- <b>National Informatics Center</b> (*)</li> <li>- Construction newspapers and magazines</li> </ul>

4.4	Develop and implement plans for attraction of international sponsorships for actions against climate change and sea level rise ( <i>Ministerial Offices and Department of Financial Planning</i> ) (**)	Sponsorships by the Government and international organizations	<ul style="list-style-type: none"> <li>- Prepare personnel and investment attraction plans</li> <li>- Execute and assist in implementing the plan</li> <li>- Attend COP and relevant seminars or conferences</li> </ul>	2016-2020	<ul style="list-style-type: none"> <li>- <b>(Department of Science , Technology and Environment, and Departments of International Cooperation)</b> (*)</li> <li>- Relevant bodies</li> </ul>
4.5	Execute action plans on green development up to 2020 and visions towards 2030 ( <i>Departments of Science, Technology and Environment</i> )	Compile action plans in conformity to national action plan on green development	<ul style="list-style-type: none"> <li>- Execute action mentioned in the action plan</li> </ul>	2017-2020	<b>Departments of Science, Technology and Environment and members of the Ministry of Construction( *)</b>
4.6	Set up teams in charge of implementing action against climate change and green development ( <i>Departments of Science, Technology and Environment</i> ) (**)	Assist in executing action against climate change	<ul style="list-style-type: none"> <li>- Draw up annual plans and reports</li> <li>- Implement and inspection the implementation of mitigation and adaption measures.</li> <li>- Search for international assistance</li> </ul>	2017-2020	<b>Departments of Science, Technology and Environment and members of the Ministry of Construction( *)</b>

Notes:

(\*) Organizations in bold refer to the name of governing bodies.

(\*\*) refers to entities in charge of inspection of implementation and accomplishment of assigned actions.