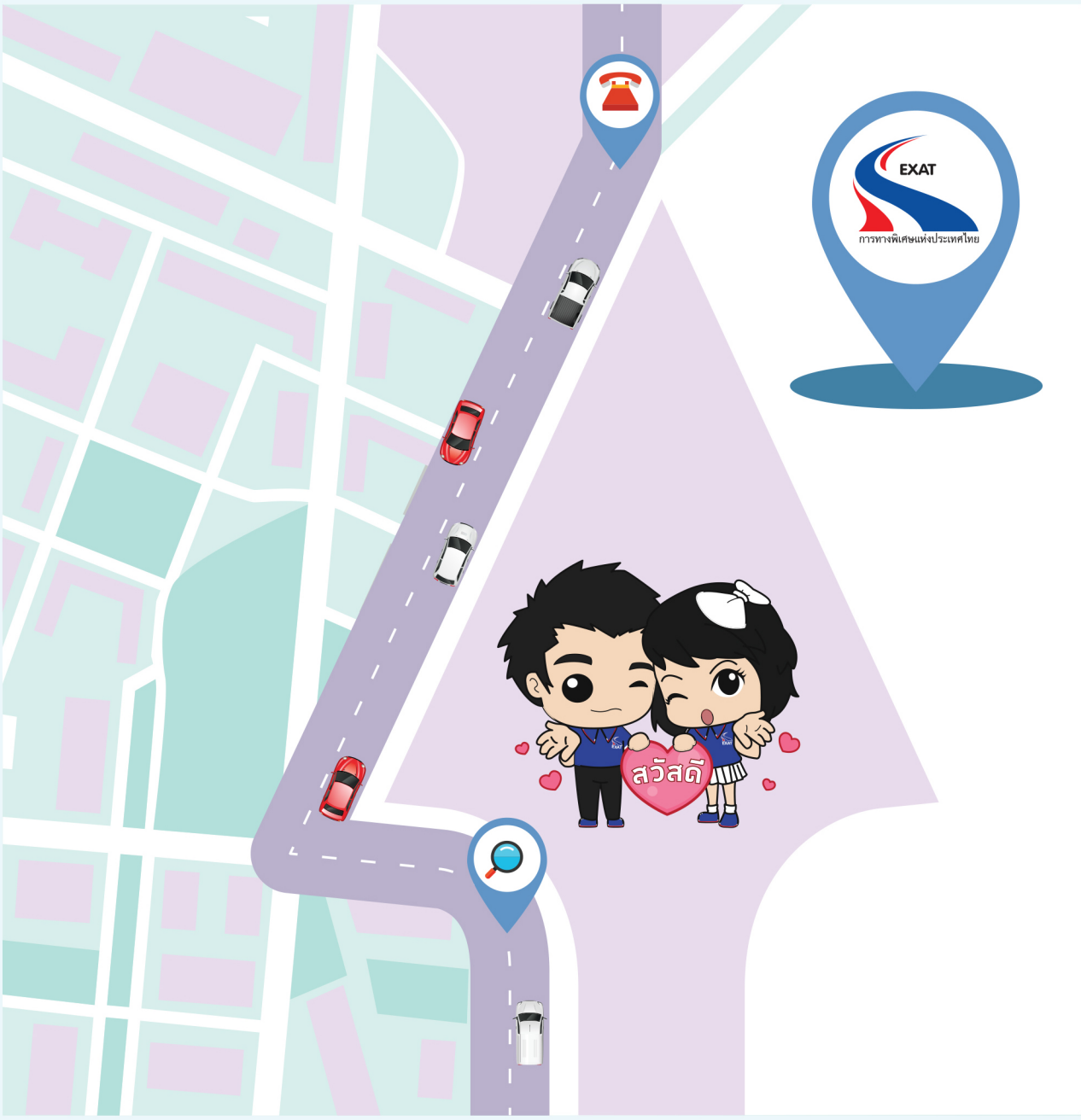
EXPRESSWAY AUTHORITY OF THAILAND

Corporate Social Responsibility Report 2019

EXPRESSWAY AUTHORITY OF THAILAND




EXAT
การทางพิเศษแห่งประเทศไทย
สวัสดี

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Message from the Governor
of the Expressway Authority of Thailand (102-14)



As a state enterprise under the Ministry of Transport, **the Expressway Authority of Thailand (EXAT)** is tasked to build or provide the expressways as well as the maintenance and operations related to the expressways, which is not limited to in the Bangkok Metropolitan area, its surroundings. With the vision of **"Development of the expressway to provide provision good and worthwhile services, with convenience, fastness, sustainable safety"** the Authority focuses on the improvement and development of expressways to meet standards, ensure safety, and offer good quality service based on the importance placed on Corporate Social Responsibility through the integration within the main operation process in order to earn trust from key stakeholders related to the EXAT, which is considered a significant factor that will lead the EXAT to accomplish its important missions.

From past to present, the Expressway Authority of Thailand has been determined to conduct its main Corporate Social Responsibility or CSR in Process, driven through with the 5-year long term Strategic Corporate Social Responsibility Master Plan (2016-2020) which consists of three Strategies. The 1st Strategy - Responsibility for Business Procedure (Sustainable Business), includes important operations such as the use of the system to detect vehicles running on the left shoulders of expressways (emergency lane) on Kanchanaphisek Expressway (Bang Phli-Suksawat) to reduce the number of accidents caused by vehicles running on the left shoulders of expressways, the system of toll fee collection with cash card in the form of EMV (Europay / Mastercard and Visa) to enable "Touch & Go" expressway toll fee collection by tapping cards at toll booths in toll plazas under the pilot plan to use on Kanchanaphisek Expressway (Bang Phli-Suk Sawat), etc. The 2nd Strategy - Fairly Reinforcing Communities and Social Acceptance (Sustainable Society), includes important operations such as the development of expressway route area by planting trees, building sports fields, providing shortcut routes/bicycle lanes and public parks, etc. The 3rd Strategy - Enhancing Capability of Environmental Mitigation and Development (Sustainable Planet), includes important operation performance such as the measurement of environmental quality around expressway toll plazas and office building area by measuring air quality, drinking water quality, noise level, as well as health risk assessment of employees who operate their works at expressway toll plaza area, operation initiatives, projects to study and determine guidelines for measurement and assessment of Eco-efficiency, and Life Cycle Assessment: LCA, etc.

The Expressway Authority of Thailand has included its operations of Corporate Social Responsibility in this 2019 CSR Report which is its first one prepared according to the reporting standards of the GRI Sustainability Reporting Standards or GRI Standards, in order to establish guidelines to measure and communicate the performance of its operations to the stakeholders based on global standards.

As the Deputy Governor for Operation Acting Governor of the Expressway Authority of Thailand, I would like to show my appreciation to all staff of the EXAT and the parties concerned who join the support for the operations of Corporate Social Responsibility, leading to sustainable development for the interests and benefits of the citizens and the country.



(Mr. Dumkerng Pankam)
Deputy Governor for Operation
Acting Governor

The Expressway Authority of Thailand

The Expressway Authority of Thailand (EXAT) [102-1] has the main responsibility in building and managing expressways in order to solve traffic problems and provide convenient and speedy transportation that propel nation's economy. Its main business is expressway service, with the other business in offering expressway areas for rent to interested parties. [102-2]

The Expressway Authority of Thailand (EXAT) is a state enterprise under Ministry of Transport, [102-5] established by the Announcement of the Revolutionary Council No.290 dated 27 November B.E. 2515 (1972). EXAT has authority in operation according to the Expressway Authority of Thailand Act B.E. 2550 (2007), which are:

1. To construct or provide the expressway by any means, as well as to maintain and preserve the expressway.

2. To operate work or businesses relating to the expressway and other businesses relating to expressway or for EXAT's interests.

Expressway Services [102-4, 102-6, 102-7]

At present, there are 8 expressways and 4 expressway links in service, with the total distance of 224.6 kilometers.

Expressways

1. Chalerm Maha Nakorn Expressway (distance of 27.1 kilometers)
2. Si Rat Expressway (distance of 38.4 kilometers)
3. Chalong Rat Expressway, Ram Inthra - At Narong (distance of 18.7 kilometers) and the Ram Inthra -Outer Bangkok Ring Road Expressways (distance of 9.5 kilometers)
4. Udon Ratthaya Expressway (distance of 32.0 kilometers)
5. Burapha Withi Expressway (distance of 55.0 kilometers)
6. Bang Na-At Narong Expressway (distance of 4.7 kilometers)
7. Kanchanaphisek Expressway (Bang Phli-Suksawat) (distance of 22.5 kilometers)
8. Si Rat-Outer Bangkok Ring Road Expressway (distance of 16.7 kilometers)



Expressway Links (102-4)

1. The elevated road at the southern part of Suvarnabhumi Airport linking Burapha Withi Expressway (additional on-off ramps of Burapha Withi Expressway to support Suvarnabhumi Airport Services)

2. The expressway link between Kanchanaphisek Expressway (Bang Phli-Suksawat) and Burapha Withi Expressway (additional on-off ramps of Burapha Withi Expressway to support the transportation between Burapha Withi Expressway and Kanchanaphisek Expressway (Bang Phli-Suksawat))

3. The Chalerm Ratchadamri 84 years link (the expressway link between Kanchanaphisek Expressway (Bang Phli-Suksawat) and Industrial Ring Road to support the transportation between Kanchanaphisek Expressway (Bang Phli-Suksawat) and Industrial Ring Road)

4. The link between Si Rat-Outer Bangkok Ring Road Expressway to the northern direction of Si Rat Expressway (Chaengwattana bound)

Future Expressway Projects (102-4)

Distance 18.7 kilometers

Rama III - Dao Khanong – Western Outer Bangkok Ring Road Expressway Project

Distance 17.2 kilometers

Third Stage Expressway System Project, Northern Route in N2 Section, linking with Eastern Outer Bangkok Ring Road and Section N1 Substitution

Distance 3.98 kilometers

Kathu-Patong Expressway Project, Phuket Province

Distance 2.60 kilometers

Expressway network connecting Utrapimuk Elevated Tollway to Si Rat-Outer Bangkok Ring Road Expressway Project (Missing link)

Distance 104.7 kilometers

Chalong Rat-Nakhon Nayok-Saraburi Expressway Project

Expressway Right of Way Utilization

Urban area

- Chalerm Maha Nakorn Expressway
- Sri Rat Expressway
- Chalong Rat Expressway (Ram Inthra-At Narong Expressway and the Ram Inthra-Outer Bangkok Ring Road Expressways)
- Bang Na-At Narong Expressway
- Udon Ratthaya Expressway (Chaengwattana-Si Saman)

Outside city area

- Udon Ratthaya Expressway (Si Saman – Bang Pa-in)
- Burapha Withi Expressway
- Kanchanaphisek Expressway (Bang Phli-Suksawat)

Area utilizations were as follow:

1. Making small parks and public parks
2. Building sport fields
3. Constructing shorter routes / bicycle ways
4. Other public benefits
5. Areas for rent

Vision

"Development of the expressway to provide provision good and worthwhile services, with convenience, fastness, sustainable safety"

Commit	• Commit to the operation, determine, and responsible for the tasks with diligence and patience to accomplish the target.
Expressway Development	• Improve existing expressways for better standard that facilitate commuters' transportation. • Expand expressway networks by building new expressways.
Excellent Services	• Improve service systems such as toll collection system, traffic control system, rescue system, and traffic information system.
Worthwhile	• Save travelling time, save fuel, and reduce engine wear and tear.
Convenient, prompt, safe	• EXAT would provide convenient, prompt, and safe travelling experience in using expressways, from the entrance and all along the expressway.
Sustainable	• EXAT would take care of all stakeholders and affected parties both internal and external with fairness, as well as manage turnover sustainably.

Missions

1. To provide expressway development in accordance with required standards and safety.
2. To provide innovative and valuable services.
3. To manage its assets efficiently in order to enhance expressway operation potentiality and social benefits.
4. To develop management and investment system to add organizational values.

Corporate Goals

1. The business turnover grows with stability.
2. The services are provided with high quality, promptness, and safety.
3. The expressways and assets are exercised to their full capacity.
4. It is a learning organization that is well prepared for changes and adjustment in the future.
5. The organization is under good governance management.

Core Values (102-16)

"Excellent service, visionary innovations, and transparently accountable."

Corporate Cultures

Willing to serve (Service – Minded)	Have good human relations and hospitable, pleased and willing to provide service and assistance to both internal users and external customers for better understanding, satisfactions, and good coordination among related parties to achieve target.
Teamwork (Mutuality)	Respect, accept, and follow group opinion in working, coordinating, maintaining, and enhancing harmony among colleagues and all related parties. Able to work smoothly with others, both within and outside the organization, for ultimate achievement with efficiency and effectiveness.
Honesty (Integrity)	Follow rules, regulations, and ethics in operation, with honesty and strictly comply with corporate's good governance concept.
Corporate commitment (Loyalty & Engagement)	Have good attitude towards organization, be a part of the organization, commit and proud to be a member of the organization, willing to do one's tasks and related tasks for corporate achievement.
Personal and corporate achievement (Endeavour)	Able to efficiently and effectively achieve target, key performance indicators (KPIs), and objectives. Eager for new, useful knowledge (both from work experience, and regular research), as well as utilize the knowledge for better work potential.

Operational Strategies

EXAT set 5-year operational strategies (fiscal year 2017-2021) for the organization to move forward under the vision of **"Development of the expressway to provide provision good and worthwhile services, with convenience, fastness, sustainable safety"** There are 4 strategies as follow:

1. Extend the network and provide sustainable service.
2. Make maximum use of the assets.
3. Build sustainability for society, communities and the environment.
4. Make EXAT an organization of the future.

Under these strategies, EXAT would be able to develop expressway networks to alleviate traffic problem, provide efficient service, and create satisfactions for expressway users. Moreover, EXAT would manage existing resources for the optimum benefits, and take good care of environment and living standards of communities around expressways to its full capacity.

Economic Operational Results (103-1, 103-2)

In the fiscal year 2019, EXAT operated in various aspects such as focusing on developing its human resources to prepare them for service provision, developing service provision standard, changing organization to be a learning organization, and utilizing technologies in its operations. EXAT's direct economic value generated was distributed to operating costs, employee wages and benefits, payments to providers of capital, payments to government, and community investments, which can be seen in detail in table 1 below.

Table 1 Distribution of Direct Economic Value Generated (201-1)

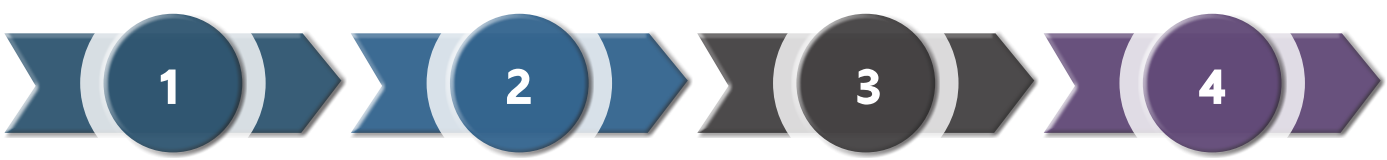
Economic Details	Amount (Baht)
Direct economic value generated	
Revenues	18,620,159,435.48
Economic value distributed	
Operating costs	4,072,955,099.09
Employee wages and benefits	3,534,953,835.51
Payments to providers of capital	4,303,824,356.83
Payments to government by country	3,000,000,000.00
Community investments	6,363,672.45
Economic value retained	**3,702,062,471.60**

EXAT Risk Management

For 47 years, EXAT's core business has been providing expressway services. Its missions are developing and improving expressways that are safe and comply with applicable standards, while providing innovative services. This is in accordance with EXAT's vision of **"Development of the expressway to provide provision good and worthwhile services, with convenience, fastness, sustainable safety"** Moreover, EXAT builds confidence to its stakeholders that it can continuously and promptly operate under today's changing environment.

EXAT manages risk by using **"Value-based Enterprise Risk Management"** (VBRM) principle as a tool to support its operation under the COSO-ERM Portfolio Views of Risk framework. It focuses on performing duties via various strategies while using risk management aspect to create business opportunities that results in the achievement of organizational values and benefits. This operation complies with the regulation of the Ministry of Finance on standards and practice in the risk management for the government agencies B.E. 2562 (2019) that all state enterprises should follow on the aspect of risk management and internal control.

The previous risk management outcomes and organization's quality evaluations indicated that EXAT still has more risk situations to come. These situations may be varied according to the changing trends as well as uncertainty from both internal and external factors. Therefore, it is necessary for EXAT to do the analysis on organization's risk situation to indicate organizational risk and manage them to create confidence that the organization would not lose business development opportunities as well as to enhance organizational value that allows sustainable growth. This is in accordance with EXAT's risk management direction for the fiscal year of 2017-2021, which is to **"commit to risk intelligence to create opportunity and preserve values of the organization"**. There are 4 strategies as follows:



1	2	3	4
Securing financial balance	Driving business in system and process innovation	Operating business for society	Reinforcing organizational risk culture

There are 6 strategies as follows:

1. Development of human capital and process capital to be the foundation toward a leading state enterprise.
2. Enhancement of investment capability strategy based on financial innovation management.
3. Building business opportunity from revenue management by making maximum use of assets and technologies.
4. Business development based on requirement management / expectation management of customers and stakeholders.
5. Creation of sustainable organization based on development of organizational learning, integration of working procedures, the personnel potential management, and establishment of the intelligent organizational culture and risk management ability.
6. Development of the potential in managing Big Data to be used for warning of the organizational risks and reducing losses in business opportunities, personnel potential management, and reinforcement of constructive organizational culture.

From the risk situation analysis that anticipating the future outlook, the review of risk drivers' indicators and the causes of risk, EXAT was able to indicate its key risk factors in fiscal year 2019 and divide into 4 aspects: strategy, operation, finance, and law and regulation. It covered 3 risks issues and 5 causes of the risks, which were managed by using 3 risk management plans as follows:

Table 2 EXAT's risk management directions for the fiscal year 2019

Risks	Causes	Risk Management Operation Results
1. Expressway Security	• Network Crisis Management • Network Exposure and Vulnerability Management	<u>Smart Expressway</u> **Operation success: 80 percent** 1) Proactive traffic management • Information system development to support expressway staff's operation • Proactive maintenance development • Automatic lane control system development 2) Proactive incident management • GPS system development that connect hazardous materials transport trucks with Department of Land Transport • Road safety audit and black spot investigation on expressway • Structure investigation on expressway during the construction project of Metropolitan Rapid Transit Orange Line, from Thailand Cultural Centre to Min Buri (Suwintawong)
2. Organizational Development	• Readiness toward Leading State Enterprise	<u>Smart Organization</u> **Operation success: 100 percent** 1) Human resource infrastructure development • EXAT's career path review operation • Risk culture support 2) Operation system development towards being leading state enterprise agencies • Organization's work system development study and planning 3) Database development • Customer's database development readiness • Database development for real time result demonstration • Standard development for information data exchange

Risks	Causes	Risk Management Operation Results
3. Performance	• Revenue Management • Cost Management	<u>Smart Value</u> **Operation success: 100 percent** 1) Improvement and value-added creation • Monitoring result of market promotion and integrated business development under the corporate image and brand management strategy • Electronic Toll Collection System (ETCS) development • Expressway area development master plan creation • Civil engineering standard regulation setting: under adjustment according to working group's resolution • System development for investment budget status monitoring during normal operation: all related agencies cooperated in entering data since March 2019 2) TFF fund supervision • TFF fundraising operation monitoring • RTA agreement law monitoring 3) Dispute and lawsuit management • Preparing for the end of dispute and lawsuit on adjusting the express-way toll rate • Preparing for the end of dispute and lawsuit from other causes • Coordination with other related agencies for the complete information and evidence submission within the agreed timeframe • In case that the court sent out notification about the appointment for judicial process with high value, all related parties will be contacted • Analysis on the result of the financial effects for the closed lawsuit, e.g. ways that characterized as competitive

Risks	Causes	Risk Management Operation Results
		4) Expressway project's joint venture agreement management • Si Rat -Outer Bangkok Ring Road Expressway supervision activity • Monitoring in preparation of Si Rat expressway management after the end of the concession periods 5) Expressway construction contract management (IC) • Rama III- Dao Khanong-Western Outer Bangkok Ring Road Expressway Project supervision activity. • Third stage expressway system project, Northern route in N2 Section, linking with Eastern Outer Bangkok ring road and section N1 substitution

In terms of risk management, in fiscal year 2019, it consisted of 3 risks issues and 5 causes of the risks while there were 3 risk management plans. EXAT controlled the risks on expressway security, organizational development, and performance to the acceptable level, or 97.05 percent, as can be seen in the figure 1.

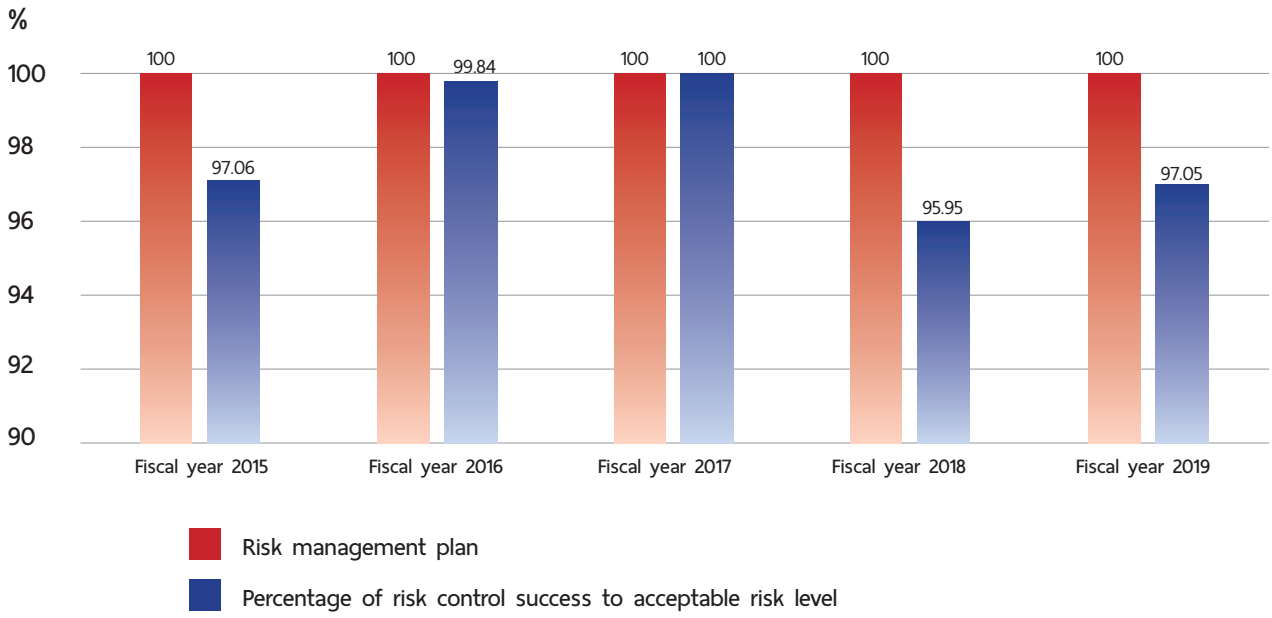


Figure 1 Percentage of risk management success according to acceptable risk criteria

Business Continuity Plan

EXAT has utilized the Enterprise Risk Management (ERM) system as its operation framework since fiscal year 2003 in the form of preventive risk management. Later, EXAT adapted the concept of Business Continuity Management System (BCMS) which focused on corrective risk management. In the fiscal year 2016, EXAT started utilizing Business Continuity Plan (BCP) as scope for its operation. Moreover, it reviewed and set its business continuity plan followed EXAT's 4 important processes to be consistent with today's situation and to cover all important system.

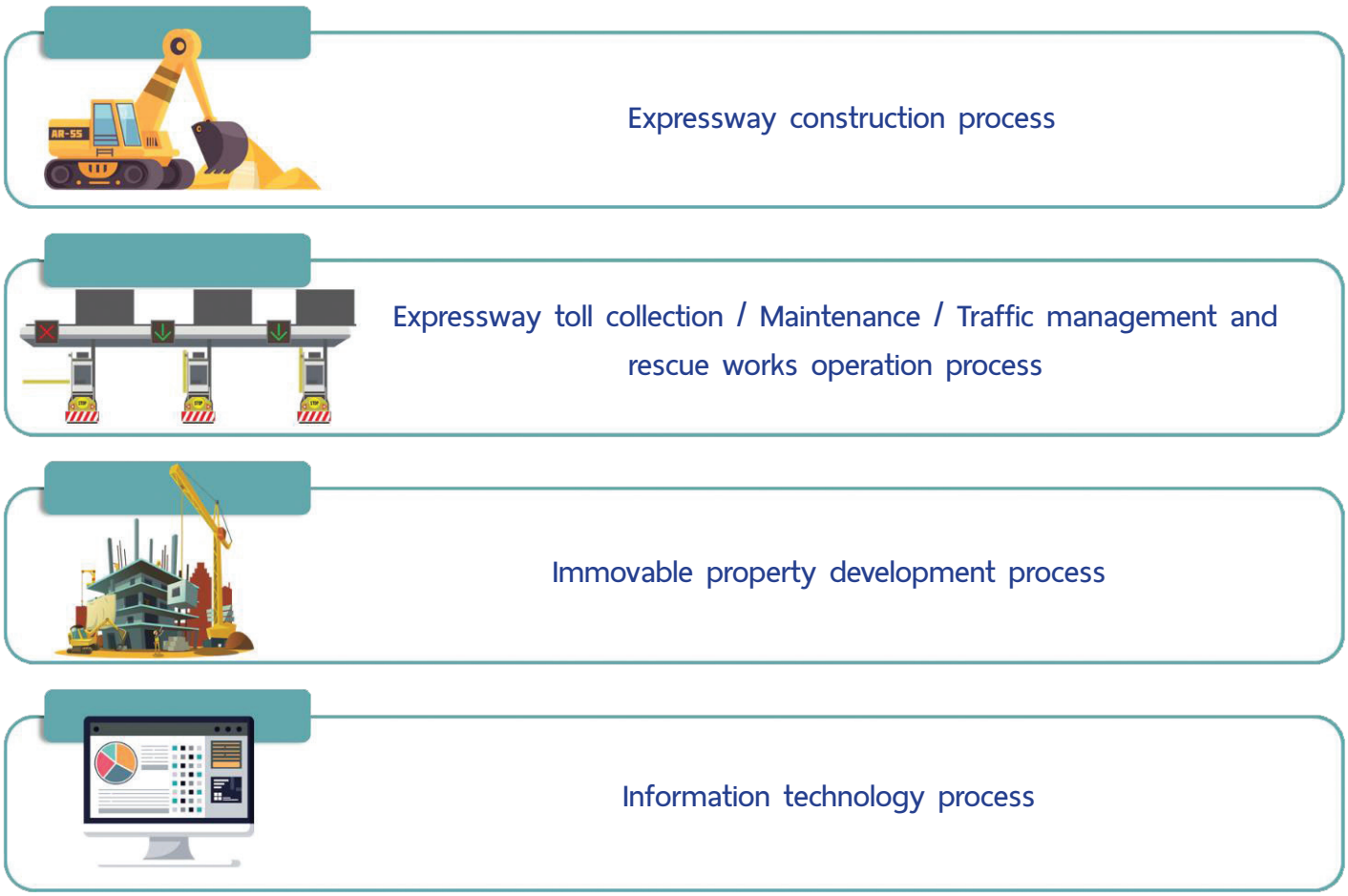


Figure 2 EXAT's important operation process

For the organization to be readied for any critical situation that might occur and be able to operate continually and effectively, as well as be able to communicate with stakeholders to create awareness in business continuity management effectively, EXAT practiced business continuity plans for 5 critical situations and 12 crisis as can be seen in table 3.

Table 3 Business Continuity Management

Critical Situations	Crisis	Time Period for Problem Solving
Expressway traffic has been disrupted.	Expressway is not ready for utilization due to severe accident on the expressway.	**Emergency plan:** Time period used for assisting in the accident and removing them from obstructing the way, until at least 1 lane of the traffic can be resumed normally, should be within 1 hour 30 minutes from the incident notification time. **Continuity plan:** Time period used for initial damage investigation should be within 3 hours from the notification time of suppression.
	Expressway structure is damaged due to disaster (earthquake) / sabotage.	**Emergency plan:** Time period used for redirecting expressway users to other routes should be within 30 minutes from the incident notification time. **Continuity plan:** Time period used for initial damage investigation should be within 3 hours from the notification time of suppression back to normal safety.
	Expressway structure is damaged due to severe fire in expressway area.	**Emergency plan:** Time period used for extinguishing the fire should be within 1 hour from the incident notification time. **Continuity plan:** Time period used for redirecting users to other routes should be within 30 minutes from the moment that fire was extinguished.
Heavy traffic jam in front of the toll plaza	Expressway's toll collection system cannot be used due to fire at the expressway toll plaza.	**Emergency plan:** Time period used for containing the fire to a limited scope should be within 30 minutes from the incident notification time. **Continuity plan:** Time period used for solving the derailed toll collection problem until the toll can be collected by using the method of "toll collection when some equipment is not in the perfect condition" should be within 2 hours from the moment that fire was extinguished.
	Expressway's toll collection system cannot be used due to flood at the expressway toll plaza.	**Emergency plan:** Time period used for evacuating employees and important assets to operate in temporary office should be within 24 hours from the moment that the flood on the road plain is higher than 30 centimeters and continue to increase, and employees cannot enter the premise. **Continuity plan:** Time period used for solving the derailed toll collection problem by using "toll collection when some equipment is not in the perfect condition" method, and employees can move to operate in the expressway toll office should

Critical Situations	Crisis	Time Period for Problem Solving
		be within 2 hours from the moment that flood on road plain decreases to not higher than 20 centimeters.
	Central computer system cannot be used due to disaster / sabotage / system was invaded / system was down / fire at central computer center, ETC system and Cash system.	<u>Cash system</u> **Emergency plan:** Time period used for changing toll collection system to "toll collection when some equipment is not in the perfect condition" method and evacuating to temporary computer center office should be within 4 hours from the incident notification time. **Continuity plan:** Time period used for restoring main computer system back to normal condition and can be used continually should be within 7 days from incident notification time. <u>ETC system</u> **Emergency plan:** Time period used for immediate evacuation to backup computer site (CCB3) should be within 4 hours from the incident notification time. **Continuity plan:** Time period used for restoring center system (CS) back to normal continuous operation should be within 24 hours from the incident notification time.
	Unable to collect toll due to protest at expressway toll plaza.	**Emergency plan:** Time period used for setting up area that does not obstruct the traffic for the protestors should be within 1 hour from the incident notification time. **Continuity plan:** Time period used for initial damage investigation should be within 3 hours from the negotiation conclusion time.
Delayed construction	Unable to construct due to huge accident during construction.	**Emergency plan:** Time period used for initially restoring the site back to safety and at least 1 lane of the traffic can be resumed normally should be within 1 hour from the incident notification time. **Continuity plan:** Time period used for removing the accident so that it does not obstruct the traffic and normal traffic on all lanes can be resumed, even though the construction site is not back to normal condition yet, should be within 3 days and the investigation process with solution should be within 7 days from the moment of suppression back to normal safety.

Critical Situations	Crisis	Time Period for Problem Solving
Office building / expressway control building cannot be used	Office building / expressway control building cannot be used due to fire.	**Emergency plan:** Time period used for containing the fire to a limited scope should be within 30 minutes from the incident notification time. **Continuity plan:** Time period used for setting temporary offices for the affected agencies to operate should be within 24 hours from the moment that fire was extinguished.
	Office building / expressway control building cannot be used due to flood.	**Emergency plan:** Time period used for evacuating employees and important assets to operate in temporary office should be within 24 hours from the moment that the flood on the road plain is higher than 30 centimeters and continue to increase, and employees cannot enter the premise. **Continuity plan:** Time period used for initial damage investigation should be within 24 hours from the moment that flood on road plain decreases to not higher than 20 centimeters.
	Office building / expressway control building cannot be used due to protest.	**Emergency plan:** Time period used for negotiation and conclusion should be within 24 hours from the moment of incident notification time. **Continuity plan:** Time period used for initial damage investigation should be within 3 hours from the negotiation conclusion time.
Important back office system cannot be used	Main data center for important back office system cannot be used due to fire at the main computer center.	**Emergency plan:** Time period used for containing fire to a limited scope should be within 30 minutes from the incident notification time. The back-office system at backup computer site should be back within 4 hours after the incident. **Continuity plan:** Able to use back office system at backup computer site within 24 hours from the incident.

This is to prepare for the critical situations that might occur and affect EXAT's operation. Employees are being communicated to create awareness and understanding in EXAT's business continuity management plan. Moreover, the business continuity plans for the fiscal year 2020 are set for the stable operation in the future.

Stakeholder Engagement

The Expressway Authority of Thailand (EXAT) realizes that its operations create economic, social and environmental impacts on several groups of stakeholders, the organization is therefore determined to conduct its operations and management with appropriate responsibility for each group of stakeholders. The EXAT analyzes and divides its stakeholders into 7 groups, namely the Government sector as the owner, EXAT employees, Partners, Expressway users, Affected parties by land expropriation, Expressway surrounding community, and the Society. The contact channels are open through both Online and Offline system for the convenience of the stakeholders of the EXAT to express their opinions and concerns on various issues and topics to the organization in order to improve and develop its operations in response to the expectations of the stakeholders.(102-42)

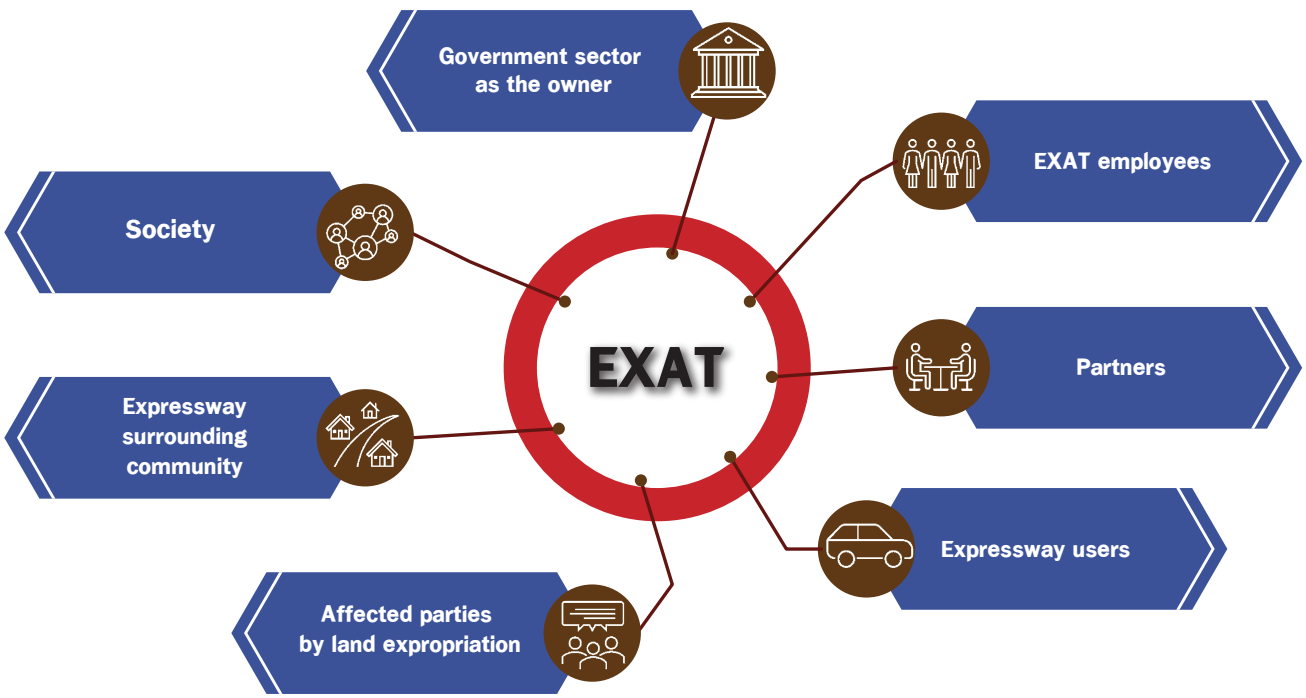


Figure 3 The stakeholders of the EXAT

Table 4 The stakeholders and responses to expectations of stakeholders.

Stakeholders(102-40)	Contact channels(102-43)	Expectations from stakeholders (102-44)	Responses to stakeholders(102-44)
Government sector as the owner	• Coordination between departments or divisions in lines of responsibility.	• Collect income efficiently with the ability to maintain strong financial status without becoming financial burden to government sector. • Build up strength to communities surrounding the expressway. • Improve efficiency in services such as development of automatic expressway fee collection by the use of Easy Pass card, improvement of channels to listen to service users, care and prevention of accidents, etc. • Improve guidelines on knowledge management and become an organization of learning, and also create opportunity for advancement in career path according to demands of organization. • Use important information and complaints of stakeholders in order to systematically improve guidelines of operations, and communicate to suppliers and partners in order to make improvement in work operation process. • Implement the government policy. • Use more areas for the purpose of common public interest and greater benefits.	• Operate works with integrity, transparency, and adherence to the interest and benefits of the people and the government sector. • Conduct operations to achieve goals of the organization according to the assigned policy.

Stakeholders(102-40)	Contact channels(102-43)	Expectations from stakeholders (102-44)	Responses to stakeholders(102-44)
EXAT employees	• EXAT Sound. • Internal public relations documents. • Seminars and trainings.	• Enhance advancement of employees by setting clear Career Path in each line of work, and establish rule and principle to support just and fair choice of Successor. • Place importance on tasks assigned to employees to perform. • Encourage employees to be proud of their works and realize that they are valuable to the organization. • Establish good relationship and atmosphere for employees to work together at every level and age group to eliminate age gap at work. • Provide education and spread knowledge continuously, and exchange opinions, points of view and ideas with supervisors or colleagues in both the same and other departments or divisions. • Provide benefits, welfare and remuneration in accordance with the way of life under present economic condition and up to the current situation. • Enhance and create supporting activities in accordance with EXAT value to cultivate and develop EXAT identity. • Create and open up opportunities for employees with responsibility for works starting from the beginning throughout until the end. Give employees freedom to set up steps in work process or plan their work schedules until their works are accomplished.	• Give equal and fair treatment to EXAT officers or employees in terms of opportunity, remuneration, benefits, development of potential and quality of life, and safety at work. • Create employees' engagement and participation. • Provide channels to hear complaints.

Stakeholders(102-40)	Contact channels(102-43)	Expectations from stakeholders (102-44)	Responses to stakeholders(102-44)
Partners	• Coordination between procurement departments or divisions.	• Improve procurement process to make its operation more efficient and flow smoother. • Communicate clear and common understanding of contracts and details of operations between employers and employees. • Communicate basic information in procurement process or other important information to enable partners to plan efficient work operations.	• Conduct business operations with just and fair practice to partners (contract partners, creditors) without taking any advantage. • Respect and comply with conditions stipulated in contracts.
Expressway users	• Expressway toll plazas. • EXAT Call Center 1543. • EXAT Portal Mobile Applications. • EXAT Traffic Application. • EXAT SIMAP Plus Applications. • EXAT website (www.exat.co.th). • www.thaieasypass.com • Email : webmasters@exat.co.th • Email : off_infor@exat.co.th • Email : crm.ebiz.exat@gmail.com • www.facebook.com/exatsociety • ww.facebook.com/etceasypass • Government Easy Contact Center (GECC). • One Stop Service Center. • Services available at Land Right-Acquisition Office.	• Increase number of toll fee collection lanes for faster service. • Reduce and waive toll fee during weekends. • Improve stability of Easy Pass system. • Show route signage with more details on express way. • Find solutions to traffic congestion on expressway. • Give users receipts every time without request. • Clean traffic surfaces on expressway. • Reduce expressway toll fee for Easy Pass system users. • Notify accurate status on expressway. • Provide traffic officers to help manage and facilitate traffic flow during rush hours.	• Increase public relations to promote Electronic Toll Collection System (ETCS) by the use of Easy Pass card to encourage more expressway users to switch to Easy Pass service through every channel of online and digital media. • Offer convenient services to EXAT express-way users who pay toll fee by cash. • Study the use of Easy Pass card in the form of cash card paying for other public transportation system as well as paying in convenient stores, in order to persuade group of expressway users paying by cash to switch to Easy Pass card. • Provide online multi-media or public relations posters making comparison of time taken while passing through toll fee

Stakeholders(102-40)	Contact channels(102-43)	Expectations from stakeholders (102-44)	Responses to stakeholders(102-44)
	• Exhibition activities and Road Show activities. • Activities to build relationship with customer. • Survey on satisfaction of express-way users. • Radio, television, printed media. • Signal signage and information and public relations signage. • Intelligent Traffic System (ITS). • Banks and external agencies joining the prepaid Easy Pass card project. • "Bright expressway with Care for Expressway Users" project. • Enhancement of image related to the brand or Brand Equity, and Voice of Customer. • Projects for convenience and safety to support trips people make during New Year and Songkran holidays.		collection lanes between expressway users paying by cash and those using Easy Pass card. • Assess the volume of expressway users by types of toll fee collection of express-way users at expressway toll plazas with high density. Assessment result showed more users paying by cash than those using Easy Pass card, discount promotion was consequently offered to Easy Pass users for toll fee collection in order to reduce high density resulted from long lines causing delay in toll fee collection lanes at those toll plazas. • Launch project to offer expressway discount of 5 baht per ride for expressway users through Easy Pass and M Pass system only during weekday morning rush hours at Asok 4 toll plaza, Bang Khun Tian Toll Plaza, Dao Khanong Toll Plaza, Pracha Chuen Toll Plaza (Inbound), Bang Khun Tian 1 Toll Plaza (Inbound), and Bang Khun Tian 2 Toll Plaza (Outbound). • Assess satisfaction and seek opinions from participants of EXAT Road Show activities in various events and activities to build relationship with customers.

Stakeholders(102-40)	Contact channels(102-43)	Expectations from stakeholders (102-44)	Responses to stakeholders(102-44)
Group of people renting areas in expressway right-of-way	• EXAT website (www.exat.co.th) • One Stop Service Center. • Land Right-Acquisition Building, Division 1, 2. • Survey on satisfaction of people renting areas within expressway right-of-way. Enhancement of image related to the brand or Brand Equity, and Voice of Customer.	• Demand EXAT to increase various channels for rental payment using both internet and mobile channels without any fee collection. • Reduce required documents to submit for area rental request, and increase efficiency with faster services. • Take good care of lighting Illumination under expressway right-of-way for the purpose of crime prevention. • Perform accurate measurement of areas in old lease contracts and new lease contracts. • Manage trespassing of expressway area efficiently. • Develop environmental conditions of rental areas such as improvement into green areas, improvement to make areas useful, development for beautification of more rental areas. • Assign employees to take care of areas under expressway right-of-way and rental areas, and also prepare officers to reach areas in timely manner in case of complaints.	• Set up monthly/quarter Action Plan to support area rental service. • Reduce the number of steps or days taken in certain step to make area rental process faster. Enable lease contract renewal to be obtained faster than making a new lease contract.
Affected parties by land expropriation	• Letters. • Survey on image of corporate social responsibility.	• Take good care of landowners or parties affected by impacts of land appropriation appropriately by settling issues such as relocation or resettlement and dissatisfying estimated land appraisal. • Consider or improve rules and regulations on pricing to become more relaxed in favor of fair estimated land appraisal to both the EXAT and groups of	• Listen to problems resulted from impacts on way of life of landowners or parties affected by appropriation for the construction of new expressway projects, in order to develop guidelines for healing and solutions or mitigation to minimize occurring impacts as much as possible.

Stakeholders(102-40)	Contact channels(102-43)	Expectations from stakeholders (102-44)	Responses to stakeholders(102-44)
		landowners or parties affected by appropriation, and also start the search for areas of their relocation close to where they originally used to live for some group of communities in need. • Solve problems and communicate news, information, rules and regulations to groups of landowners or parties affected by expropriation with proactive public relations, in order to develop clear and mutual understanding and reduce problems of conflicts or disputes.	
Expressway surrounding community	• Corporate Social Responsibility (CSR) activities. • Radio, television, printed media. • EXAT website (www.exat.co.th). • Regular site visit to the areas to have unofficial and official dialogue and coordination with community leaders.	• Allocate areas left from expropriation to be used for public interest and benefits. • Conduct operations for prevention and reduction of environmental impacts from EXAT operations. • Work on proactive public relations to give news and information to communities surrounding the expressway in order to develop understanding and set requirements to make use of allocated areas.	• Treat communities surrounding the express-way with attention and care, and be mindful of possible impacts which may occur. • Be responsible for communities surrounding the expressway, and work towards solutions to occurring impacts with prompt response and equal treatment. • Participate and engage in development of quality of life and safety for communities surrounding the expressway. • Encourage participation and engagement of communities surrounding the expressway.

Stakeholders(102-40)	Contact channels(102-43)	Expectations from stakeholders (102-44)	Responses to stakeholders(102-44)
Society	• Corporate Social Responsibility (CSR) activities. • EXAT website (www.exat.co.th). • EXAT Call Center 1543. • Radio, television, printed media.	• Develop quality of life and increase support for Corporate Social Responsibility. • Develop and help enable communities to become sustainable and move forward by themselves. • Receive clear news and information to develop understanding on EXAT operations to be carried out in the future.	• Value and place importance on the society in practice with social recognition and care. • Take responsibility for occurring impacts with prompt response, express concerns, listen to, and also take part in the care, creation and development of sustainable society.

About this report

The Expressway Authority of Thailand (EXAT) has prepared this Corporate Social Responsibility Report in accordance with global reporting framework for the 6th year (102-52) to show its commitment on accurate and transparent information disclosure regarding corporate social responsibility of the organization to the stakeholders. The information disclosure covers economic, social and environmental performance of the EXAT's operations with the reporting period from 1st October 2018 to 30th September 2019. (102-50) EXAT has adopted a sustainability report in accordance with the Global Reporting Initiative: GRI Standards for the first year by This report has been prepared in accordance with the GRI Standards: Core option (102-54) and guidelines of additional information disclosure in Ground Transportation – Highways and Rail Tracks. This report is different from the reporting in fiscal year 2016 which is based on the GRI-G4 reporting standard. (102-51) Moreover, the EXAT also combines the Sustainable Development Goals (SDGs) with the strategies and operations of the organization in order to express its determination in response to the sustainable development goal chosen by the organization for its operations, and to the demands and expectations of different groups of stakeholders.

Assessment process for material aspects of corporate social responsibility (102-46)

The Expressway Authority of Thailand reports materiality aspects of sustainability, which are significant to corporate social responsibility and affect the stakeholders and the organization, in accordance with the sustainability reporting standards of the Global Reporting Initiative: GRI Standards through a 4-step process as follows,

1. The identification of relevant aspects of sustainability

The Expressway Authority of Thailand has considered and gathered material aspects of sustainability in the fiscal year 2019 in order to analyze and identify material aspects of sustainability for the stakeholders and the organization with the consideration of the information from internal and external factors which may create impacts to the sustainability in the business operations of the EXAT. Covering economic, social, and environmental dimensions, the information comes from the following internal and external factors.

Internal factors

- The EXAT's Action Plan for corporate social responsibility in the fiscal year 2019.
- The 5-year Strategic Corporate Social Responsibility Master Plan (2016-2020).
- The State Enterprise Plan in the fiscal years 2017-2021 and the Action Plan in the fiscal year 2019 (revised version).

External factors

- The State Enterprise Performance Appraisal (SEPA).
- Specific-area aspects of the Sustainability Accounting Standards Board: SASB.
- The aspects of interest from the assessment based on Dow Jones Sustainability Indices: DJSI.
- The opinions of the total 7 groups of stakeholders affected by the impacts from the operations of the organization.

2. The prioritization of material aspects of sustainability.

After comparing materiality aspects of sustainability significant to the organization and the stakeholders with the Topics in accordance with the GRI Standards, the Expressway Authority of Thailand found a total of 34 Topics for prioritization, and then brought all of them into consideration process in order to prioritize the aspects of sustainability of the EXAT in 2019 under consideration by the following 2 criteria.

- The impacts of the organization on the economy, society and environment.
- The importance to the assessment and decision of the stakeholders.

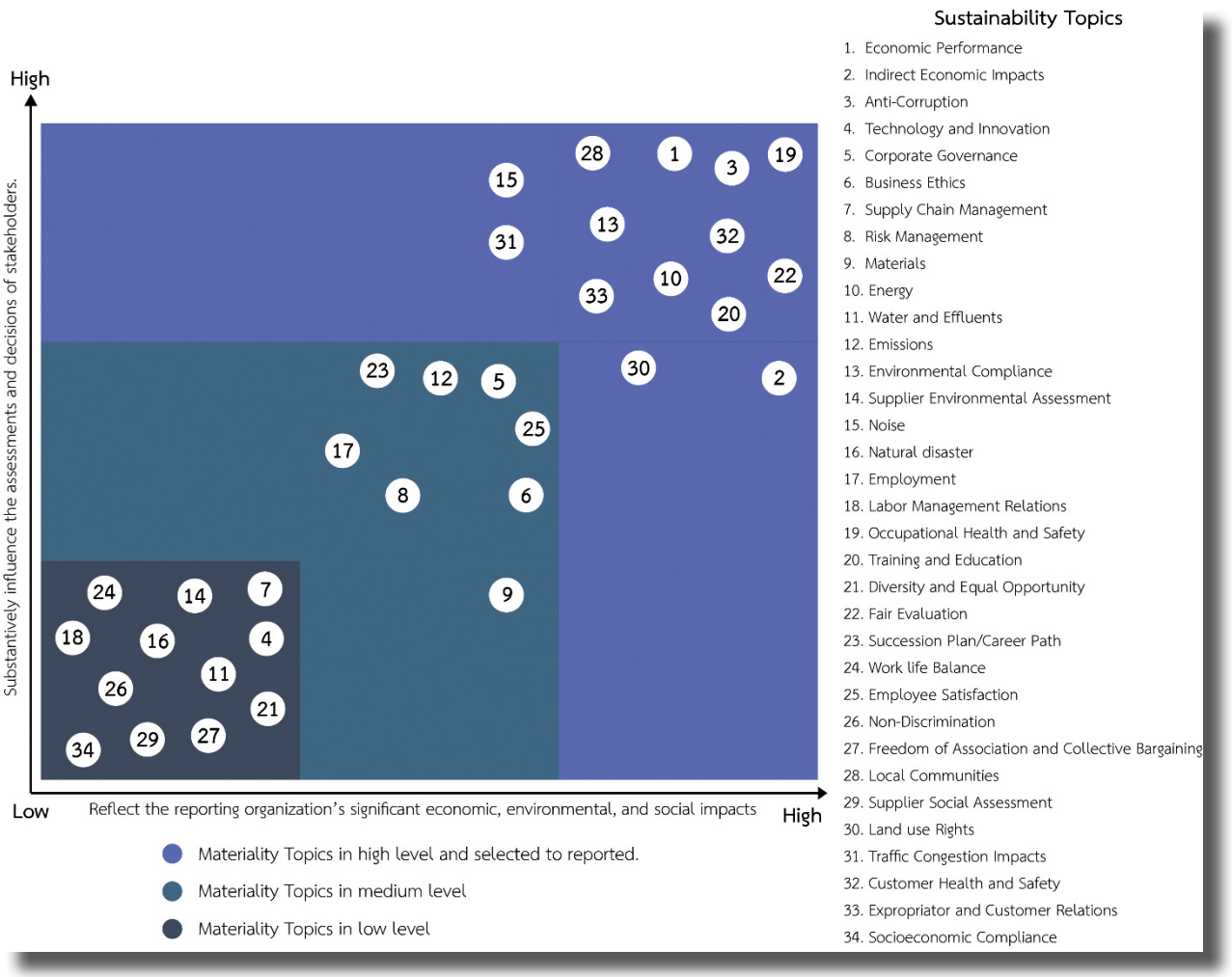


Figure 4 Prioritization of sustainability topics

From sustainability issues that are related to EXAT, from total of 34 topics taken into consideration through prioritization criteria found that there are 14 material topics. And after the workshop has added the topic of **"Emissions"** on materiality topics, total 15 material aspects of sustainability have been found. This report has been 6 significant aspects change from the fiscal year 2019, such as energy, emission, environmental compliance, fair evaluation, employee satisfaction, and expropriator and customer relations as detailed in the table showing the assessment result of the material aspects of sustainability. (102-49)

3. The validation of material aspects of sustainability.

The Expressway Authority of Thailand validated the completion of material aspects of sustainability by the executives of the EXAT, then the validated aspects of sustainability were proposed to the Governor of the EXAT in order to consider for approval and confirmation of material aspects of sustainability under the scope of both internal and external impacts of the organization.

4. The review of material aspects of sustainability.

The Expressway Authority of Thailand has prepared the questionnaire at the end of the report in order to listen to opinions, points of view, perspectives and suggestions of the stakeholders. The information from these opinions will be gathered after the Corporate Social Responsibility Report of the EXAT is publicized to the general public for the purpose of the improvement and development of the content in the next report.

Enquiry of information (102-3, 102-53)

Any additional suggestion or enquiry of information shall be directed to,

Good Governance Division, Office of Governor, The Expressway Authority of Thailand.
2380, Phahonyothin Rd., Saenanikom Chatuchak District, Bangkok, 10900
Telephone: 0 2558 9800 Fax: 0 2940 1210

Table 5 The assessment result of materiality aspects

Material Topics (102-47)	Impacts (102-46)	Strategic Corporate Social Responsibility Master Plan	Reported Content
1. Economic performance	• EXAT	• Strategy 1 : Responsibility for Business Procedure (Sustainable Business)	• Economic Performance
2. Indirect economic impacts	• EXAT	• Strategy 2 : Fairly Reinforcing Community and Social Acceptance (Sustainable Society)	• Indirect Economic Impacts
3. Anti-corruption	• EXAT • Trade partners • Government sector	• Strategy 1 : Responsibility for Business Procedure (Sustainable Business)	• Anti-corruption
4. Energy	• EXAT	• Strategy 3 : Enhancing Capability of Environmental Mitigation and Development (Sustainable Planet)	• Energy and Emission
5. Emission	• EXAT	•Strategy 3 : Enhancing Capability of Environmental Mitigation and Development (Sustainable Planet)	• Energy and Emission
6. Environmental Compliance	• EXAT	• Strategy 3 : Enhancing Capability of Environmental Mitigation and Development (Sustainable Planet	• Environmental Compliance
7. Occupational health and safety	• EXAT	• Strategy 1 : Responsibility for Business Procedure (Sustainable Business)	• Occupational health and safety management
8. Training and education	• EXAT	• Strategy 1 : Responsibility for Business Procedure (Sustainable Business)	• Development of personnel education and potential
9. Fair evaluation	• EXAT	• Strategy 1 : Responsibility for Business Procedure (Sustainable Business)	• Equal and rewarding salary management

Material Topics (102-47)	Impacts (102-46)	Strategic Corporate Social Responsibility Master Plan	Reported Content
10. Employee satisfaction	• EXAT	• Strategy 1 : Responsibility for Business Procedure (Sustainable Business)	• Relationship management and employee satisfaction
11. Local communities	• EXAT • Communities surrounding exclusive right of way	• Strategy 2 : Fairly Reinforcing Community and Social Acceptance (Sustainable Society)	• Fire prevention and resolving of intrusion in expressway areas
12. Impact from traffic congestion	• EXAT • Trade partners • Government sector	• Strategy 1 : Responsibility for Business Procedure (Sustainable Business) • Strategy 2 : Fairly Reinforcing Community and Social Acceptance (Sustainable Society)	• Traffic congestion management
13. Land use rights	• EXAT	• Strategy 2 : Fairly Reinforcing Community and Social Acceptance (Sustainable Society)	• Land use rights
14. Customers Health and Safety	• EXAT	• Strategy 1 : Responsibility for Business Procedure (Sustainable Business) • Strategy 2 : Fairly Reinforcing Community and Social Acceptance (Sustainable Society)	• Customers Health and Safety
15. Expropriator and Customer Relations	• EXAT	• Strategy 2 : Fairly Reinforcing Community and Social Acceptance (Sustainable Society)	• Product improvement to raise level of satisfaction • Relationship Management of Tenants in the Expressway Area

Strategic Corporate Social Responsibility Master Plan

The Expressway Authority of Thailand has reviewed and prepared the 5-year Strategic Corporate Social Responsibility Master Plan (2016-2020) to use as guidelines for its corporate social responsibility operations with the operational framework in accordance with global corporate social responsibility standards, namely the GRI sustainability Reporting Standards with the emphasis on the evaluation of operational performance of corporate social responsibility at the organizational level, the ISO 26000 Standard providing guidelines of operations for corporate social responsibility at the organizational level, including the UN Global Compact and business performance criteria appropriate for the future, as well as the sustainability context of the organization. (102-12) This Strategic Corporate Social Responsibility Master Plan consists of Corporate Social Responsibility Strategies covering all the economic, social and environmental dimensions and divided into 3 key Strategies as follows,

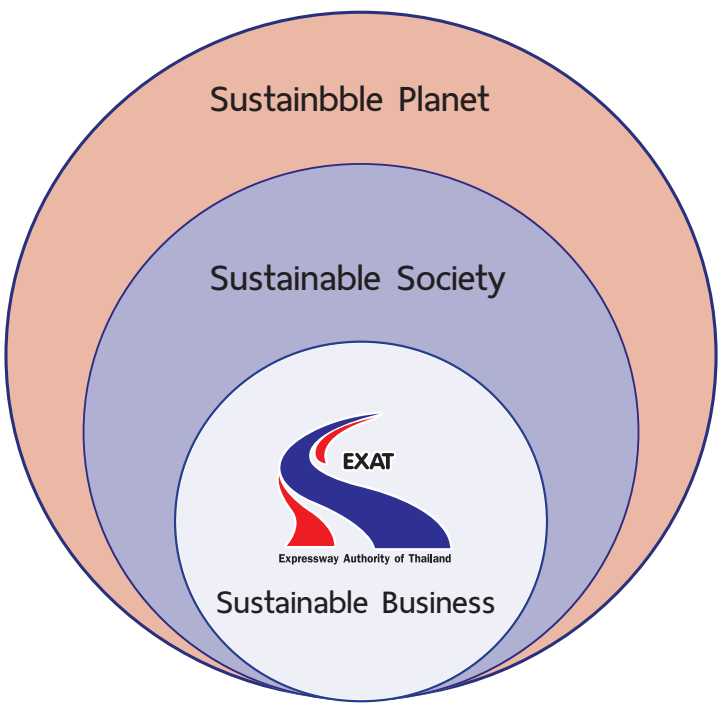


Figure 5 Overview of the 5-year Strategic Corporate Social Responsibility Master Plan (2016-2020)

Strategy 1 Responsibility for Business Procedure (Sustainable Business)

This strategy aims to enable the EXAT to thoroughly integrate its corporate social responsibility throughout the whole value chain starting from the Upstream as trade partners/suppliers, passing to the Midstream which is the EXAT, and finally to the Downstream as expressway users, with 3 sub-strategies as follows,

- Strategy 1.1 Creating good quality of life for personnel.
- Strategy 1.2 Operations with good corporate governance.
- Strategy 1.3 Responsibility for expressway services.

Strategy 2 Fairly Reinforcing Community and Social Acceptance (Sustainable Society)

This strategy aims for the EXAT's operations to gain acceptance from the communities and society. The strategy focuses on the alleviation of negative impacts caused by the EXAT's operations such as the impact on landowners affected by land expropriation and communities surrounding exclusive right of way. Furthermore, social activity like CSR-after-process will be initiated to encourage development within the communities and society by the emphasis on creating job opportunities and developing local economy, with 2 sub-strategies as follows,

- Strategy 2.1 Promotion of relationship management with landowners affected by land expropriation.
- Strategy 2.2 Creating participation in sustainable care and development for the communities and society.

Strategy 3 Enhancing Capability of Environmental Mitigation and Development (Sustainable Planet)

This strategy aims to enable the EXAT to alleviate environmental impacts and enhance environmental development to gain acceptance at the international level. The strategy focuses on the alleviation of different important environmental impacts on the EXAT's operations such as climate change, biodiversity, inventory management and improvement of energy efficiency, etc., as well as improvement for good environment in the future, with 2 sub-strategies as follows,

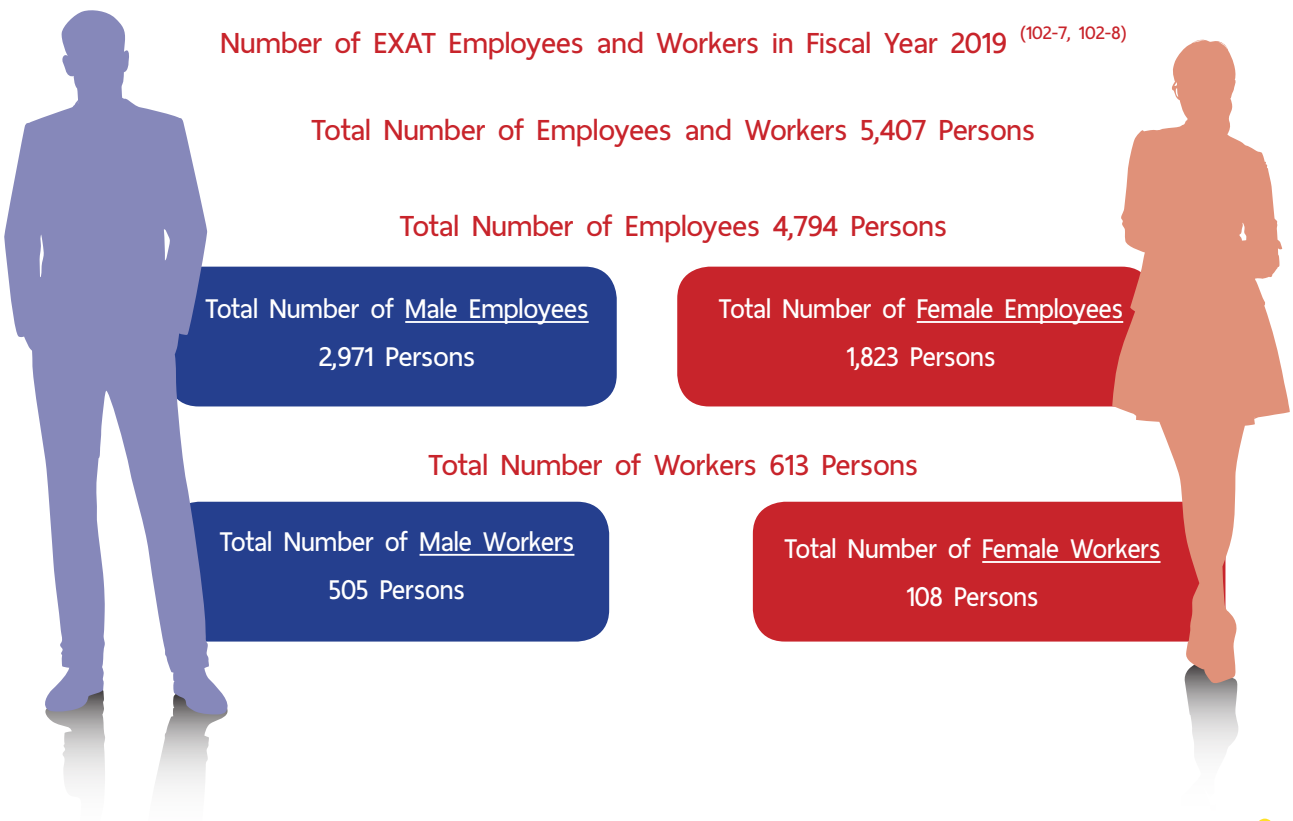
- Strategy 3.1 Promotion of responsibility for the environment in the operations.
- Strateg 3.2 Care and attention to the efficiency of energy consumption and impacts from climate change.

Responsibility for Business Procedure

EXAT acknowledges the importance of supply chain sustainability on business operation from upstream to downstream, that it causes business sustainability. Therefore, EXAT put emphasis on mutually creating values in supply chain from upstream (selecting capable **"partners/suppliers"** who operate businesses with ethics) to midstream (developing **"employees"** to become professionals and ready to adjust to the change, as well as improving operations of "organization" with good governance to respond to the needs of downstream) to downstream (to create maximum satisfaction level for **"expressway users"**). There are 3 main strategies as follows.

Strategy 1.1 Creating Good Quality of Life for Personnel

Organization 4.0 or organization in the 21st century could not achieve its target if its human resource lacks skills, knowledge, capability, attitude, motivation, leadership, creativity, and ability in integrating technology. Therefore, EXAT focuses on developing its personnel to be able to handle more diversified types of work, as well as paying more attention to the emotion and mind of employees and workers within the organization. EXAT believes that all **"EXAT's employees and workers"** are valuable resources to the organization. The good quality of life reflects better work efficiency.



To adjust its organization and respond to organization 4.0 concept, EXAT emphasizes on enhancing and increasing skills for EXAT's employees and workers to be more diversified, managing and considering rewards according to skills and capability of EXAT's employees and workers, and taking care of occupational health and safety within workplace for all EXAT's employees and workers.

Learning and Personnel's Capacity Enhancement (103-1)

The rapid change and intense competitiveness in today's business force every organization to look back at themselves and pay more attention to strategic human resource development (Strategic HRD), especially in building human capital, and improving knowledge management system to create competitive advantage of being the leader of the enhancement that responds to the change and achieves organization target.

Management Approaches (103-2)

In the fiscal year 2019, EXAT set development scope by analyzing the necessity in developing employees from State Enterprise Plan for the Fiscal Year 2017-2021 that consistent with EXAT's main capacity. Moreover, Training Roadmap was prepared to enhance employees' knowledge, improve their capabilities, and adjust their attitudes to create passion and organizational commitment, and prepare for their promotions of level or position. EXAT also promotes knowledge management system creation and development, and support learning organization environment to exchange knowledge, pass on job-related knowledge, and support organizational value creation.



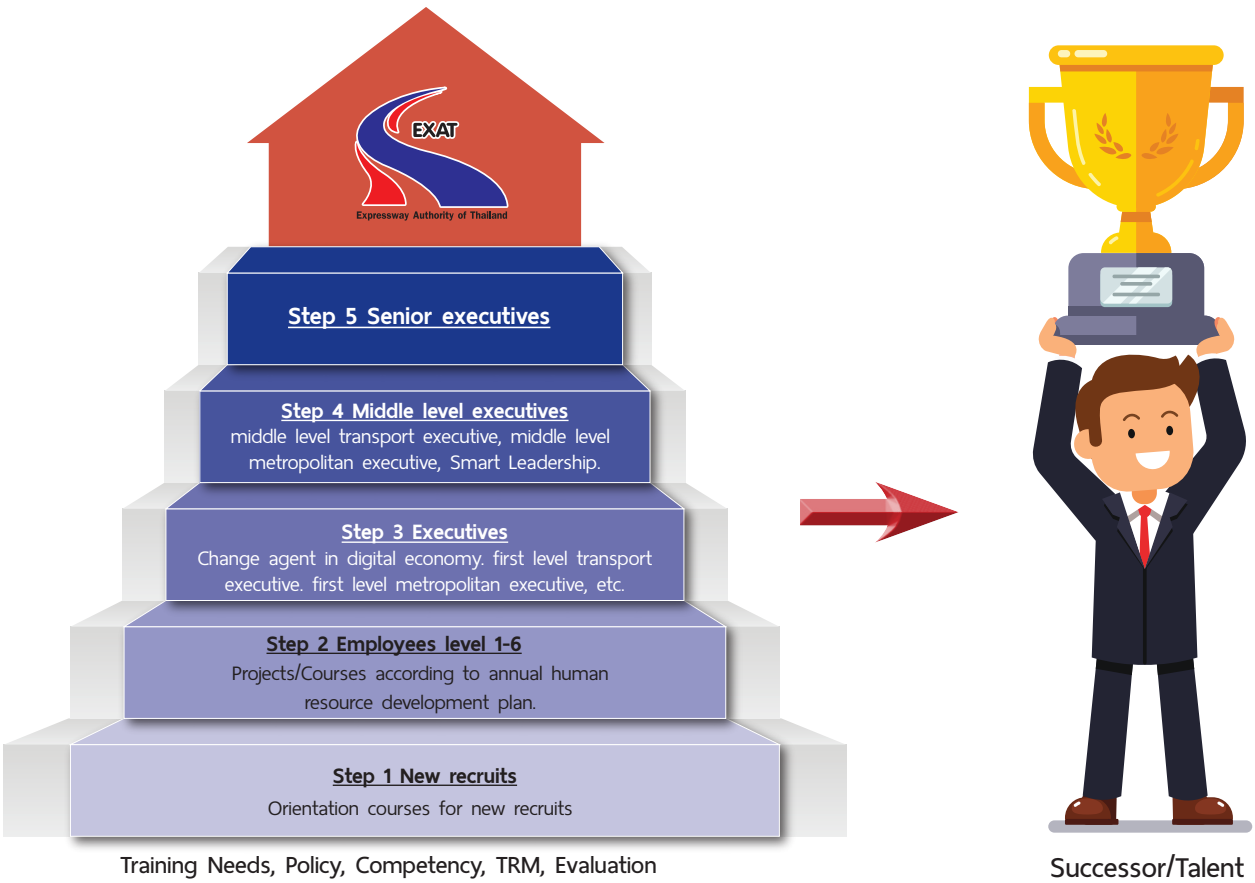


Figure 6 Training Roadmap

Table 6 Training Roadmap

		Training Roadmap
Step 1	New recruits	Orientation courses for new recruits (e.g. provide knowledge about the organization, benefits and welfare, regulations, rules, ISO 14001:2015 system, ISO 9001:2015 system, core competency, functional competency).
Step 2	Employees level 1-6	Projects/Courses according to annual human resource development plan (e.g. core competency, functional competency, TRM, policy, readiness courses).
Step 3	Executives	Managerial competency development (managerial competency, TRM such as first level executive courses, first level transport executive course, first level metropolitan executive course).
Step 4	Middle level executives	Managerial competency development (managerial competency, TRM such as middle level transport executive course, middle level metropolitan executive course, smart leadership, middle level executive course at King Prajadhipok's Institute, public and private training courses).
Step 5	Senior executives	Managerial competency development (managerial competency, TRM such as senior level transport executive course, senior level metropolitan executive course, senior level executive courses at King Prajadhipok's Institute, Ministry of Finance, Ministry of Justice, Thailand National Defence College, public and private training courses).
Successor/Talent	Prepare the successor for the position/talent	Smart leadership course, leadership & management course, preparation for executive level course, leadership development course in preparation for team leader, technology transfer course, provide scholarships for master and doctorate degrees.

Training Courses in Fiscal Year 2019 (404-2)

Referring to training roadmap plan for the fiscal year 2019, EXAT organized training courses to enhance skills, and prepare for the job transfer and support retiring employees as follows.

Training courses for enhancing skills

- Engineering work development
- Automotive innovation and technology knowledge development
- Employees' trainer development for Traffic Control Department
- Disaster command system management in emergency situation
- Standard first aid training
- Radio communication utilization in operation
- Introductory fire safety training
- Advanced fire safety training and chemicals-related accident management
- How to write official letters and minutes
- Supply operation skill enhancement, procurement problem and solution skill enhancement according to Government Procurement and Supplies Management Act B.E. 2560 (2017)
- Occupational safety, electrical work safety, electrical hazard rescue
- Safety officer supervisory level in maintenance work
- Safety manual practice for toll collection work
- Safety officer management level
- Safety, occupational health, work environment committee
- Infographic and modern work environment
- Professional service provider 4.0
- Leadership development in preparation for becoming team leader
- Technology transfer for technical specialists / operation staffs / traffic control management
- How to safely use overhead crane for operator, supervisor, signaler, and rigger
- Government asset management, accounting policy, and latest guidelines: for executives
- Digital HR forum 2019
- Human resource development certificate program
- Human capital development for the digital age
- Innovative HR transformation
- Powerful presentation for professional
- Procurement problems and solutions according to Government Procurement and Supplies Management Act B.E. 2560 (2017)

- Safety supervisor
- Speech technique for executives
- Professional technique for arranging meeting, training, seminar by international standard
- Professional master of ceremonies
- Blockchain technology for developer
- Gathering opinions, suggestions, rules, and grading methods for construction work employment
- Individual knowledge management plan in organization's operation process development for the personnel's career advancement
- Mentor system development for quality manpower in public sector

Training courses for job transfer supporting the retiring employees or employment terminated employees

- Post training for the employees who retired in the fiscal year 2019
- Preparation for the employees who will retire in the fiscal year 2020



Table 7 Average Training Hours for EXAT's Employees Per Year (404-1)

Number of Average Training Hours	Fiscal Year 2016	Fiscal Year 2017	Fiscal Year 2018	Fiscal Year 2019
Categorize by genders				
Male	23.06	28.82	21.79	27.55
Female	29.96	33.26	25.64	31.17
Categorize by types of Employees				
Executives level 9 and onwards	106.29	105.31	88.08	121.83
Executives level 7-8	68.45	84.22	90.30	103.07
Employees level 1-6	22.41	26.90	19.21	24.84

After recruiting employees and workers, EXAT starts developing their skills, knowledge, and capabilities according to their fields of work. After that, EXAT equally assesses operation result for all personnel. EXAT will retain quality employees with the organization, by providing continuous development opportunities, allocating suitable reward and welfare, taking care of their occupational health and safety, and creating excellent workplace environment by using good communication within organization for personnel satisfaction and commitment. The personnel who are assessed as worthy with high potential will be the main force in developing EXAT, and also help the organization reduces operation cost in recruiting employees and workers for EXAT. (103-1, 103-2, 404-3)

In the fiscal year 2019, EXAT held training course for personnel who were assessed as high potential for the organization via "Preparation for executives" course. The objective was to prepare the employees for higher responsibilities and missions, as well as enhancing their skills in adjusting to the changes in internal and external environment. There were 50 employees the attended the course.

Worthy and Equitable Reward Management

EXAT's reward management is the important part in human resource management. Good reward management creates motivation and attracts personnel to work with the organization, as well as provides good incentives for the employees within the organization. Moreover, good reward management allows

the organization to effectively control its human resource expense. Organization with effective and equitable reward management will result in employees' satisfaction, and great relationship between organization and employees. EXAT provides benefits and welfares for its employees and workers as follows.

Table 8 Benefits and Welfares of EXAT's Employees and Workers

Benefits	Personnel		Remarks
	Employees	Workers	
Benefits and Welfare Provided by EXAT (According to Regulations)			
Salary	✓	✓	
Wage	✓	✓	
Bonus	✓		
Allowance	✓	✓	
Medical fee assistance	✓	✓	The workers, their spouse, and children also get benefits, but not the workers' parents.
Education assistance fee for children	✓	✓	
Child allowance	✓	✓	
New child assistance fee	✓	✓	
Retirement bonus	✓	✓	
Funeral fees	✓	✓	
Hazard and injury fees for accidents incurred during work	✓	✓	
Personal accident insurance for those in dangerous jobs	✓	✓	
Uniforms	✓	✓	
Annual medical checkup	✓	✓	
Disaster aid fee	✓	✓	
Welfare funds	✓		
Provident funds	✓		
Cremation, funeral and burial funds	✓	✓	Compensation depends on length of employment.

Benefits	Personnel		Remarks
	Employees	Workers	
Other Welfare (Voluntary)			
Insurance (accident / car / fire)	✓	✓	
Group Endowment Insurance and retirement fund	✓	✓	
Housing welfare loans	✓		Workers' contract is on year-to-year basis.
Government Saving Bank's welfare loans	✓		
Krung Thai Bank welfare loans	✓		

EXAT has disseminated the information about benefits and welfares through various channels, such as the Intranet, broadcasting, handbooks, and through the public relations board to inform employees and workers of their rights, regulations, and rules regarding their benefits and how to effectively request for their benefits.

Moreover, EXAT also provides provident funds for EXAT's employees. In the fiscal year 2019, EXAT paid 195,357,893.12 baht for employees' provident funds.[201-3]

Employees Relations and Satisfaction Management (103-1)

Employees satisfaction in EXAT is the significant driving force for the organization's success and mission achievement. EXAT sets incentive factor for employees' highest satisfaction, such as adjusting remuneration rate for new recruits that correspond with labor market, providing higher benefits and welfares comparing to other state enterprises in the same category and to the standard benefits of private sector, and clear career path. In addition, there are supporting factors that reinforce employees' satisfaction which results in passion, commitment, harmony, and unity within the organization. Examples are internal companionship promoting activity, sports events activity, Songkran day activity, various exhibitions within EXAT, as well as meet executive activities to communicate organization development guideline, publicize policies, listen to the employees' opinions, make employees feel comforted and be a part of the organization. Every activity is open for participation of employees freely.

Management Approaches (103-2)

Every year, EXAT conducts survey of commitment and satisfaction of employees towards the organization, which also gather requirements and suggestions from employees. EXAT summarizes the survey result together with suggestions from employees and creates commitment and satisfaction enhancement plan for employees. In conducting survey, employees participate in setting satisfaction-related factors towards EXAT as follows.

1. Job Description Factor
2. Career Advancement Factor
3. Relationship with Colleagues and Supervisor Factor
4. Workplace Environment Factor
5. Remuneration Factor
6. Benefits and Welfares Factor
7. Job Security Factor

EXAT set satisfaction level of employees to not less than 80 percent. In the fiscal year 2019, employees' satisfaction level was 85.25 percent increasing from last year for 0.75 percent.

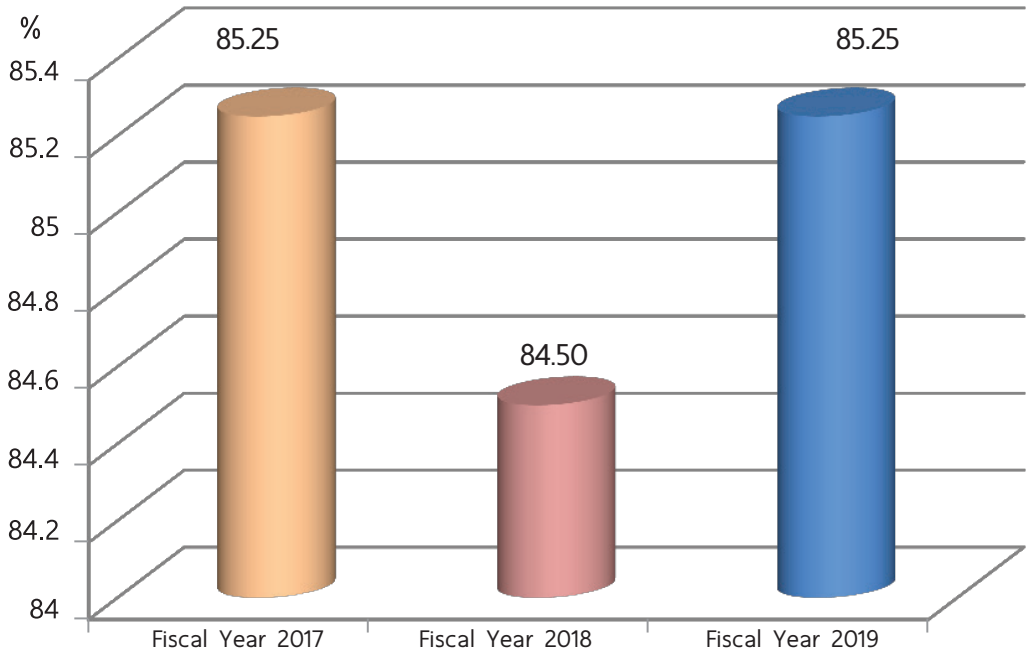


Figure 7 EXAT's employee satisfaction level in the fiscal year 2017-2019

Occupational Health and Safety Management (103-1)

EXAT focuses on occupational health, safety, welfare, and workplace environment of employees and workers. So, all departments could comply with the law on occupational health, safety, well-being, and workplace environment, as well as support and improve workplace environment to retain employees and workers within EXAT and ensure their safety at work.

Management Approaches (103-2)

EXAT is aware of the importance of safety, occupational health, and workplace environment that has impact on life and property of EXAT's employees and workers, as well as operators from outside or visitors. Therefore, it sets policy on safety, occupational health, and workplace environment as a management guideline as follows.

1. Operates under laws, regulations, and standards related to safety, occupational health, and workplace environment.
2. Supports and promotes activities on safety, occupational health, and workplace environment for the best operating results.

3. Continuously improves personnel's capability on safety, occupational health, and workplace environment to maintain standard of safe and effective operation.
4. EXAT's employees and workers, as well as operators from outside or visitors, should strictly comply with the law on safety, occupational health, and workplace environment.
5. Supervisors in all levels should support, promote, take responsibility, and focus on safety, occupational health, and workplace environment of those under their supervisions.
6. Create organizational culture on safety, occupational health, and workplace environment via the executive's intention and participation from all levels of personnel.

EXAT set up committee on safety, occupational health, and workplace environment from 95 employees, or 1.76 percent of all personnel. [403-1] This committee represents personnel from EXAT's headquarter at Chatuchak, expressway control center building, land acquisition department building, and toll plaza building. The responsibilities of the committee on safety, occupational health, and workplace environment are as follows.

1. Considers policies and plans on workplace safety.
2. Reports and provides recommendations on measures or guideline on adjustment that comply with laws on workplace safety.
3. Promotes and supports activities on EXAT's workplace safety.
4. Considers regulations and manual on operational safety.
5. Conducts survey on safety operation in the workplace and monitor accident statistics in EXAT.
6. Considers projects or plans for safety training in the workplace.
7. Sets reporting system about the dangerous workplace condition, and involves all employees and workers from all levels
8. Monitors the progress on the issues that proposed to the Governor of EXAT
9. Provides annual reports, including problems, obstacles, and recommendations in the operations of the committee.
10. Evaluates the operational result on workplace safety of EXAT.
11. Conducts other safety-related works assigned by the Governor of EXAT.

In the fiscal year 2019, EXAT held the following activities related to the safety, occupational health, and workplace environment: annual fire drill in all buildings, monthly visiting survey, spraying to eliminate carrier insects, health checkup according to the risk factors for operational employees, annual health checkup for other office employees, 5S activities for all employees and workers to participate in creating good workplace environment, training on safety for employees, setting up exercise areas and activities for EXAT's employees and workers.

EXAT's safety committee regularly evaluates the risk on the health of EXAT's employees and workers, continuously monitors workplace environment to find the appropriate prevention and solution guidelines, and provides safety equipment and conducts annual health checkup for field employees and workers who have to work in risky environment in their normal works such as rescuers, traffic management staffs, and technicians. The checkup results for the fiscal year 2019 indicated that employees in operational field works and in office have the following health issues. (403-3)

	Work-related risk/health issues	Operations to reduce risks
EXAT's employees and workers in the operation fields	• Loud noise exposure • Dust/smoke exposure	• Monitor workplace environment, dust/smoke • Prepare PPE suit for staff to protect them from dust/ smoke during the operation • Health checkup according to risk factors
EXAT's employees and workers in the office	• Office syndrome	• Annual health checkup • Arrange doctor consultation sessions for all staff to consult and monitor their health 4 times/year

The EXAT's labor union was established with the State Enterprise Labor Act of B.E. 2543 (2000). It aims for the organization as an employer status, to operate or change the employment-related agreement, and to promote good relationship between employer and employees (including workers). EXAT's labor union will promote benefits of labor union members to create workplace environment that is appropriate for their health and safety. In the fiscal year 2019, there was no complaint about safety issues from EXAT's employees and workers. Moreover, EXAT's labor union will be the one who communicates between executives and EXAT's employees and workers. (102-41, 403-4)



Injury and Death Statistics for EXAT Employees and Workers in the Fiscal Year 2019 (403-2)

From the safety, occupational health, and workplace environment management in the fiscal year 2019, EXAT set target in safety operation as follows.

1. Work accident statistics of EXAT's employees and workers should not exceed 0.11 : 200,000 working hours. In the fiscal year 2019, the rate was 0.07, which was not exceed the target.

2. The number of EXAT's employees and workers who had accidents should not exceed 6 persons. In the fiscal year 2019, there were 4 persons who was in work-related accidents, which was not exceed the target.



* Total number of EXAT's employees and workers is 5,407 people.

* Lost day rate (LDR) is calculated from the number of lost day, which is the day that EXAT's employees and workers have accident and have to take leave more than 3 days. The total lost day was 66 days.

In the fiscal year 2019, EXAT managed, controlled, and prevented for the safety, occupational health, and workplace environment better than the target. However, from the work-related accident rate that happened to EXAT's employees and workers, EXAT has monitored and investigated the cause of each accident to find the ways to improve the workplace safety management, to gain trust from EXAT's employees and workers about the work safety and their abilities to work at their full potential.

Strategy 1.2 Operation with Good Corporate Governance

Nowadays the management in government and private sectors places importance on the system of morality and ethics, since the management in many organizations is encountering problems and facing serious crises, mostly caused by corruption, lack of mutual or social responsibility, and focus only on private interest of oneself or a particular group, which reflect the lack of morality and ethics in management.

As a result, the operation based on Good Governance occupies essential role in every sector, government or private, and also the general public with their growing attention and widespread application of good governance to operations of organizations, since the operation with good corporate governance will help create and enhance potential and efficiency of organizations. For instance, operation with transparency, honesty, and integrity will not only deliver growing business performance of such organizations, but also gain credibility among investors and the general public, create positive impact on the stability of the government and progress of the country, and encourage continuous development.

Good Corporate Governance

As the crucial foundation of business operation, good corporate governance of an organization consequently provides stability, establishes credibility, and develops the ability of sustainable growth. The Board of Directors of the EXAT is intent on the promotion and support for the EXAT to become a transparent and accountable organization with efficient business operation, and therefore set up the sub-committee for good corporate governance with duties to establish policies, strategies, objectives, and operation plans for good corporate governance, and to govern, regulate, monitor, and promote operations based on good corporate governance as well.

Management Approaches

The Expressway Authority of Thailand (EXAT) is a State Enterprise under the Ministry of Transport, regulated by the Ministry of Finance with the governance of the State Enterprise Policy Office (SEPO) as the main government agency to govern, regulate and support to enable good management system and competitiveness of the EXAT as a driving mechanism of social and economic strategy of the country based on efficient operations with adherence to the principles of good governance. Currently, the EXAT has integrated the principles of good corporate governance into every operation procedure from the development of vision, mission, objectives and strategy of the organization as follows,

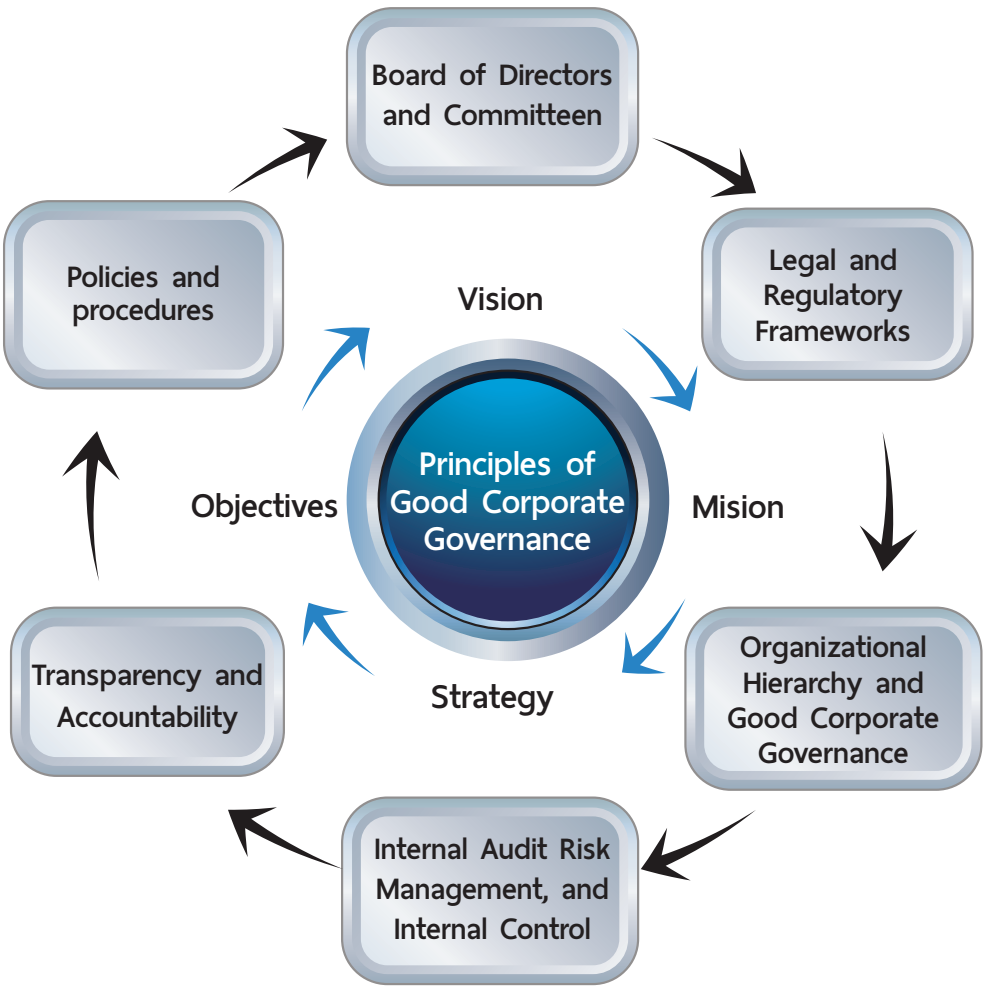


Figure 8 The principles of the EXAT's good corporate governance.

Figure 8 shows the implementation of operation on good corporate governance of the EXAT with the establishment of vision, mission, objectives, and strategy of the organization under the principles and guidelines on good corporate governance in order to pave to the way to guidelines of different operations with major role in good corporate governance of the organization, build confidence and also ensure every group of related individuals that the operations of the organization are conducted under the principles and guidelines on good corporate governance in response to the control and administration of the organization both at present and in the future as well.

For the purpose of accountable, transparent, and efficient business operation, the EXAT therefore issues guidelines for operations on good corporate governance for the EXAT's Board of Directors, executives, and all employees of the EXAT to adhere to as guidelines of practice in work operations, with details of these following 7 principles,

Accountability	Be accountable to the outcome of their duty performance.
Responsibility	Be aware of duty to provide good service to expressway users or stakeholders through capability and adequate efficiency.
Equitable Treatment	Give stakeholders equitable treatment.
Transparency	Perform their tasks transparently, disclose information and be accountable.
Value Creation	Increase operating capability in all dimensions to enhance competitive advantage and add value to business in both short and long terms.
Ethics	Follow EXAT's code of morality and ethics.
Participation	Allow public participation to express public opinion regarding any operation which may affect the environment, health, quality of life and livelihood of community or locality.

The Board of Directors of the EXAT must perform duty to comply with Section 19 and Section 20 of the Expressway Authority of Thailand Act, B.E. 2550 (2007), and the Cabinet Resolution related to Guidelines on State Enterprise Good Governance with the focus on Duty of Care, Skills, and Duty of Loyalty. The Board of Directors has assigned the Sub-committee for Good Governance with responsibility to establish policies, strategies, objectives, and operation plans on good corporate governance and corporate social responsibility of the EXAT, as well as to govern, regulate, monitor, and promote the implementation according to operation plans on good corporate governance.

Consequently, the EXAT regularly prepares and implements its operation plan on good corporate governance every year, and reports its operational performance to the sub-committee for good corporate governance and the Board of Director of the EXAT every quarter to make sure that the operations of the EXAT comply with the principles of good corporate governance.

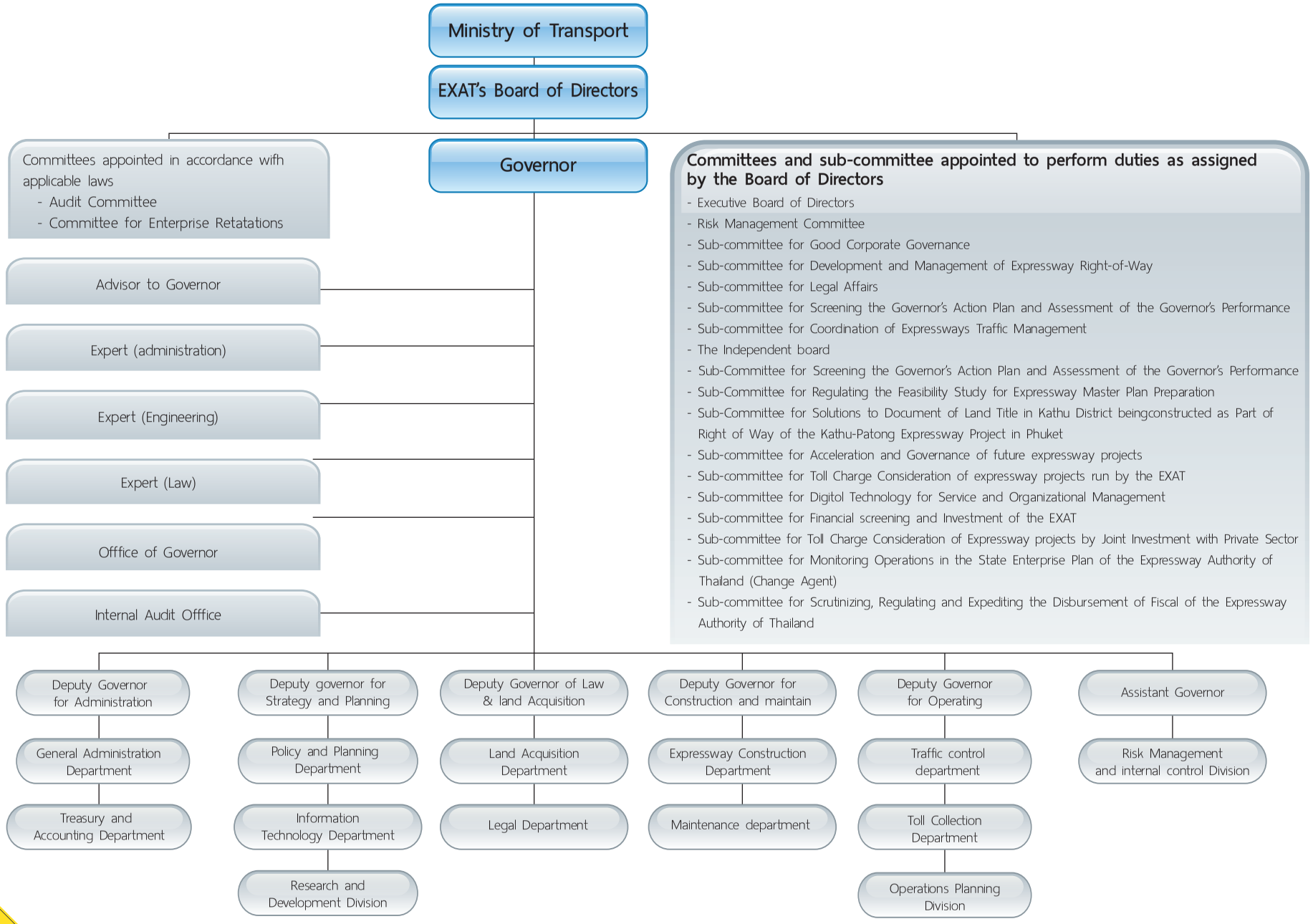


Figure 9 The organizational hierarchy and good corporate governance system of the EXAT. (102-18)

Ethical Code of Conduct in Operations (102-16)

The Expressway Authority of Thailand (EXAT) has revised ethical standard of the organization and ethical standard as the main value of the EXAT since the fiscal year 2011 by using words to communicate the meaning of commitment and determination within the organization of the EXAT's employees and the serious compliance with ethical code of conduct and operations in accordance with the guidelines of practice provided by the organization as each letter in the acronym **"HEARTS"** to show the commitment and determination of the EXAT's employees and the meaning to **"perform duties with HEARTS."**

The commitment leading to **"perform duties with HEARTS"** or **"HEARTS"** consists of the following key points of duty performance for every employee of the EXAT to apply as guidelines of practice to work operations at all time in the position of employees performing duties for the EXAT,

H	=	Honesty
E	=	Equity/Equitable Treatment
A	=	Accuracy
R	=	Responsibility
T	=	Transparency
S	=	Society



"Honesty, Equity, Accuracy, Responsibility, Transparency, Society"

In the fiscal year 2019, the EXAT has provided training programs suitable to employees at different levels, such as Morality, Ethics and Good Governance Promotion Program, Enhancement of Morality and Ethics within the Organization Program, and Orientation of new employees with topics related to "Ethics", with 360 training participants in order to build confidence and ensure that employees at every level in the organization acquire knowledge and understanding, can apply such knowledge gained from the training to their work operations, and partly join the contribution to help propel the EXAT to move forward as a transparent and accountable organization.

Anti-Corruption (103-1)

The EXAT truly realizes that corruption is an obstacle to social and economic development of the country, since the illegal misconduct of corruption has negative impacts on ethical code of conduct in business operation and destroy the confidence of the stakeholders, hence, the EXAT places importance on anti-corruption by the strict compliance with the laws of Thailand for the purpose of anti-corruption, including the promotion and support for employees and workers of the EXAT at every level to have moral conscience against corruption and be aware of corruption in every form as well.

Management Approaches (103-2)

The EXAT applies the guidelines on the enhancement of corporate governance under good corporate governance policy with consideration for the focus on sustainable development and corporate social responsibility to the governance and regulation of its operations, and also prepares the Corporate Social Responsibility Master Plan with specified operations based on good governance for anti-corruption to make every part of operations both within the organization and of related partners free from corruption.

Furthermore to prevent corruption, the EXAT conducts its operations in accordance with the Notification of the Anti-Corruption Cooperation Committee regarding guidelines and methods for the operation of anti-corruption cooperation project in the procurement of government sector under the Integrity Pact, the recruitment of observers, and the preparation of the report to comply with Section 17 and Section 18 of the Government Procurement and Inventory Management Act, B.E. 2560 (2017) pertaining to **"the Integrity Pact Preparation Project"** with the stipulation that the Integrity Pact shall be prepared under the agreement from the resolution of the Anti-Corruption Cooperation Committee, should a procurement project includes any of the following categories,

1. Any procurement project with the budget limit of at least 1 billion baht.
2. Any procurement Project under the attention of the general public, such as infrastructure investment project.
3. Any other form of procurement project for which the Anti-Corruption Cooperation Committee agrees that the preparation of the Integrity Pact is deemed appropriate.

In the fiscal year 2019, the EXAT has launched the construction projects of the EXAT's Expressway Management Center and the Rama III - Dao Khanong - Western Outer Bangkok Ring Road Expressway Project. The EXAT has then conducted its operations in accordance with risk management plan related to corruption in construction project management, and will take the cause of risk, risk management plan, and risk management activities to handle possible risk which may occur, into consideration with the following details,

Table 9 Identification of risks and the control and assessment level of corruption risks. (205-1)

Chance/Risk of Corruption	Types of Corruption Risk		Control and Assessment Level of Corruption
	Know Factor	Unknown Factor	
1. Expressway management center construction project.			
1.1 Corruption in procurement	- Specific method to select contractor.	- Any action in special favor of contractor.	Moderate
1.2 Corruption in supervision of construction project	- Contractor has not made adequate effort to achieve satisfactory work progress/ contractor has abandoned work.	- Delivery of work does not meet standard and nothing has been corrected.	
2. Rama III – Dao Kanong – Western Outer Bangkok Ring Road Expressway project.			
2.1 Corruption in procurement	- Specific method to select contractor.	- Any action in special favor of contractor.	Moderate
2.2 Corruption in supervision of construction project	- Contractor has not made adequate effort to achieve satisfactory work progress/ contractor has abandoned work.	- Delivery of work does not meet standard and nothing has been corrected.	

During the construction project of the EXAT's Expressway Management Center and the Rama III-Dao Khanong-Western Outer Bangkok Ring Road Expressway Project in the fiscal year 2019, the assessment and control of corruption risks stood at moderate level, but the corruption management of the EXAT has been able to prevent any case of corruption,[205-3] This is to say, EXAT's will keep aiming and continue to maintain practicing the standard operating guidelines to be a free corruption organization by supporting and encouraging morals and ethics to the staff as a norm and strictly carry in their usual behavior.

Social Responsibility Development and Promotion within the Supply Chain

The management of supply chain is considered one of the key strategies for sustainable business operation which will enhance fast and efficient provision of goods or services in timely manner with good quality and economically worthwhile in both the budget and consumption of resources. Additionally, the forms of procurement in the era of Thailand 4.0 encourage the drive of both government and industrial sectors to move forward with technology, creativity, and innovations in response to the smooth flow of fast business operation. As a result, the management of supply chain has to be improved and developed in order to carry out efficient and effective work operations amidst changes in the society at present.

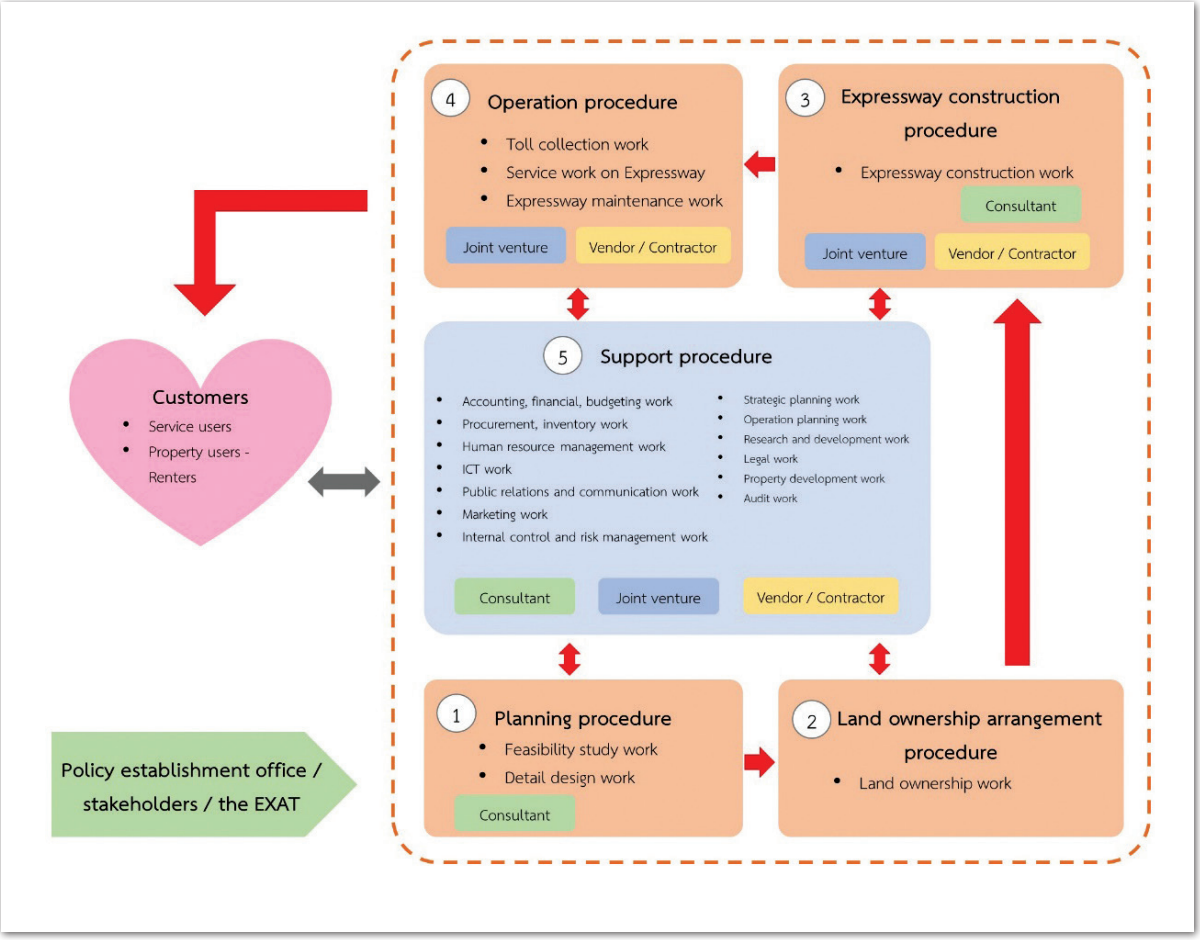


Figure 10 The supply chain of the EXAT. (102-9)

Management Approaches

Based on its main mission, the EXAT divides its operations into the following 2 work systems,

- **Expressway service work system** with 4 main procedures, namely the planning procedure, the land ownership arrangement procedure, the expressway construction procedure, and the operation procedure.
- **Area management work system** with 2 main procedures, namely the procedure of area management for public interest and benefit, and the procedure of area management to increase income.

In the work systems of the EXAT, the significant factor of success comes from the drive of support procedure which is an important procedure. The reason is because in this procedure, different departments and divisions are available to support operations of every main procedure in each work system.

The supply chain system of the EXAT is devised within the operations of the aforementioned main procedures and support procedure. Each procedure shares related individuals who share mutual operations, such as partners, vendors, suppliers, cooperative partners, and stakeholders. The EXAT manages the supply chain through different forms of operations, such as management of related individuals in the form of partners, vendors, suppliers, or cooperative partners through procurement in accordance with "the Government Procurement and Inventory Management Act, B.E. 2560 (2017)" and related laws, or the stakeholder management according to procedures of the Acts of Parliament, Royal Decrees, or related laws, etc., to enable the suppliers selected by the EXAT to be qualified with the ability to raise the level of operational performance of the organization. In procurement operation, the EXAT will establish different committees appointed from heads of departments or divisions to oversee every step of operations from the specification of supplier qualifications, supplier selection, and supplier operations. Such committees have clear authorities and duties according to rules, regulations, and methods of practice under the Government Procurement and Inventory Management Act, and the procurement of the EXAT is mainly divided into 2 following forms of procurement,

- Purchasing or outsourcing or contracting (not construction work).
- Outsourcing or contracting for construction work.

Different committees comprise different elements and duties with skill and expertise in specific tasks. Such committees perform duties to specify qualifications for the Pre-Qualification screening of suppliers who seek to operate their works with the EXAT, with the following specified Pre-Qualification,

- Size and financial status.
- Skill, expertise, and ability of suppliers.
  - Work experience according to the task.
  - Value of work.

Moreover, the committees are tasked to oversee operations in the procedure of supplier selection, such as purchasing or outsourcing or contracting committee, outsourcing or contracting operation committee, consideration committee for electronic price bidding, and inventory inspection committee which perform duties to oversee the works during the operations of suppliers to ensure that their operations conform to the scope of works and the works are completely finished in timely manner under the conditions of the contract. The operations of different committees in each step of the procedure partly build confidence to ensure that suppliers selected by the EXAT are properly qualified and able to raise the level of operational performance of the EXAT.

The EXAT assesses the operational performance of suppliers in 2 forms depending on the types of works which are purchasing and outsourcing or contracting, with the difference in time period of assessment and the forms of assessment. During the operation under the contract in the case of purchasing or outsourcing or contracting with supervisor of work, the assessment is carried out during operations, or in the case of outsourcing or contracting without supervisor of work, the inventory inspection committee is tasked with the assessment of operational performance. The number of times to give assessment is different under the conditions of the contract, and the last assessment of suppliers will be made after operations are completely finished under the contracts.

Every supplier will receive notice of the assessment result. If the result of operational performance of a supplier turns out at poor level, such supplier with poor score for operational performance will receive assessment result indicating that the operation is **"to be improved"** in order to inform the supplier to make subsequent improvement. Additionally, the EXAT also takes actions with suppliers during operations, for example, if a supplier cannot deliver the work in timely manner when it is due, the EXAT will follow the procedure to issue written notice to accelerate the delivery of work to such supplier. If the supplier still fails to deliver the work accordingly, the EXAT will terminate the contract and issue a notice to inform that the supplier has abandoned work.

Table 10 Number of suppliers of the EXAT.

Supplier list	Number (suppliers)
Total number of suppliers. *	363
Suppliers whose contracts are terminated in the fiscal year 2019.	-

* Remark: Total number of suppliers is calculated based on number of procurement contracts, and one supplier may have more than one contract.

Strategy 1.3 Responsibility for Expressway Services

EXAT has placed great importance on upgrading its responsibility for expressway services with the focus on maximizing the satisfaction of its major stakeholders like customers, who can increase EXAT's economic value in the long run, be part of efficiently upgrading EXAT's expressway services, and promote sustainability in the organization.

EXAT has determined its management guidelines to maximize customer satisfaction, covering customer relationship building, listening to customer feedback, evaluating customer satisfaction and loyalty, and improving products and services to be convenient, modern and safe for all groups of expressway service users. EXAT has categorized customer groups based on segmentation using products and services as the criteria, which can be grouped into two parts. The first part is expressway service users, which can be divided into 3 groups, namely 1. service users paying in cash, 2. service users using Easy Pass, and 3. customers who have not used EXAT's expressway services (customers of comparable companies/customers using regular routes (general roads), while the second part consists of lessees of areas of all expressways. EXAT has determined the management process specifically for each group of customers as follows:

Product Improvement to Increase Satisfaction (103-1, 103-2)

EXAT has set the guidelines for improving products and services to increase the satisfaction of all groups of customers through research and development in order to come up with innovations which can meet the demands of customer groups in accordance with the 5-year Strategic Corporate Social Responsibility Master Plan (2016-2020), for instance, management of expressway traffic and the entrance and exit in front of expressway toll plazas, development of public relations channels to communicate information widely, and determination of guidelines of other major operations as follows:

Expressway Service User and Expressway Area Lessee Relationship Management

Expressway Service User Relationship Management (103-1)

Expressway service users have expected EXAT to focus on improving the Easy Pass services and adding the policy to expand expressways to cover all areas with traffic problems. As the number of expressway service users keeps increasing, traffic congestion in front of the expressway toll plazas has affected transportation during rush hours. From the data on traffic volume of EXAT expressway service users collected during the fiscal year 2015-2019, it was found that in the fiscal year 2019, the number of expressway service users increased by 1.61 percent compared with that of the fiscal year 2018. The details are illustrated below:

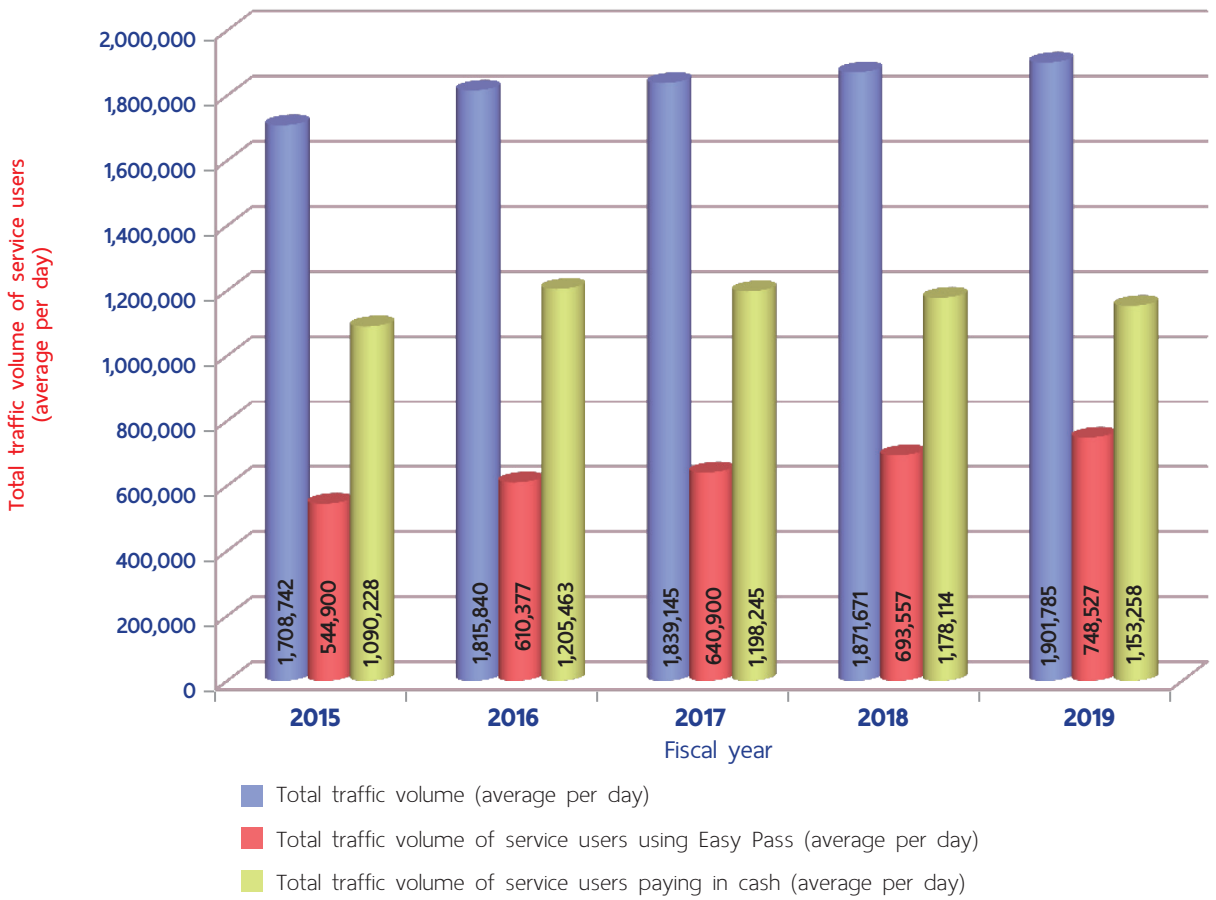


Figure 11 Total Traffic Volume of Expressway Service Users (average per day)

Therefore, EXAT has incorporated the guidelines for responding to such expectations in the State Enterprise Plan of the fiscal year 2017-2021, and the Action Plan of the fiscal year 2019, covering the issues of customer health, safety, and impacts from traffic congestion, for instance, development of the Intelligent Transport System (ITS), promotion of the use of Easy Pass, development and improvement of the expressways to ensure compliance with standards and safety. This is in line with the major operation goal to deliver standard expressways, effectively solve traffic problems, link transportation networks nationwide, as well as building confidence and highest satisfaction of expressway service users through the following major operation process:

Traffic Congestion Management (103-1, 103-2, 103-3)

According to the data on traffic volume of the expressway service users in the fiscal year 2019, the total number of service users was 1,901,785 vehicles (average per day), which increased by 1.61 percent compared to that of the fiscal year 2018 with the total number of service users of 1,871,671 vehicles per day (average per day), which caused traffic congestion on the expressways, particularly the bottlenecked toll plazas, so the services were delayed and could affect the expressway service users' confidence and satisfaction. Consequently, EXAT required the toll collecting staff to take not over 35.30 seconds per vehicle to collect the toll, starting from 50 meters away from the toll booth. In the fiscal year 2019, the average time spent per vehicle was 34.63 seconds, which was better than the set target.

The Sub-committee for Digital Technology for Service and Organizational Management has also been appointed to monitor and supervise the operations to go as planned, issue policies, determine plans to create a strategic plan for developing an automatic toll collection system (2018-2022), and upgrade other service systems as follows:

Automatic Lane Control System Installation Project

EXAT has implemented the project to install the automatic lane control system on Chalong Rat Expressway at the exit towards Prasoet Manukit (Kaset-Nawamin) Road since such area always encountered traffic congestion due to traffic sign violation by switching the lane at the prohibited area (solid line). Thus, EXAT has applied the automatic lane control system, which uses the data from the automatic traffic condition measuring equipment for analysis, and presents the results to expressway service users to acknowledge the traffic condition information through message signs together with warning images and messages in case the service users exceed the speed limit prescribed by law. The signs are variable message signs (VMS), and the automatic license plate detection system is available to detect vehicles switching lanes at the prohibited areas (solid lines). Such the system could help solve the traffic congestion problems in front of the toll plazas and effectively reduce the work of the staff providing services in this area.

Improvement of the Database Structure and Algorithm for Real Time Result Display

EXAT has improved the database structure and algorithm system by using Google color line data together with EXAT's traffic condition data for display to ensure that the displayed data are more efficient and easier to understand so that the expressway service users and road service users can use such data to make a pre-trip decision, for example, checking the traffic condition before traveling to avoid the congestion, checking the travel duration from the expressway entrance and exit, checking the toll rate in each toll plaza using modern technology, such as Smart VMS installed in front of the toll plaza, which presents real time traffic condition information, and the mobile application "EXAT Traffic", where the system administrator can use expressway service users' feedback for improving and developing future services.

Development of Application Programming Interface (API)

EXAT has developed the Application Programming Interface (API) to create the traffic condition database so that expressway service users can access the traffic condition information and plan their trip efficiently in order to reduce traffic congestion problems. The availability of traffic condition information from various sources can help the staff to report the traffic condition accurately and in consistent with the current situation. Moreover, historical data can be viewed and the information can be reported in the form of statistics and monitoring on the dashboard.

Project for Development of Non-stop Lane System (Electronic Expressway Toll Collection System by Cancelling the Barriers)

EXAT studied the non-stop lane system in the fiscal year 2016 and proceeded with the installation for testing in the fiscal year 2019. The Easy Pass Lane barriers were canceled at the area of At Narong Toll Plaza, Port 1 Toll Plaza, and Sathu Pradit 1 Toll Plaza, and the License Plate Recognition (LPR) System was installed to increase the efficiency of detection of vehicles passing through the toll plaza without making payment. Such the system has enabled faster traffic flow in front of the toll plaza at the rate of 1,500 vehicles/hour, and the drivers can use the speed of 60 kilometers/hour through the lane, and the number of vehicles passing through the toll plaza without making payment accounted for 1.21 percent. In addition, test systems were installed at Asoke 4 Toll Plaza, Asoke 3 Toll Plaza, Bang Mueang 1 Toll Plaza, and Pu Chao Saming Phrai Toll Plaza. It was found that the system could release the traffic volume of 1,000 vehicles/hour, and the number of vehicles passing through the toll plaza without making payment accounted for 4 percent. In the future, EXAT plans to integrate the information with external agencies, such as the Department of Land Transport and Royal Thai Police, and develop a multi-lane free flow system to solve the problem of accumulated traffic in front of the expressway toll plazas and facilitate expressway service users.

Electronic Toll Collection System (ETCS)

The Electronic Toll Collection System (ETCS) using Easy Pass adopted and continuously developed by EXAT is the system which can help solve traffic congestion problems in front of the expressway toll plazas more efficiently than collecting tolls in cash. Therefore, EXAT has encouraged the expressway service users to use Easy Pass more by setting the target number of ETCS users at 45.01 percent of all the 4-wheeled vehicles using the expressway services. From this idea, EXAT has imposed the policy to give a discount for Easy Pass application from 1,000 baht to 500 baht to encourage the expressway service users to switch from using cash to using Easy Pass in order to solve the long-term traffic congestion problems.

Project for Offering Easy Pass Toll Discount

EXAT has implemented the project to offer a 5-baht discount per trip for expressway service users using Easy Pass and M-Pass only during rush hours in the morning of working days to solve the traffic congestion problems in front of the expressway toll plazas, starting from Asoke 4 Toll Plaza. As a consequence, an increase in the number of the expressway service users switching to Easy Pass accounted for 0.9 percent, and the traffic congestion in front of the toll plaza declined by 84.2 percent. EXAT also has a plan to extend such the operation with other expressway toll plazas in the future, such as Bang Khun Thian Toll Plaza, Dao Khanong Toll Plaza, Prachachuen Toll Plaza (Inbound), and Bang Khun Thian 2 Toll Plaza (Outbound).

However, to facilitate the expressway service users and solve the long-term traffic congestion problems, EXAT aims to develop EMV (Europay/Mastercard and Visa) payment system, with an aim to set the standards for joint operations of cards with IC Chip, such as credit cards and terminal machines like EDC (Electronic Data Capture) or ATM machines. More and more credit card providers have taken part in this initiative and the international standards have been developed. The cards can be used as credit cards, debit cards, or QR codes for payment of expressway tolls through the Touch & Go system and make payment later through automatic debit from a credit card. The pilot expressway for this system is Kanchanaphisek Expressway (Bang Phli - Suksawat).

Expressway Area Lessee Relationship Management (103-2)

EXAT has the area for utilization of 1,160,369 square wah, and has leased the area for 686 contracts, accounting for 96,856.37 square wah for rent or for developing commercial space in the expressway are as deemed necessary to benefit EXAT while also taking into account the public interest. Such lease is on a temporary basis with the lease term of not exceeding 3 years, resulting in the total collected revenue from expressway area development and management of 283,370,037.48 baht with the lease details of each EXAT route as follows:

Table 11 Lease of Area in Each of EXAT's Expressways

Area management	The amount of land for lease (Square Wah)	Revenue (Baht)
Chalerm Maha Nakorn Expressway	9,609.01	67,465,891.51
Si Rat Expressway and Si Rat - Outer Bangkok Ring Road Expressway	39,317.80	111,421,643.12
Chalong Rat Expressway	30,290.56	86,019,221.33
Udon Ratthaya Expressway	8,163.00	5,263,659.00
Burapha Withi Expressway	-	4,227,764.00
Kanchanaphisek Expressway (Bang Phli-Suksawat)	9,476.00	7,872,772.00
Others (from supplying fuel at rest areas)	-	1,099,086.52
Total	**96,856.37**	**283,370,037.48**

According to the lease information of each EXAT expressway, it was found that the revenue from leasing areas under the expressways is another source of major revenue of expressway services. Thus, EXAT has determined the guidelines on area management and development to meet the demands before delivering the area to the lessees, including managing the issues of area encroachment, developing the area environment, for instance, creating a green area, improving the area for utilization, developing the area to look pleasant, taking care of facilities under the expressways, preventing crimes, appointing staff to inspect the area below the expressways and the leased areas, sending staff into the area promptly upon complaints, and developing the rental fee payment system.

To enable EXAT to find the guidelines in response to such the demands and to effectively solve the impacts on the lessee, EXAT implemented a project to survey the expressway service users' satisfaction in the services provided by EXAT as of the fiscal year 2019. It was found that the overall satisfaction was 83.03 percent, which was higher than the set target of 80 percent. The details are illustrated below:

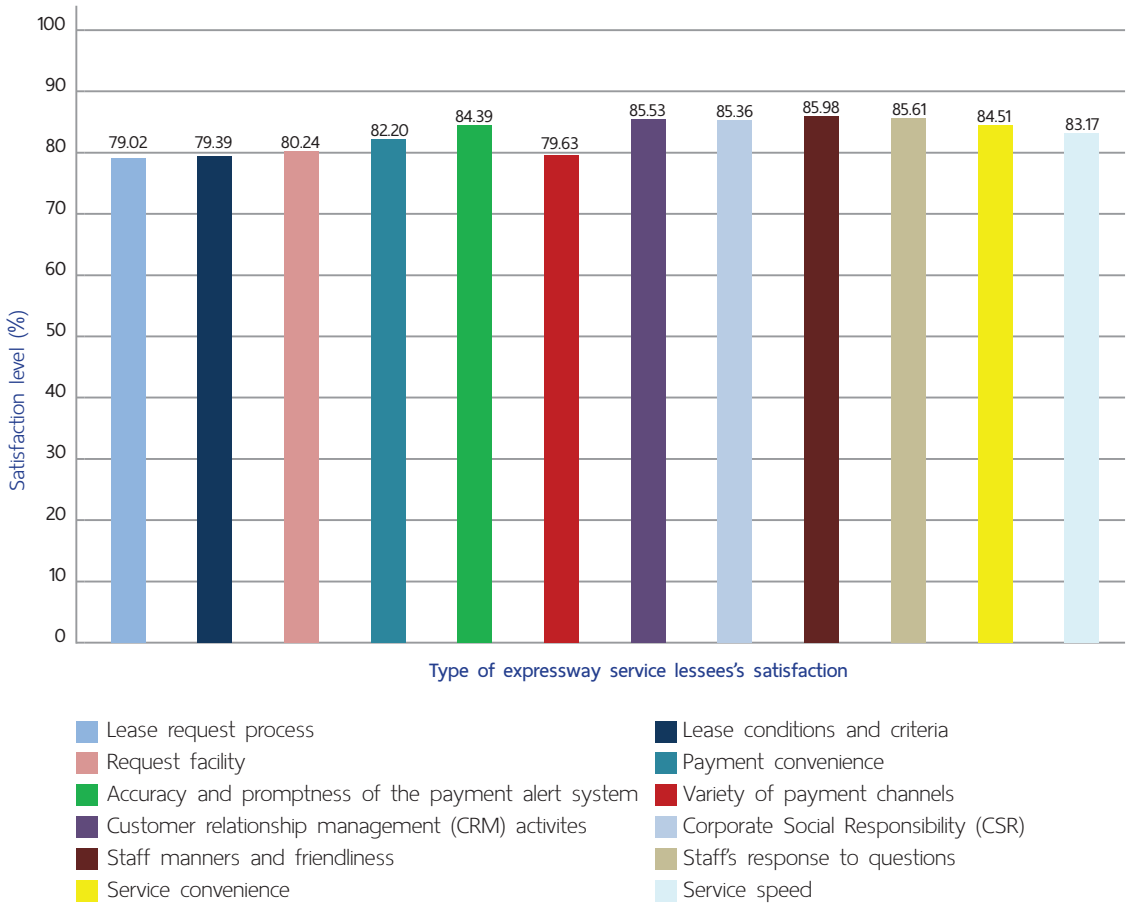


Figure 12 Expressway Area Lessees' Satifaction in EXAT Services as of the Fiscal Year 2019

It was also found that the lessees of the expressway areas have raised concern about problems with the contract making process, a delay in contract renewal, redundant documents required for lease request, environmental problems in the leased area, such as damages caused by floods from rain, lights under the expressways to prevent crimes, and a request for EXAT to increase the channels for rental fee payment via the Internet and mobile phone without fee collection. From such the recommendations and demands, EXAT has taken corrective actions and accelerated the development of services, contract making process, and payment systems to be more efficient.

To ensure continuous development and sustainable upgrades of the expressway service standards in the future both in terms of safety and highest satisfaction in using the expressway services, EXAT has determined the customers' complaint management process according to the complaint handling procedures under ISO 9001 quality management standards (102-12) to serve as a management guideline, with operation procedures through complaint receiving channels and listening to feedback, which will lead to resolutions, remedies, or response to the customer demands. The details can be seen below:

1 complaint

Major channel EXAT Call Center 1543

Other channels

- Expressway toll plaza
- Center (GECC)
- EXAT Information Center
- EXAT website(www.exat.co.th)
- One Stop Servuce (OSS)
- Email channels as follows:
  - webmasters@exat.co.th
  - off_info@exat.co.th
  - crm.ebiz.exat@gmail.com

Record complaints and recommendations, and categorize complaints

- In case EXAT Call Center has all the information, it can respond to the complaint on its own with the complaint management period of 1 working day.
- In case EXAT Call Center needs to submit the complaint to related agencies for inspection and corrections, it needs to proceed with such submission within 3 working days.

2 Prevent Improve

Propose the matter to related agencies to make corrections, prevention, and improvement before notifying the complainant

- In case of a complaint received through mass media, the explanation must be given within 1 working day.
- In case the complaint is not complicated, the complainant will be responded within 1 working day.
- In case the complaint is complicated and requires time for inspection or taking corrective actions, the complainant will be responded within 3 working day.

Type of complaint	Number (case)	Completed (case)	In progress (case)
EXAT staff operation			
Expressway toll collection	4	4	-
EXAT staff corruption	1	1	-
Land			
Expressway encroachment	3	3	-
Other	11	10	1
Expressway inconvenience or troubles			
Lights	2	2	-
Damaged trafffiic surface	3	3	-
Noise	18	17	1
Signs	3	3	-
Expressway traffic management	21	21	-
Expressway toll collection system	29	29	-
Expressway toll collection booth	8	8	-
Other	13	12	1
Other	5	4	1
Number of complaints	121	117	4

*Data of Fiscal Year 2019

3 conclude

Collect and summarize information, and prepare an operation report to be proposed to the executives

Result of complaint management effectiveness assessment

Take corrective actions to achieve resolution with the average score of now lower 80 percent

In the ffiiscal year 2019, EXAT received 121 cases of complaints and resolved 117 cases. It was found that the number of complaints in the fiscal year 2019 decreased by 25.30 percent compared to that of the ffiiscal year 2018, and that 151 cases out of 162 cases were resolved.

EXAT's complaint management effectiveness accounted for 96.69 percent, which was higher than the set target.

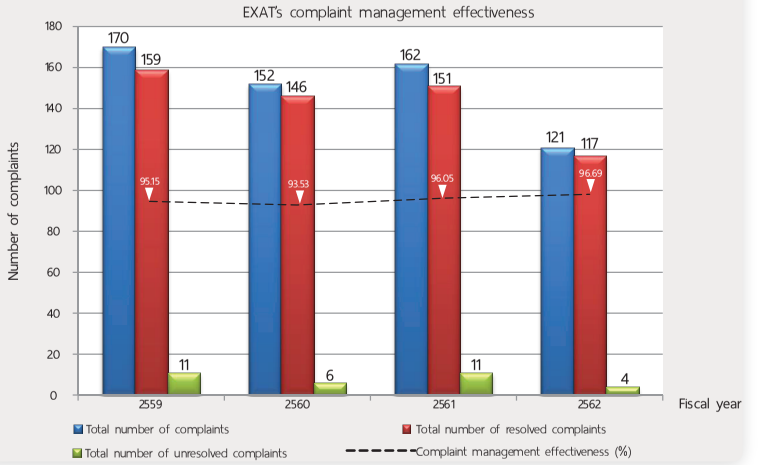


Figure 13 Customer Complaint Management Process and Complaint Management Effectiveness (103-2)

Service-related Safety (103-1, 103-2)

EXAT has attached great importance to safety of expressway service users, both in terms of prevention of damages to properties and lives of drivers caused by accidents on the expressways. EXAT has determined an indicator of expressway safety by using the ratio of number of expressway accidents per 100 million vehicles per kilometer, with the target of not exceeding 10.86 times per 100 million vehicles per kilometer, and has prescribed the guidelines on expressway accident prevention and rescue, as well as the guidelines on giving support to broken down vehicles on the expressways for related agencies and staff, for example, expressway control centers, ad hoc support centers, expressway police officers, etc. to be ready for handling immediate problems effectively, with the operation guidelines as follows:

Communication Staff 	◉ The communication staff at the Expressway Control Center monitors incidents on the expressways 24 hours a day through CCTV installed along the expressways and coordinate with related agencies. ◉ Make a campaign on and promote safety driving by giving safety information via VMS on a daily basis.
Rescue Staff 	◉ Monitor safety on the expressways, such as collecting fallen items which might cause accidents, any obstructing items on the expressways, such as vehicles, humans, animals, and monitor the operations of expressway lanes to prevent hazards to the service users. ◉ Inspect the road condition, road surface joint, traffic signs, and condition of equipment, such as lights, CCTV, VMS, and availability of emergency calls on a weekly basis. ◉ Provide support or protection to the broken-down vehicles or vehicles suffering accidents for safety of the expressway users and preventing further accidents. ◉ Ensure safety on the expressways by reporting information to the supervisor in case there are locations where accidents take place frequently in order to coordinate with related agencies to perform inspection and analysis for finding preventing measures, as well as to install other safety equipment, such as speed limit sign, slowdown sign, and flashing lights. ◉ Coordinate with traffic management staff and expressway police officers for strict law enforcement with vehicles running beyond the speed limit to reduce the number of accidents caused by speed.
Traffic management Staff 	◉ Strongly prohibit trucks which exceed the weight limit, are unstable, or fail to secure things firmly or to fastern the container with the vehicle body to use the expressways to prevent possible accidents and damages to traffic surface and expressway structure.

Figure 14 Expressway Accident Prevention Procedures

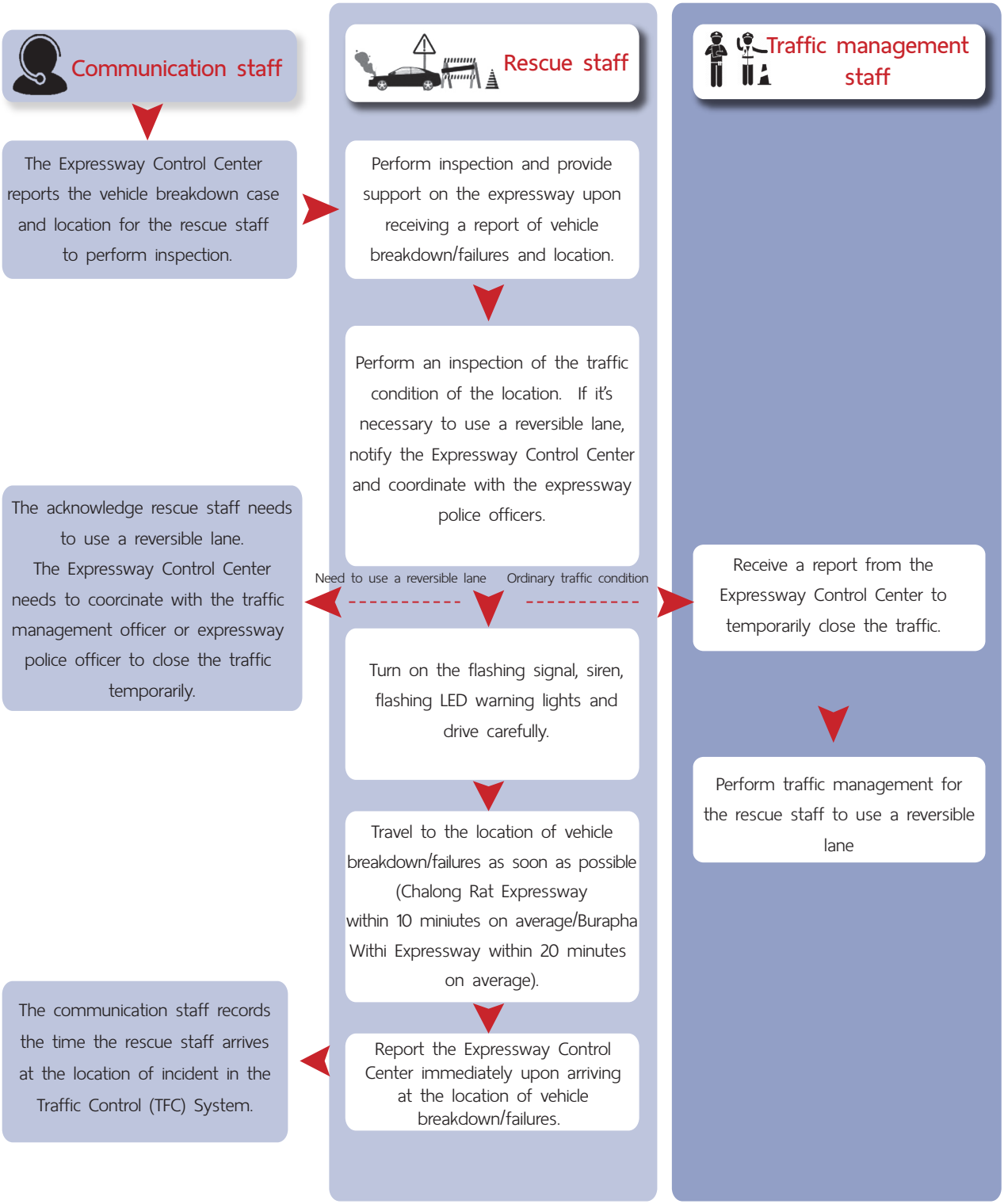


Figure 15 Incident Report Procedures and Access to the Incident Location

Apart from the efficient proactive preventive measures and accident response plans, in the fiscal year 2019, EXAT implemented other projects in order to deliver expressway services with maximized safety to users as follows:

Your Speed Sign Installation Project

EXAT has installed Your Speed Sign in the area with frequent occurrence of accidents for warning and preventing accidents as a result of speed driving. You Speed Sign can display speed from 0-199 kilometers/hour using solar energy for viewing images, sending speed information, adjusting operation properties, and checking the operating status online. EXAT has installed Your Speed Sign at three points of Burapha Withi Expressway, which are KM 14+600 (Inbound), KM 24+100 (Outbound), and KM 32+500 (Inbound).

GIS System Development Project for Communication and Rescue Works

EXAT has developed a system to detect unusual incidents on the expressways by applying Artificial Intelligence (AI) Technology for analyzing video images, driver behavior monitoring information, and unusual incidents on the expressways through CCTV image processing both in analog and digital forms installed on EXAT's expressways. Such the system has been developed to prevent accidents, promote travel safety, and upgrade the operations of the staff on duty to receive incident reports faster.

Full LED Traffic Light Signal Sign Controlling System for a Reversible Lane

EXAT has developed a full LED traffic light signal sign controlling system for a reversible lane, which can control, command, and adjust the display format, and check status from Chalong Rat Expressway (CCB3) through the traffic light signal sign control program instead of conventional traffic light signal signs, which is controlled using a manual system and cannot be adjusted to other forms of message. The traffic light signal sign controlling system has been installed on 24 signs on Outbound Chalong Rat Expressway at KM 6+000-12+000 to increase staff's traffic management efficiency during rush hours (06.30-09.00 hrs.), which could help solve traffic congestion problems on the expressways and reduce accidents as a result of confusion in using lanes on the expressways. Furthermore, the officer can analyze the obtained information to find the number and traffic lanes where accidents occur, plan maintenance, and set appropriate speeds as statistics for determining the guidelines on traffic and safety management for potential expressway service users in the future.

Based on EXAT's safety operation measures for expressway service users, the expressway accident rates tended to decline in the fiscal Year 2019 at 9.71 times per 100 million vehicles per kilometer, which was not beyond the target set by EXAT at 10.86 times per 100 million vehicles per kilometer.

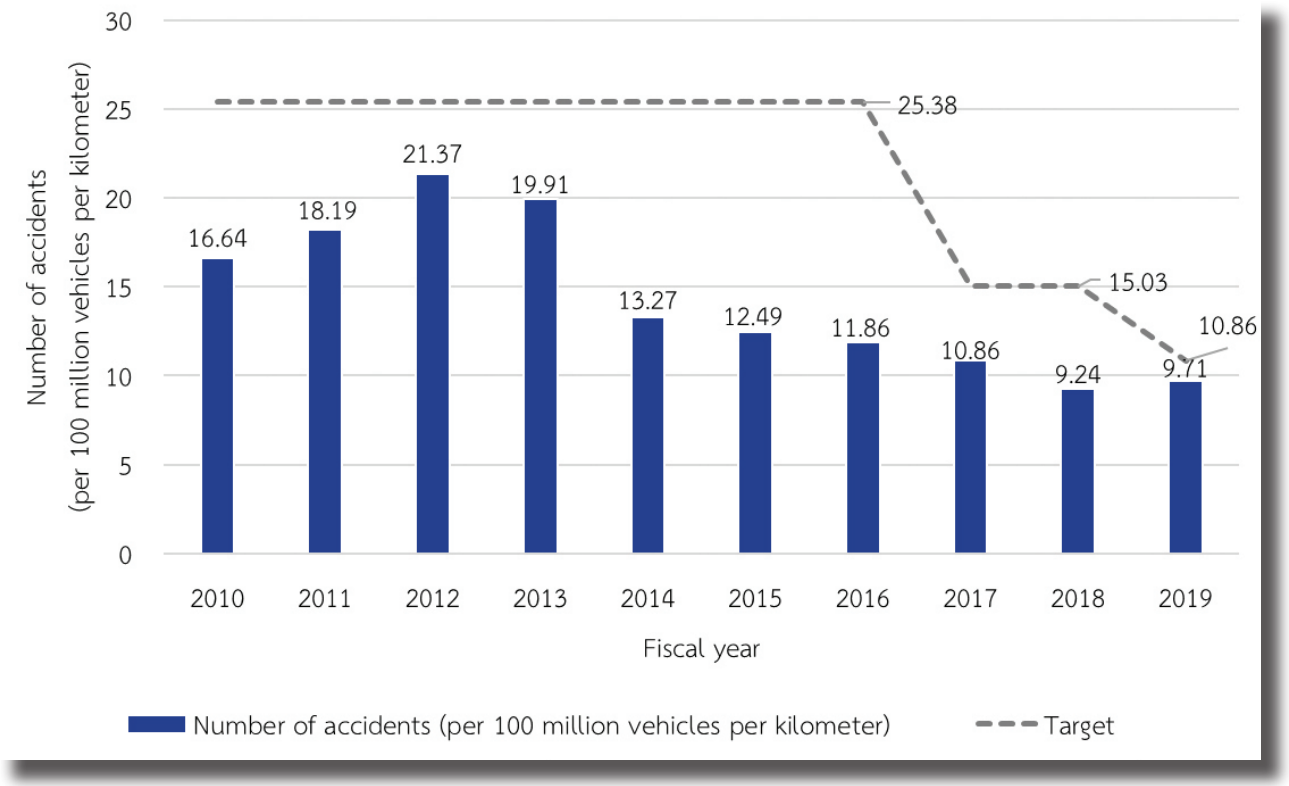


Figure 16 The Rate of Expressway Accidents for the Fiscal Year 2010-2019

In addition, EXAT has implemented a project to survey expressway service users' satisfaction and behaviors towards EXAT services and images in the fiscal year 2019. The users' satisfaction was surveyed in 7 aspects, which were expressway physical condition, expressway traffic flow, expressway safety, direction and signal signs, expressway rescue services, expressway toll collection in cash, and the ETCS system using Easy Pass. It was found that in the fiscal year 2019, the overall satisfaction was at 94.7 percent, which was higher than the set target at 90.0 percent, and the satisfaction level increased by 0.32 percent compared to that of the fiscal year 2018, which was at 94.4 percent. The survey results are illustrated below:

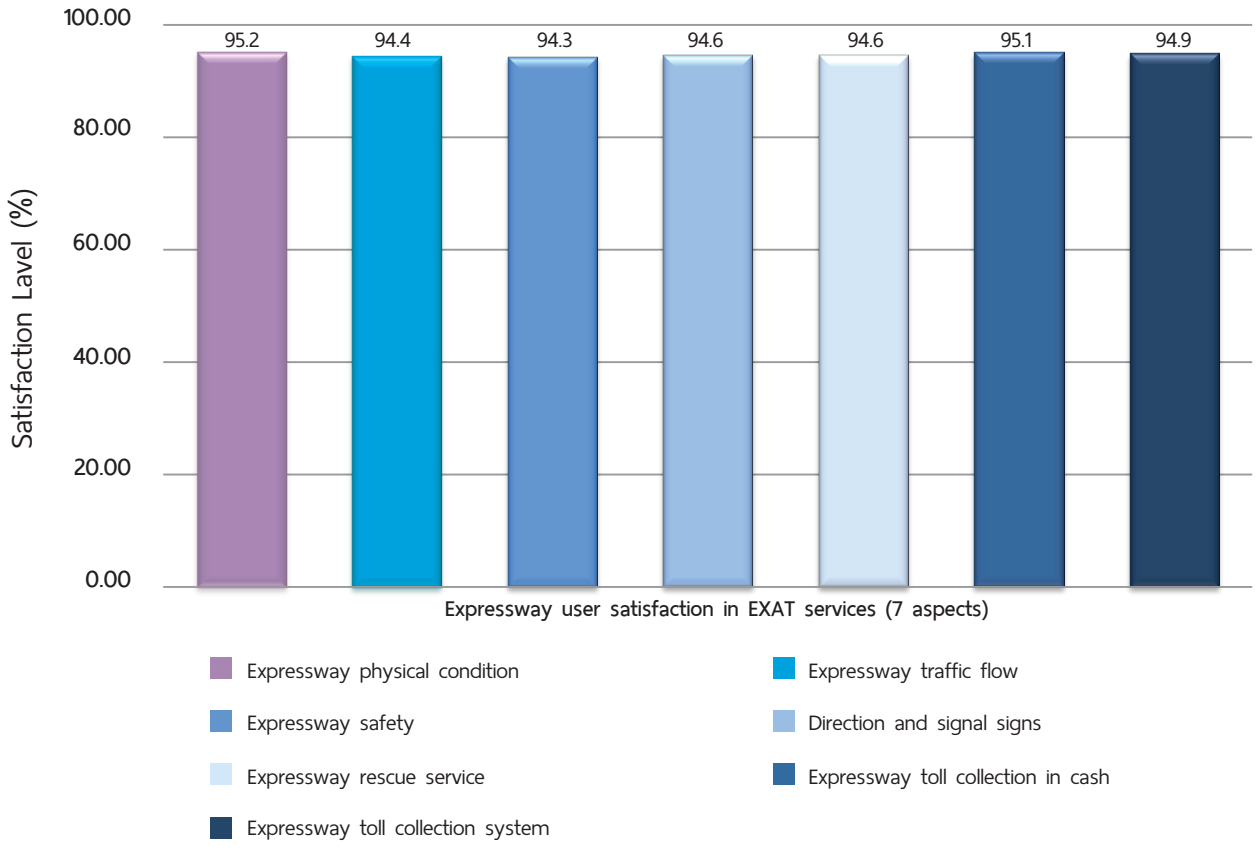


Figure 17 Expressway Service Users' Level of Satisfaction in EXAT's Services (7 Aspects)

Customer Health and Safety (103-1, 103-2, 416-1, 416-2)

The development of inter-city transportation networks and urbanization has resulted in an increase in inter-city travel and traffic congestion in the regular routes. Therefore, currently, users of vehicles and roads have turned to expressways more and more and it tends to keep increasing in the future. Due to this reason, delivering expressway services with the maximized safety from construction to service provision, and continuous route maintenance throughout the services is the key to expressway services in order to prevent possible accidents to the expressway service users. EXAT has assessed safety of all expressways after construction in compliance with the prescription in the Work Manual of the Expressway Construction Department (2016 revised version). In the fiscal year 2019, there was one route, namely Rama III - Dao Khanong-Western Bangkok Outer Ring Road Expressway. The result of assessment of expressway safety accounted for 100 percent without any negligence or violation to the safety assessment practice guidelines of such manual. Moreover, the maintenance of the 8 routes with long services was in accordance with the expressway maintenance guidelines covering inspection, maintenance, and repair of expressways and components of expressways, which can be divided into preventive maintenance to extend the service life, and corrective maintenance in case of damages in order to maintain good services for expressway service users, with the details as follows:

Guidelines on Expressway Inspection

- **Daily Inspection:** It is an inspection of various components of expressways on a daily basis, such as deformation of the traffic surface joints, breakage of fall protection walls, distortion of steel rails, traffic signs, light flicking, toll collection equipment malfunction, emergency call system, CCTV, etc.
- **Routine Inspection:** It is a regular inspection of major structures of the expressways, such as cracks and breakage of concrete structures, steel structure screw condition, Rama IX Bridge cabling condition, deterioration of traffic signs, reflective markers, power distribution equipment cabinets, expressway light intensity, toll collection equipment, and CCTV according to the yearly plan.

- **Special Inspection:** It is an inspection of expressway structures in addition to daily and routine inspection, using more complicated methods, for example:
  - Carbonation Test
  - Corrosion Test
  - Ultrasonic Test
  - Skid Resistant Test
  - Ground Penetration Radar
  - Rama IX Bridge Structural Strength Test, etc.

Expressway Maintenance and Repair

- **Routine Maintenance:** This includes cleaning traffic marking, traffic signs, drainage systems, traffic surfaces, lamps, changing traffic signs with wear and tear, painting steel rails, and small routine repair according to the work plan, etc.
- **Corrective Maintenance:** This depends on the actual damages occurred, such as renovation of traffic surfaces, traffic surface joints, and fall protection wall joints, cementing cracks, and sealing concrete structure cracks, replacement of light bulbs, light cables, repair of damaged toll collection equipment, emergency call system, variable message signs (VMS), and matrix signs, etc.
- **Urgent Maintenance:** This form of maintenance is carried out upon damages from various incidents, such as from car accidents, fires, chemicals, etc. to facilitate traffic flow, while permanent urgent maintenance is carried out for damaged expressway structures and components to return to their normal condition.

Fairly Reinforcing Community and Social Acceptance (103-1)

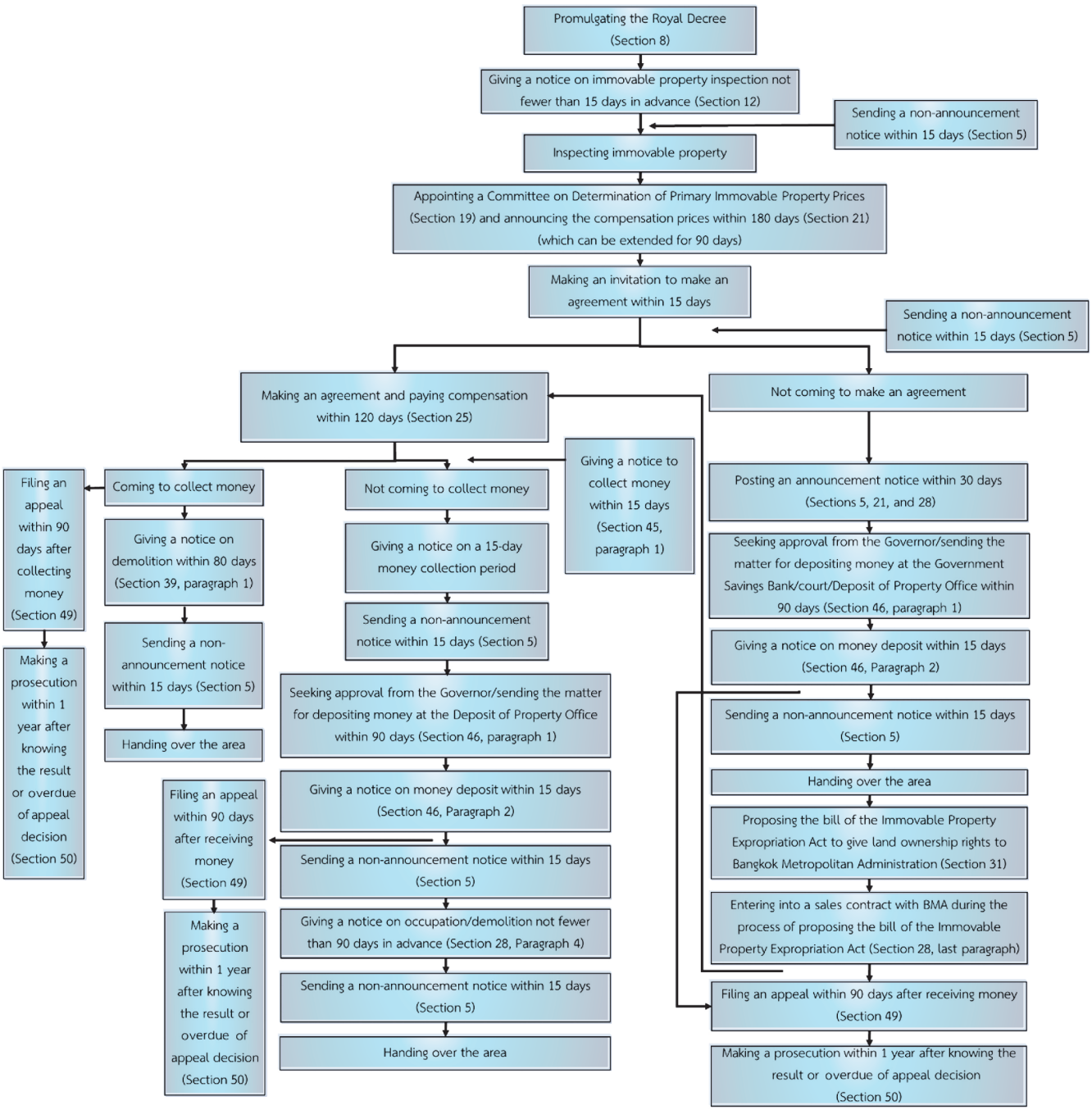
EXAT has identified those affected by land expropriation and communities along Expressway Right-of-Way as the major stakeholders for its sustainability operations as EXAT realized that its main operation process inevitably affected these groups of stakeholders, both from land expropriation and migration as a result of project development. Therefore, EXAT has placed great importance on alleviating the negative impacts arising from such operations in order to gain community and social acceptance through the CSR-after-Process activities for community and social development by means of career building and local economy development. There are two sub-strategies as follows:

Strategy 2.1 Promotion of Relationship Management with Landowners Affected by Land Appropriation (103-2, 413-1, 413-2)

In fiscal year 2019, EXAT acquired land for the Rama III-Dao Khanong-Western Outer Bangkok Ring Road Expressway Project, which covered 67 plots of expropriated land, accounting for 6-0-82.1 rai; 94 expropriated buildings; expropriation expenses EXAT received from the government's land ownership budgets of 807 million baht in total. 100 percent of the affected communities were assessed to use the data for preparing the report on environmental impact assessment of the Rama III-Dao Khanong-Western Outer Bangkok Ring Road Expressway Project. The affected communities included 31 communities of Chom Thong District, 15 communities of Bang Khun Thian District, 6 communities of Bang Bon District, 3 communities of Rat Burana District, 13 religious places, 7 sanatoriums, and 29 educational institutions.

However, before starting the process related to land expropriation, EXAT conducted a study of project feasibility and set the channels to allow opportunities for people affected by the project to share opinions, information, objections, or recommendations related to the project. Such the process would result in the right choice and decisions agreed by all the people concerned to promote joint understanding, acknowledgement, and learning, In addition, practice guidelines were formulated in accordance with the Act on Expropriation and Acquisition of Immovable Property, B.E. 2562 (2019), and the work manual of the Land Acquisition Division was strictly observed.

EXAT also determined the compensation for immovable property in accordance with the criteria prescribed by the law on prescription of the practice guidelines for expropriation of immovable property, calculation of expropriated buildings, and determination of compensation for damages of immovable property as approved by the Ministry of Transportation as well as the guidelines of the Transportation Minister to ensure justice for those affected by land expropriation.



Total minimum duration for expropriation according to the legal procedures

Approximately 570 days in case of coming to make an agreement
Approximately 720 days (24 months) in case of making an agreement, but not collecting money
Approximately 585 days in case of not coming to make an agreement

Remarks: Entering into an agreement and receiving compensation shall not be regarded as a waiver of the right to file an appeal according to this Act (Section 26, last paragraph)

Figure 18 Process and duration for immovable property expropriation under the Act on Expropriation and Acquisition of Immovable Property, B.E. 2562 (2019)

Strategy 2.2 Creating participation in sustainable care and development for the communities and society (103-1, 103-2)

EXAT has focused on promoting participation and care for the communities since communities are a group of stakeholders directly affected by EXAT's operations to expand expressways during the pre-construction, construction, and operation phases. Thus, EXAT has determined operation guidelines to minimize negative impacts and promote positive impacts to the communities, for instance, alleviating the impacts from traffic congestion, giving land utilization rights, fire protection, and solving the problem of expressway encroachment, which are detailed below.

Impacts from Traffic Congestion (103-1, 103-2)

EXAT is well aware that the pre-construction process can substantially affect transportation as there are various construction works to be carried out, such as roadway excavation, space adjustment, foundation and foundation post construction, transfer of utilities, as well as transportation of materials and equipment using heavy trucks, which will cause damages to the road surface and closure of certain road surface, resulting in more congested traffics and travel inconvenience for commuters. Therefore, it is necessary for EXAT to determine the action plan for preventing and correcting transportation impacts, and to place signs, equipment, and traffic signs during the construction for fencing along the construction site, as well as for giving the information on the warning sign installation distance and appropriate lane transition distance so as to minimize possible impacts from the project. The operation procedures are as follows:

1. Coordinating with relevant organizations, such as the Department of Highways, area police stations, utility owner organizations, as well as other related organizations to ensure project completion within the timeframe and construction safety.

2. Closely coordinating with Bangkok Metropolitan Administration, Department of Highways, Traffic Police Devision, and area police stations to formulate the regulations on use of vehicles and roads around the construction site and good management of traffic routes.

3. For the construction of foundations and foundation posts, and pile boring close to the road, the construction site must be inside a concrete barrier installed along both sides covering the whole construction area. In addition, warning signs, channelizing devices, traffic signals, and lighting must be installed for safety of the users of relevant highways and expressways in accordance with the standards on traffic signs and standards of the Expressway Authority of Thailand, Department of Highways, and Bangkok Metropolitan Administration.

4. The installation of signals and signs must be in accordance with the practice guidelines on installation of signals and signs for road construction and repair, and utility works of government agencies and state enterprises of the Bureau of the National Safety Council of Thailand, the Secretariat of the Prime Minister.

5. For traffic management during the expressway construction, the contractor must install equipment and warning signs to caution commuters before reaching the starting point and ending point of the project construction.

Figure 19 The action plan for transportation impact prevention and correction

Sign	Name	Sign characteristics	Usage and installation
	Construction sign	A 60×60 cm sign with yellow background, black symbol, and black border	For cautioning drivers about the construction ahead within the distance of 1 kilometer, 500 meters, and 150 meters before reaching the construction site.
	Right lane merge sign	A 60×60 cm sign with yellow background, black symbol, and black border	For cautioning drivers about the merging traffic lanes ahead from 3 lanes to 2 lanes
	Speed down sign	A 80×120 cm sign with yellow background, black symbol, and black border	For cautioning drivers to drive at the prescribed speed
	Worker sign	A 60×60 cm sign with orange background, black symbol, and black border	For cautioning drivers to beware of the operating workers
	Operating machine sign	A 60×60 cm sign with orange background, black symbol, and black border	For cautioning drivers to beware of the operating machines
	Direction sign	A Ø60 cm sign with blue background, white arrow symbol, and white border	For guiding drivers to keep left
	Traffic direction sign	A 4-meter tall sign which can be seen from a 1,000-meter distance and consists of an arrow with 24 RS 2000 halogen lamps and parallel strobe lights	Used jointly with the “Pass through this way” sign
	Construction site ending sign	A 80×120 cm sign with vermillion background, black symbol, and black border	For informing drivers that they have reached the end of the construction site
	Concrete wall	Concrete wall	For separating the construction site from the traffic stream
	Light bulb	Light bulb	For directing ways and cautioning pedestrians and drivers throughout the construction site boundary
	Strobe light	Direct right and reflective glass attached to the light bulb, which can be seen from far away	Light installed directly towards the approaching traffic at the distance of 3 meters between each light.
	Traffic cone	Orange traffic cone	Placed at the distance of 1-2 meters apart throughout the lane merge range where temporary operations are carried out

Figure 20 Signs and equipment used as barricades of the construction site

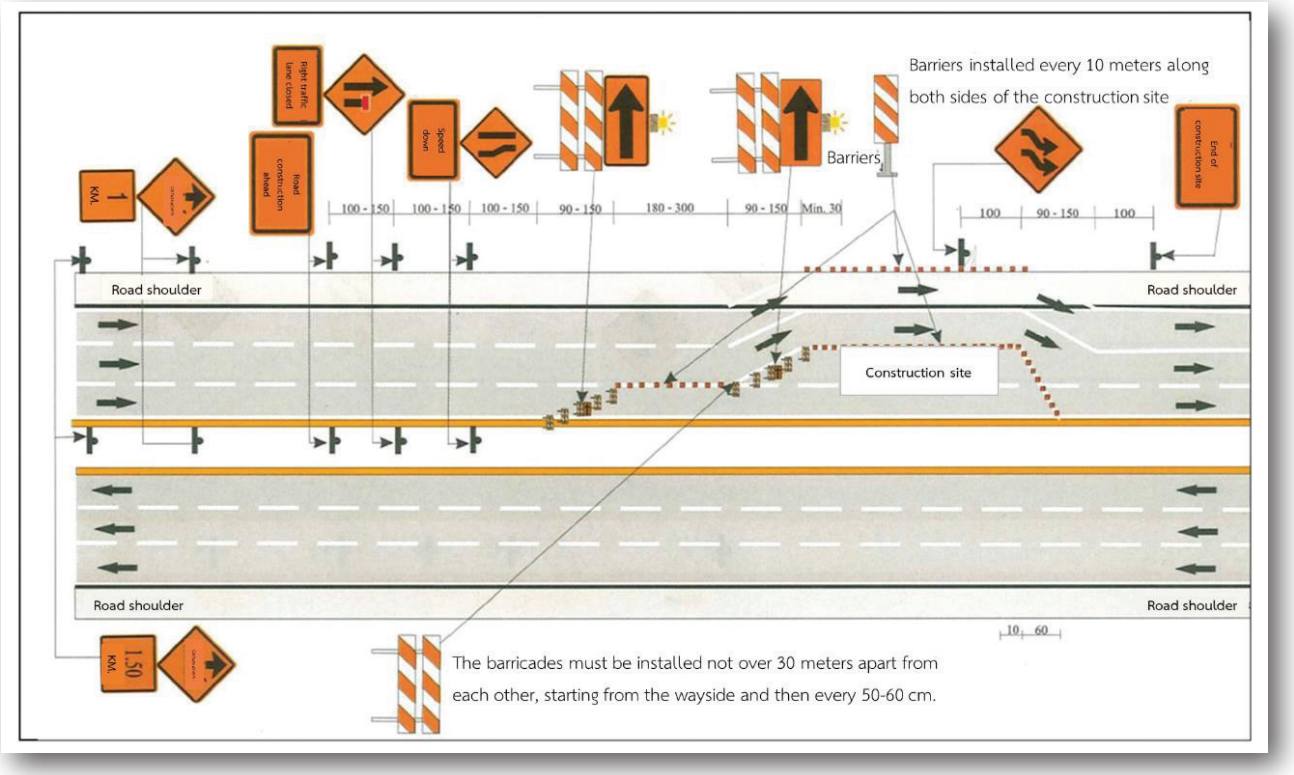


Figure 21 An example of traffic sign installation during construction

Table 12 Early Warning Sign Distance

Type of road	The distance between the operation site and the first warning sign, and the distance between signs (meter)
Urban road (Low speed of 30 km/hr.)	30
Urban road (Low speed of 60 km/hr.)	100
Rural road (80 km/hr.)	150

Table 13 Appropriate transition distance

Type of road / Type of transition	Transition distance
Urban road (60 km/hr.)	T = 40-80 m
Rural road (80 km/hr.)	T = 150-200 m
Transition to reduce traffic lanes	Not lower than T
Transition to change the traffic lane	Not lower than 0.5 T
Transition on the road shoulder	Not lower than 0.33 T
Transition between 1 traffic lane and 2 traffic lanes	Not over 30 m
Transition upon reaching the end of the construction site	30 m/ 1 lane

Land Utilization Rights (103-2, 413-2)

EXAT has prepared an action plan for economic and social impact prevention and correction to minimize the impacts on the communities, especially social impacts both physically and mentally caused by land expropriation, as well as environmental impacts, such as dust, noise, and vibration. In addition, it has built confidence and clear understanding about the project to gain acceptance and support for project development, and has cared for the communities and people living in the study area of Rama III-Dao Khanong-Western Outer Bangkok Ring Road Expressway Project, covering 6 sub-districts and 4 districts, namely Samae Dam Sub-district and Tha Kham Sub-district in Bang Khun Thian District; Bang Bon Sub-district in Bang Bon District; Bang Mot Sub-district and Chom Thong Sub-district in Chom Thong District; Bang Pakok Sub-district in Rat Burana District. The pre-construction, construction, and operation phases are as follows:

Pre-construction phase	Construction phase	Operation phrase
A department overseeing complaints has been established. In case there are complaints, problems must be solved seriously and urgently by following EXAT's current methods and procedures implemented as follows:		Activities to promote good relationships between the project and the communities in the project area need to be organized.
1) Receive complaints and recommenciations through the EXAT Call Center 1543 or toll plazas via telephone, fax, website and other channels, record information in the complaint and recommendation form, and send fax the EXAT Call Center. 2) The EXAT Call Center issues a code and makes a record in the complaint and recommendation register by categorizing the record into complaints or recommendations on services of the toll collection staff, expressway environment, etc. 3) The executive signs the form and the EXAT Call Center sends the form to the department being complained via fax (submit the original later). 4) The department being complained performs an inspection according to the recorded form in order to find preventive and corrective actions, and improvement before responding to the person filing the complaint. 5) The EXAT Call Center coordinates with the department being complained via phone or in person, and makes a record in the complaint and recommendation follow up register in case no corrective action is taken, in order to monitor progress in the following week and report to the Governor for acknowledgement. 6) The department being complained takes corrective actions and returnes the form to the EXAT Call Center. 7) The EXAT Call Center prepares a report on monthly performance of the EXAT Call Center to be proposed to the executive holding the position of assistant governor or higher and prepares a meeting agenda to be proposed to the executive meeting at the department level or over.		✓ Travel safety campaigns ✓ Energy saving activities ✓ Activities jointly organized with religious places on important religious days ✓ Activities jointly organized with educational institutions, such as giving scholarships, giving sports equipment ✓ Environmental protection activities,etc.

Figure 22 Action plan for economic and social impacts prevention and correction

Apart from preparing the action plan for economic and social impacts prevention and correction in order to care for the communities and society affected from the Rama III-Dao Khanong-Western Bangkok Outer Ring Road Expressway, EXAT has also allowed Bangkok Metropolitan Administration and government agencies for utilization and allowed communities and society for public use in 8 expressways, including Chalerm Maha Nakorn Expressway, Si Rat Expressway (including Si Rat-Outer Ring), Chalong Rat Expressway (Ram Inthra-At Narong and the Ram Inthra-Outer Bangkok Ring Road Expressway), Udon Ratthaya Expressway, Bang Na-At Narong Expressway, Burapha Withi Expressway, with the total land area of 1,160,369.00 square wah as detailed below.

Land permitted for Bangkok Metropolitan Administration utilization

Objective	Number (place)	Area (square wah)
Public park	61	138,664.70
Sport venue	28	26,475.93
Shortcut/bicycle rute	17	36,743.70
Other activities	51	15,341.01

157 places in total, accounting for 217,225.34 Square wah

EXAT's Land for growing trees and other public utilization

78 places in total, accounting for 110,603.87 Square wah

Land permitted for utilization of EXAT or other organization

Objective	Number (place)	Area (square wah)
Public park	6	32,142.50
Sport venue	4	6,259.95
Shortcut/bicycle rute	11	23,991.86
Other activities	157	62,910.10

178 places in total, accounting for 124,910.10 Square wah

EXAT's Land for lease

686 places in total, accounting for 96,856.37 Square wah

Figure 23 Information on lease and permission for expressway utilization as of fiscal year 2019

Fire Protection and Finding Solutions to Expressway Encroachment Problems

EXAT has appointed a working group overseeing fire protection and finding solutions to expressway encroachment problems, with the role to determine the guidelines for management related to the activity to build allied network communities with the expressways and carry out fire protection and suppression rehearsals below the expressways, EXAT WE CARE activity, and the activity to develop the areas around the expressways. The working group comprises those from inside and outside the organization, for example, Disaster Prevention and Mitigation Office, district offices, police stations, etc. Meetings to monitor progress and summarize the operational results are conducted every quarter or 4 times a year. In addition, in the fiscal year 2019 Exat were also undertaken operation to oversee the expressways areas and to build good relation with expressway surrounding communities as follows :

o Arrangement of the activity to build allied network communities with the expressways and carry out fire protection and suppression rehearsal under the Kanchanaphisek Expressway (Bang Phli-Suksawat) and the EXAT WE Care activity to donate firefighting equipment, demonstrate how to use fire extinguishers, give knowledge, explain how to extinguish fire caused by household LPG gas, and provide primary medical check-up service by the mobile medical unit of Ramathibodi Hospital to 3 communities, namely Mit Maitri 1, Mit Maitri 2, and Ratcha Suphamit 1-2, and donate sports equipment to Anuban Tessaban Mueang schools.

o Arrangement of the activity to build allied network communities with the expressways and carry out fire protection and suppression rehearsals for the Chalerm Maha Nakorn Expressway in the area of Nonsi Witthaya School in Yan Nawa District to promote good relationships between communities and reduce areas at risks by having communities to help care for the area around the expressways.

o Arrangement of the activity to build allied network communities with the expressways and carry out fire protection and suppression rehearsals for the Chalong Rat Expressway in Koh Klang Community, 100-Year Her Majesty the Queen's 80th Birthday Park, Ministry of Transportation in order to increase the efficiency of prevention and correction and provide assistance in case of fire under the Chalong Rat Expressway according to the environmental management system ISO 14001:2015, requiring a once-a-year rehearsal.

o Arrangement of the project to carry out fire protection and suppression rehearsals, build allied network communities with the Si Rat Expressway in Ratchathewi Phirom Park, donate 20 fire extinguishers and instructional materials for young kids in Sam Sen Community and Soi Ratchataphan Community around the expressway to increase the efficiency of prevention and correction, provide assistance in case of fire under the expressway, and carry out the CSR strategic operations.

o Arrangement of the project to carry out fire protection and suppression rehearsals, build allied network communities with the Udon Ratthaya Expressway behind the Si Saman Toll Plaza, donate 20 fire extinguishers and sports equipment to 5 communities and 3 schools to provide prevention, correction, and assistance in case of fire under the expressway and carry out the CSR strategic operations.

Indirect Economic Impacts (103-1, 103-2, 103-3, 203-1)

At present, urbanization is taking place and is likely to increase in the future, resulting in expansion of residences and workplaces both in the area of Bangkok, which is the capital city and business center, and nearby provinces. As a result, transportation keeps growing, which leads to traffic congestion and considerable damages to the economy, society, and environment. Therefore, In fiscal year 2019, EXAT studied suitability in terms of engineering, economy, finance, and environmental impacts of the Rama III-Dao Khanong-Western Outer Bangkok Ring Road Expressway Project, which is an expressway project in the master plan for the expressways in the Bangkok Metropolitan region aimed at linking transportation between Bangkok and Western outer Bangkok, linking the transportation networks from provinces in the south to Bangkok Metropolitan for convenient and fast travel, reducing traffic congestion on Rama II Road, and increasing the capacity of the Chalerm Maha Nakorn Expressway, from Rama IX Bridge to Dao Khanong interchange area from 4 traffic lanes at present to 10 traffic lanes. Furthermore, it is the alternative route for traveling and transportation of goods during unusual circumstances, such as during floods.

The prediction of the traffic volumes of the Rama III-Dao Khanong-Western Outer Bangkok Ring Road Expressway Project from using the Si Rat Expressway-Dao Khanong, Dao Khanong-Western Outer Bangkok Ring Road Expressway, Si Rat Expressway-Dao Khanong and Dao Khanong-Western Outer Bangkok Ring Road Expressway is as follows:

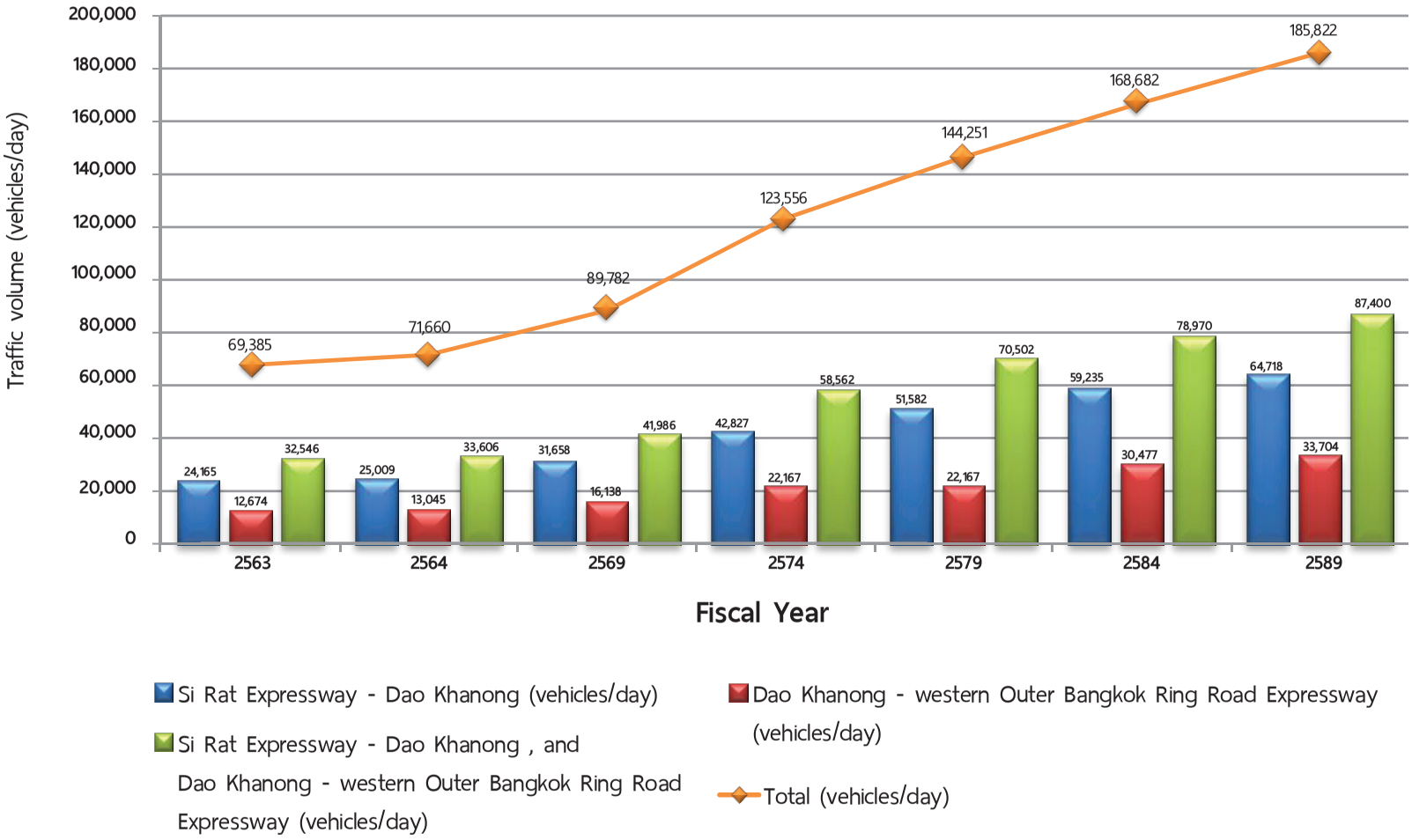


Figure 24 Prediction of the traffic volume of the Rama III-Dao Khanong-Western Outer Bangkok Ring Road Expressway Project

The information on the traffic volumes predicted from the traffic volumes of Rama III-Dao Khanong-Western Outer Bangkok Ring Road Expressway could be analyzed for the project's economic benefits to find the cost saving value from the project operations, which consist of Vehicle Operating Cost Saving (VOC), Travel Time Saving (VOT), and Accident Cost Saving (ACC) as detailed below. (203-2)

Table 14 Saved cost from the Si Rat Expressway-Dao Khanong project operations

Fiscal Year	Si Rat Expressway-Dao Khanong project operations		
	VOC (Million baht)	VOT (Million baht)	ACC (Million baht)
2020	108,260,379.00	4,048,067.00	26.74
2021	110,167,039.00	4,193,256.00	26.27
2026	120,408,440.00	5,085,816.00	23.68
2031	132,940,647.00	6,187,673.00	21.48
2036	147,137,317.00	7,546,364.00	19.50
2041	163,249,381.00	9,225,532.00	17.70
2046	181,569,709.00	11,305,448.00	16.06
2047	185,473,458.00	11,774,624.00	15.75

Source: Completely report Environmental Impact Assessment Report the Rama III-Dao Khanong-Western Outer Bangkok Ring Road Expressway Project, June 2016 issue

Table 15 Saved cost from the Dao Khanong - Western Outer Bangkok Ring Road Expressway project operations

Fiscal Year	Dao Khanong - Western Outer Bangkok Ring Road Expressway project operations		
	VOC (Million baht)	VOT (Million baht)	ACC (Million baht)
2020	108,260,379.00	4,048,067.00	26.74
2021	110,167,039.00	4,193,256.00	26.27
2026	120,408,440.00	5,085,816.00	23.68
2031	132,940,647.00	6,187,673.00	21.48
2036	147,137,317.00	7,546,364.00	19.50
2041	163,249,381.00	9,225,532.00	17.70
2046	181,569,709.00	11,305,448.00	16.06
2047	185,473,458.00	11,774,624.00	15.75

Source: Completely report Environmental Impact Assessment Report the Rama III-Dao Khanong-Western Outer Bangkok Ring Road Expressway Project, June 2016 issue

Table 16 Saved cost from the Si Rat Expressway-Dao Khanong and Dao Khanong-Western Outer Bangkok Ring Road Expressway project operations

Fiscal Year	Si Rat Expressway-Dao Khanong and Dao Khanong-Western Outer Bangkok Ring Road Expressway project operations		
	VOC (Million baht)	VOT (Million baht)	ACC (Million baht)
2020	399.00	651.00	32.00
2021	1,207.00	2,027.00	97.00
2026	2,311.00	4,360.00	109.00
2031	3,740.00	7,249.00	125.00
2036	10,037.00	11,356.00	143.00
2041	14,212.00	18,062.00	165.00
2046	18,727.00	26,497.00	189.00
2047	19,731.00	28,502.00	194.00

Source: Completely report Environmental Impact Assessment Report the Rama III-Dao Khanong-Western Outer Bangkok Ring Road Expressway Project, June 2016 issue

Enhancing Capability of Environmental Mitigation and Development (103-1, 103-2)

The Expressway Authority of Thailand (EXAT) is aware of the significance of environmental management, and is determined with strong will and commitment to work on environmental management in accordance to ISO 14001:2015 Standard and the scope or boundaries of expressway specified in environmental manual in order to encourage participation for environmental care and safety of the stakeholders, as well as to improve work operations, control of impacts due to activities, and continuous and systematic services for the purpose of sustainable environmental development, the EXAT therefore has established its environmental policy with the following principles and guidelines,

1. Place importance on the control of noise level, dust particles, garbage, waste, quality of effluent sewer water from buildings, traffic management, and accidents occurring from the operations, with commitment on environmental protection and sustainable consumption of resources, such as tree-planting and economical consumption of water, electricity and A4 papers.

2. Increase safety for expressway users, employees, workers, and related individuals who operate works on the expressway, including environmental care and protection and proper waste management for good health and environment of employees, workers and related individuals by setting objectives, goals and guidelines of practice to appropriately manage possible risks which may occur with revision for continuous and sustainable improvement.

3. Comply with laws, rules, regulations, standards and requirements related to characteristics of problems and environmental risks for the prevention and solution to environmental impacts on employees, workers, stakeholders, environment and workplace.

4. Raise awareness among employees, workers, and stakeholders to maintain environmental quality and take mutual responsibility for the consumption of energy and natural resources by saving them.

5. Introduce and disseminate environmental policy to employees, workers, stakeholders and the general public.

Moreover, the EXAT has the 5-year long-term Strategic Corporate Social Responsibility Master Plan (2016-2020). The third strategy in this Master Plan is Strategy 3: Enhancing Capability of Environmental Mitigation and Development, with its focus on mitigation or alleviation of key environmental impacts important to the operations of the EXAT, such as climate change, biodiversity, inventory management and improvement of energy efficiency, etc., as well as improvement for good environment in the future. During the reporting period in the fiscal year 2019, the following operations have been carried out according to Strategy 3: Enhancing Capability of Environmental Mitigation and Development, as follows:

Strategy 3.1 Promotion on Environmental Awareness for Business Operation

Compliance with Environmental Laws (103-1)

The EXAT places importance on different work operations to comply with related environmental laws starting from the design process and engineering, economic, financial, and environmental impact feasibility study, construction procedures and opening process to begin operations, in order to prevent and control possible pollution and environmental impacts which may occur, and to reduce conflicts with the people who may be affected by possible impacts.

Management Approaches (103-2)

The EXAT conducts its operations in compliance with the prescribed laws to reduce possible conflicts which may occur by complying with the law, The Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992), and The Enhancement and Conservation of National Environmental Quality Act (No. 2) B.E.2561 (2018), and related Laws of Environment, with details of related laws as follows,

Stage of design and enginerring, economic, financial, and environmental impact feasibility study.

- Notification of the Ministry of Natural Resources and Environment on projects, undertakings, or operations required to provide an Environmental Impact Assessment Report, and rules, procedure, and conditions in providing an Environ mental Impact Assessment Report (No. 2) B.E.2562 (2019).
- Notification of the Office of Natural Resources and Environmental Policy and Planning on guidelines for public participation in the process to provide an Environmental Impact Assessment Report.
- Notification of the Ministry of Natural Resources and Environment on rules and procedure to provide a report on the performance of compliance with measures imposed in the Environmental Impact Assessment Report which the operators must provide when the approvals are granted to operate their projects or undertakings B.E.2561 (2018).

Stage of project construction.

- Air quality standard, noise and vibration, water quality standard law.
- Notification of the Ministry of Natural Resources and Environment on rules and procedure to provide a report on the performance of compliance with measures imposed in the Environmental Impact Assessment Report which the operators must provide when the approvals are granted to operate their projects or undertakings B.E.2561 (2018).

Statge of project operation.

- Air quality standard, noise and vibration, water quality standard law.
- Notification of the Ministry of Natural Resources and Environment on rules and procedure to provide a report on the performance of compliance with measures imposed in the Environmental Impact Assessment Report which the operators must provide when the approvals are granted to operate their projects or undertakings B.E.2561 (2018).

Furthermore to comply with the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992) once the expressway is open for service and may cause possible environmental impacts on people and communities along the expressway, the EXAT has set guidelines of practice for mitigation or alleviation of problems and reduce environmental impacts for people and communities along the expressway. The people can make environmental complaints through 2 following channels,



EXAT Call Center 1543, Letter of complaint sent to the EXAT.

When a complaint is received, the Environmental Management Division, the Policy and Planning Department, will coordinate with the complainant for area inspection and appointment for quality measurement.

Measure and analyze environmental quality, and then let the complainant know the result.

As for environmental quality, if the result of quality measurement exceeds the level set by law, for example, the general noise level higher than 70 dB(A) (Notification Of The National Environmental Board No.15, B.E.2540 (1997): The Ambient Noise Standard), the EXAT will come up with the design and installation of noise barriers on the expressway to soften the impact upon the people. Such process is prescribed under environmental law.

Operational Performance (307-1)

At present, the EXAT has applied environmental standard to Chalong Rat Expressway (Ram Inthra-At Narong and the Ram Inthra-Outer Bangkok Ring Road Expressway), Bang Na-At Narong Expressway, and Burapha Withi Expressway, certified by the Environmental Management System ISO 14001:2015 Standard in order to take control and find solution to environmental problems for the purpose of worthwhile and economical consumption of resources, the efficient prevention and solution to accident problems, and the enhancement of good image for the EXAT.

In the fiscal year 2019, the operations of the EXAT has complied with environmental laws and requirements without any dispute or fine and punishment measure as a result of noncompliance with any environment laws and requirements at all.

Moreover, the EXAT has been developing its services based on its goal to achieve global environmental standard in order to create sustainable development for the society and environment.

Strategy 3.2 Care and Attention to the Efficiency of Energy Consumption and Impacts from Climate Change

Energy and Emission (103-1)

The EXAT places importance on and promote responsibility for the environment in its operations, care and attention to the efficiency of energy consumption and impacts of Climate Change, as well as the reduction of greenhouse gas emission both inside and outside the organization to avoid negative impact on the society. As climate change is considered the main cause of global warming, the EXAT has initiated its contribution to help alleviate impacts from climate change by the study and assessment of Eco-Efficiency and carbon footprint study of the organization. With its goal to assess the increasing volume of greenhouse gas emission from the operations of the organization, the studies will lead to the management of greenhouse gas emission of the EXAT in order to reduce the volume of greenhouse gas emission in the future.

Management Approaches (103-2)

To manage its energy consumption, the EXAT conducts its operations to improve and conserve energy by the focus on energy management for the purpose of economical consumption of electrical energy such as the measure to replace T8 fluorescent lighting fixtures with LED lighting fixtures. As for the management of air pollution, its operations focus on the reduction of impacts from vehicles using the expressway, because their emission of exhaust gas from combustion results in the problem of dust particles. As in the past 2-3 years, the dust problem as known as Particulate Matters or PM 2.5 in the area of Bangkok has become more serious with its major source from vehicles travelling within the area of Bangkok altogether with Climate Change, during the months of November to March in particular, when the weather condition becomes closed like an enclosed space covered by a bowl as a result of Temperature Inversion, meaning a condition of being pressured by hot air on top, leading to the lack of air circulation. This results in the accumulation of PM 2.5 dust particles from emission of exhaust from combustion and traffic in front of toll plaza areas, therefore by its management, the EXAT monitors, inspects, follows up and prevents to lessen impacts from air pollution caused by vehicles using the expressway.

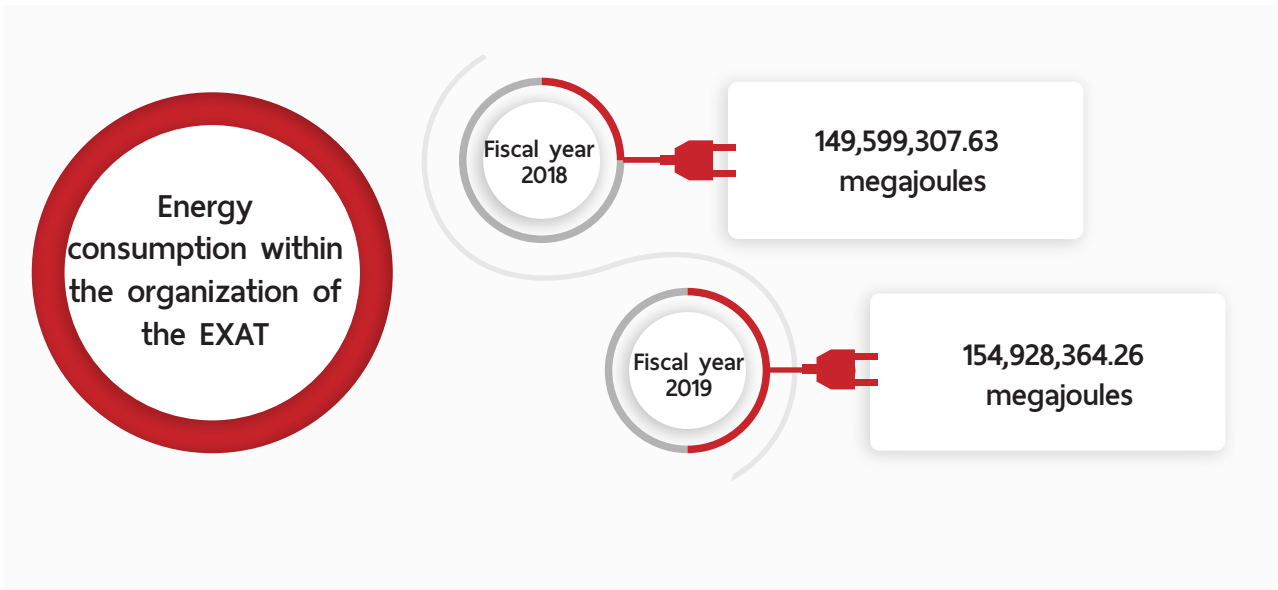
As for its management to prevent and soften impacts from air pollution caused by vehicles using the expressway, the EXAT has implemented various measures, especially the measure to reduce dust particles such as,

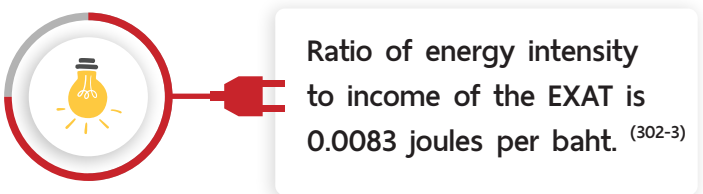
- Install high pressure water spray to reduce accumulation of dust particles in toll plaza areas.
- Clean and vacuum dust particles on the expressway and toll plaza areas.
- Detect exhaust gas emitted from vehicles before using the expressway.
- Checkup engine condition and exhaust gas emitted from EXAT vehicles in operation.
- Prepare officers for special operation unit to extinguish fire in case of fire from burning grasses or garbage near expressway routes.
- Use public relations to promote and give information by Variable Message Sign: VMS, such as message to encourage expressway users to have their vehicles checked up before using the expressway, etc.
- Promote the use of Easy Pass service to reduce accumulation of dust particles. The EXAT worked in collaboration with the Environmental Research Institute, Chulalongkorn University, to perform measurement of dust particles to compare and correlate the dust particle concentration between toll fee collection lanes by cash collection and those lanes by Easy Pass automatic toll fee collection in toll plazas. In time of equal traffic volume of 100 vehicles/hour, the result revealed that PM 10 dust particle level of automatic toll fee collection lanes turned out 5 percent less than those of toll fee cash collection lanes, and PM 2.5 dust particle level of automatic toll fee collection lanes turned out 12 percent less than those of toll fee cash collection lanes.

Energy Performance

Energy consumption within the organization of the EXAT (302-1)

According to fiscal year 2019, it is discovered that usage of electric power of EXAT has been increased 3.65 percent compared to 2018 usage. However, EXAT has initiated an efficiency of using electric power consumption by replaced 108 fluorescent T8 lighting fixtures with LED lighting fixtures to save electricity in its Headquarters. This operation saved 20,372.69 baht or 39.13 percent of electrical bill in the Headquarters. (302-4) Ration of energy intensity to EXAT income is 0.0083 joules per bath.





Emission Performance

According to the assessment of greenhouse gas emission of the EXAT in the assessment period from 1st October 2018 – 30th September 2019 within the Headquarters area, toll plaza and expressway control center buildings, the assessment shows the following overall result,



Greenhouse gas emission volume
(Headquarters, toll plaza and expressway control center buildings)
29,915.29 Ton of Carbon-dioxide equivalent (Ton CO_2e)

Table 17 The volume of greenhouse gas emission of the EXAT

Types of greenhouse gas	Fiscal year 2019, Ton CO_2e	percent	Fiscal year 2018, Ton CO_2e	percent
Greenhouse gas type 1 (305-1)				
Amount of diesel and benzene gasoline consumption and methane emission	4,548.80	15	4,505.92	16
Greenhouse gas type 2 (305-2)				
Electrical consumption	25,051.60	84	24,189.38	83
Greenhouse gas type 3 (305-3)				
Paper, water consumption	315.44	1	292.52	1
Total greenhouse gas	**29,915.29**	**100**	**28,987.82**	**100**

*** Remark: The Environmental Management Division, the Policy and Planning Department, referring to assessment method and EF. information from Thailand Greenhouse Gas Management Organization (Public Organization).

The EXAT remains consistent with its regular operations to control and take care of the environment around the expressway right-of-way in order to monitor environmental impacts occurring from the operations of the organization which may create possible impact on the society, by launching the study project to monitor and examine environmental impacts of the expressway within Bangkok Metropolitan and the surrounding areas, and performing measurement of environmental quality in toll plazas and office buildings of the EXAT, with performance result in line with the environmental standard. The organization has adopted the standard of environmental management system, ISO 14001: 2015 Standard to use for its operation on Sri Rat Expressway, Bang Na-At Narong Expressway, and Burapha Withi Expressway, with the environmental management system certified by the Office of Certification Body (OCB).(102-11, 102-12) Furthermore, in the fiscal year 2019, the EXAT has conducted its operation to monitor and test environmental quality for these 2 following projects,

1. Environmental quality measurement project in toll plaza and EXAT office building areas. For measure environmental quality and find appropriate guidelines for the prevention and solution to environmental impacts. The emission parameters to perform measurement consist of dust particle size smaller than 2.5 microns (PM 2.5) and dust particle size smaller than 10 microns (PM 10). Additionally, the study also makes comparison and correlation of dust particle level between toll fee collection lanes by cash collection and those lanes by Easy Pass automatic toll fee collection in toll plazas.

2. Study project to monitor and examine environmental impacts of the expressway right-of-way within Bangkok Metropolitan and surrounding areas. To monitor and examine environmental impacts and compliance with environmental impact reduction and prevention measure imposed by the Environmental Impact Assessment (EIA) for the expressway within EXAT responsibility. The emission parameters to perform measurement consist of Total Suspended Particulate (TSP), dust particle size smaller than 10 microns (PM 10) and dust particle size smaller than 2.5 microns (PM 2.5), Carbon-monoxide gas (CO), Nitrogen-dioxide gas (NO_2), Hydrogen-carbon gas (HC), Ozone gas (O_3), and Carbon-dioxide gas (CO_2), as well as vibration and noise level measurement. The EXAT then reports the performance result of its operations to Office of Natural Resources and Environmental policy and planning regularly every year.

Measurement of environmental quality, air, noise, vibration in expressway toll plaza areas

Toll plazas	Types of measurement		
	Air quality	Noise level	Vibration
Chalerm Maha Nakorn Expressway	✓	✓	✓
Chalong Rat Expressway	✓	✓	✓
Burapha Withi Expressway	✓	✓	✓
Bang Na - At Narong Expressway	✓	✓	No measurement
Kanchanaphisek Expressway (Bang Phli-Suksawat)	✓	✓	✓

Result of air quality measurement in the fiscal year 2019 from 13 stations along Chalerm Maha Nakorn Expressway, Chalong Rat Expressway, Burapha Withi Expressway, Bang Na - At Narong Expressway, and Kanchanaphisek Expressway (Bang Phli-Suksawat) showed that air quality in every measurement location remained within the level set by the standard.

Result of noise level measurement in the fiscal year 2019 from 17 stations along Chalerm Maha Nakorn Expressway, Chalong Rat Expressway, Burapha Withi Expressway, Bang na - At Narong Expressway, and Kanchanaphisek Expressway (Bang Phli-Suksawat) indicated that the noise level mostly did not exceed standard level according to the Notification of the National Environmental Board, except 1 station from Burapha

Withi Expressway where 24-hour average noise level ($L_{eq\ 24\ hr}$) exceeded the standard level, nonetheless, additional study showed that noise level in that area came from other sources rather than from the Burapha Withi Expressway.

Result of vibration measurement in the fiscal year 2019 from 10 stations along Chalerm Maha Nakorn Expressway, Chalong Rat Expressway, Burapha Withi Expressway, and Kanchanaphisek Expressway (Bang Phli-Suksawat) demonstrated level of vibration which individuals in general could feel, but vibration of this level is harmless to human health compared with standard vibration level according to the Notification of the National Environmental Board.

Operational Goal (103-2)

To solve emission problem especially dust particles as the major problem of the organization based on the goal set by the EXAT to reduce air pollution, the organization has conducted the study and formulated operation plan to monitor, solve and reduce dust particle, and the plan to reduce greenhouse gas emission of the EXAT by using the information from the past measurement results and the study and assessment results of Eco-Efficiency of the EXAT with the aforementioned study and formulated plan. In the early stage, the plan to prevent and reduce impact of dust particles consists of 3 following phases,

Urgent plan during crisis
(Focus on pollution reduction from its sources)

- Prepare special operation unit to extinguish fire in case of fire near expressway routes.
- Checkup exhaust gas and engine condition of EXAT vehicles.
- Clean and vacuum dust particles on expressway in both daytime and nighttime.
- Spray and wash traffic surface on shoulder of expressway.
- Wash and clean expressway areas.
- Install High Pressure Water spray system in toll plazas where impact from dust particles reaches level to be monitored.
- Improve landscape and take care of trees to increase efficiency to trap dust particles.
- Promote expressway users by Variable Message Signs (VMS) to have their vehicle condition checked up before use.

Short-term plan, 2-4 years
(Development of toll fee collection system and increase of green area)

- Develop toll gate barrier system.
- Develop Easy Pass system with trucks.
- Increase Easy Pass lanes and number of users.
- Install real-time environmental quality monitoring system.
- Increase green areas in toll plaza areas.
- Increase locations to install High Pressure Water spray system in toll plaza areas.

Long-term plan
(Adjustment and adaptation of toll fee collection system and development of operational performance)

In the fiscal year 2020, the EXAT started to install the Environmental Monitoring Online System to monitor dust particles accumulated in toll plaza areas and notify levels of impacts on human health to employees in order to have them put on protection during their work operations. The monitoring parameters to perform measurement consist of Total Suspended Particulate (TSP), dust particle size smaller than 10 microns (PM 10), and dust particle size smaller than 2.5 microns (PM 2.5). This system has been installed in 3 pilot toll plazas which are Chatu Chot toll plaza, Rama 4-1 toll plaza, and Bang Khun Thian toll plaza.

Moreover in the fiscal year 2020, the EXAT started to launch the study project to set guidelines to measure and assess Eco-efficiency in order to assess Eco-efficiency level in accordance with the ISO 14045 Standard, and use such information for the analysis to provide guidelines for the improvement of organizational efficiency, and for the potential development of EXAT personnel to prepare environmental inventory as well.

GRI Content Index (102-55)

For the Materiality Disclosures Service, GRI Services reviewed that the GRI content index is clearly presented and the references for Disclosures 102-40 to 102-49 align with appropriate sections in the body of the report. The service was performed on the English version of the report.

GRI Standard	Disclosures	Page Number	Omissions	Direct Answer	SDGs
GRI 101: Foundation 2016					
General Disclosures					
GRI 102: General Disclosures 2016	**Organizational Profile**				
	102-1 Name of the organization	3			
	102-2 Activities, brands, products, and services	3			
	102-3 Location of headquarters	28			
	102-4 Location of operations	3-4			
	102-5 Ownership and legal form	3			
	102-6 Markets served	3			
	102-7 Scale of the organization	3-4, 33			
	102-8 Information on employees and other workers	33			8,10
	102-9 Supply chain	56			
	102-10 Significant changes to the organization and its supply chain	-		No Significant Change	
	102-11 Precautionary Principle or approach	96			
	102-12 External initiatives	31,66,96			
	102-13 Membership of associations	-		No Significant Change	
	Strategy				
	102-14 Statement from senior decision-maker	1-2			
	Ethics and Integrity				
	102-16 Values, principles, standards, and norms of behavior	6,52			16

GRI Standard	Disclosures	Page Number	Omissions	Direct Answer	SDGs
	Governance				
	102-18 Governance structure	51			
	Stakeholder Engagement				
	102-40 List of stakeholder groups	19-25			
	102-41 Collective bargaining agreements	45			8
	102-42 Identifying and selecting stakeholders	18			
	102-43 Approach to stakeholder engagement	19-25			
	102-44 Key topics and concerns raised	19-25			
	Reporting practice				
	102-45 Entities included in the consolidated financial statements	-		No associated company	
	102-46 Defining report content and topic Boundaries	26,29-30			
	102-47 List of material topics	29-30			
	102-48 Restatements of information	-		No Significant Change	
	102-49 Changes in reporting	28			
	102-50 Reporting period	26			
	102-51 Date of most recent report	26			
	102-52 Reporting cycle	26			
	102-53 Contact point for questions regarding the report	28			
	102-54 Claims of reporting in accordance with the GRI Standards	26			
	102-55 GRI content index	100-106			
	102-56 External Assurance	-		No External Assurance	
Material Topice					
Economic Performance					
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundaries	7			
	103-2 The management approach and its components	7			
	103-3 Evaluation of the management approach	-			

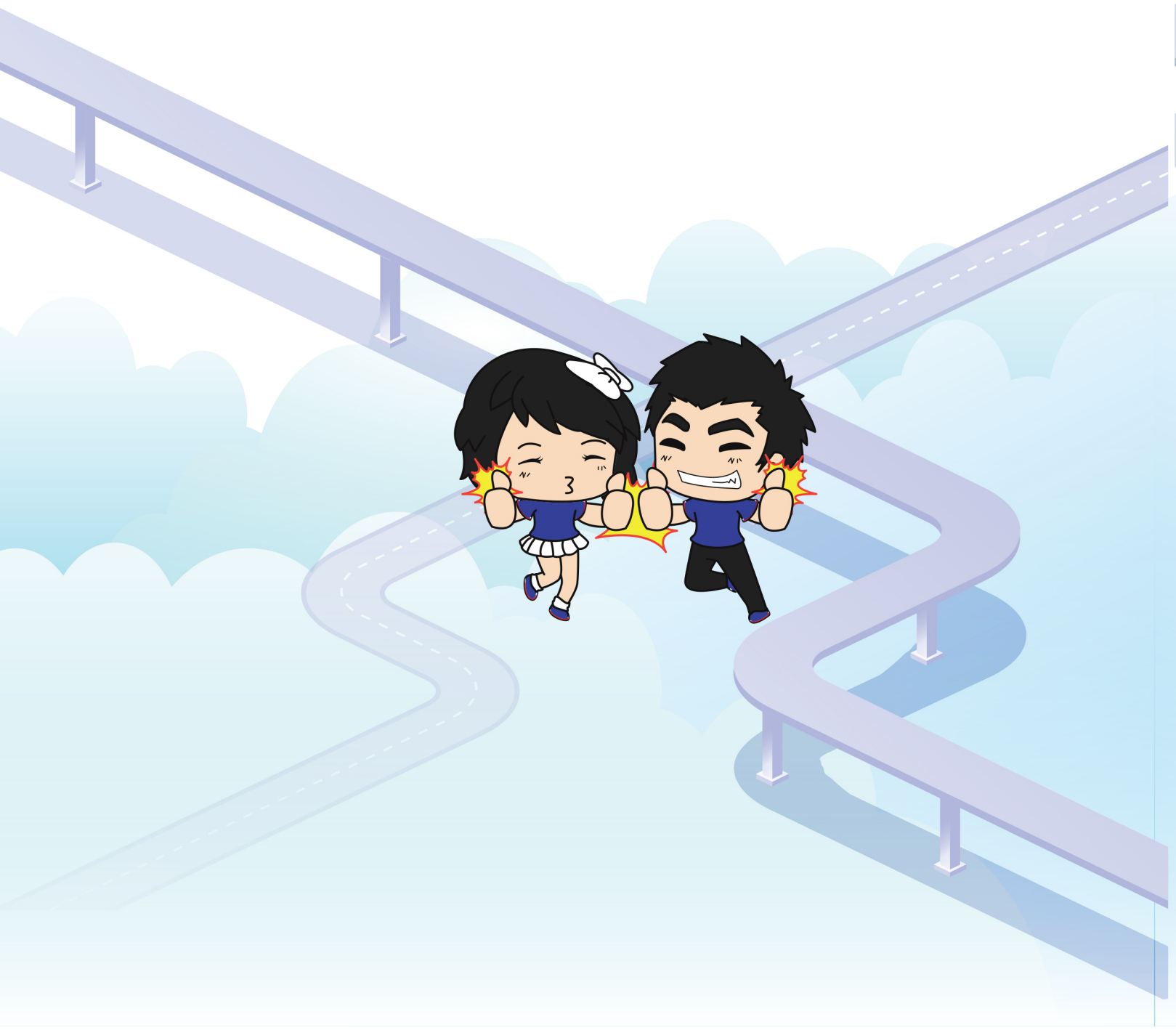
GRI Standard	Disclosures	Page Number	Omissions	Direct Answer	SDGs
GRI 201: Economic Performance 2016	201-1 Direct economic value generated and distributed	7			8,9
	201-3 Defined benefit plan obligations and other retirement plans	41			
Indirect Economic Impacts					
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundaries	85			
	103-2 The management approach and its components	85			
	103-3 Evaluation of the management approach	85			
GRI 203: Indirect Economic Impacts 2016	203-1 Infrastructure investments and services supported	85			9,11
	203-2 Significant indirect economic impacts	87-88			1,3,8
Anti-corruption					
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundaries	53			
	103-2 The management approach and its components	53			
	103-3 Evaluation of the management approach	-			
GRI 205: Anti-corruption 2016	205-1 Operations assessed for risks related to corruption	54			16
	205-3 Confirmed incidents of corruption and actions taken	55			16
Energy					
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundaries	93			
	103-2 The management approach and its components	93-94			
	103-3 Evaluation of the management approach	-			

GRI Standard	Disclosures	Page Number	Omissions	Direct Answer	SDGs
GRI 302: Energy 2016	302-1 Energy consumption within the organization	95			7,8,12,13
	302-3 Energy intensity	95			7,8,12,13
	302-4 Reduction of energy consumption	95			8,12,13
Emissions					
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundaries	93			
	103-2 The management approach and its components	93-94			
	103-3 Evaluation of the management approach	-			
GRI 203: Indirect Economic Impacts 2016	305-1 Direct (Scope 1) GHG emissions	96			12,13,14,15
	305-2 Energy indirect (Scope 2) GHG emissions	96			3,12,13,14,15
	305-3 Other indirect (Scope 3) GHG emissions	96			3,12,13,14,15
Environmental Compliance					
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundaries	90			
	103-2 The management approach and its components	90-91			
	103-3 Evaluation of the management approach	-			
GRI 307: Environmental Compliance 2016	307-1 Non-compliance with environmental laws and regulations	92			16
Occupational Health and Safety					
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundaries	43			
	103-2 The management approach and its components	43-44			
	103-3 Evaluation of the management approach	-			

GRI Standard	Disclosures	Page Number	Omissions	Direct Answer	SDGs
Occupational Health and Safety					
GRI 403: Occupational Health and Safety 2016	403-1 Workers representation in formal joint management–worker health and safety committees	44			8
	403-2 Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities	46			8
	403-3 Workers with high incidence or high risk of diseases related to their occupation	45			8
	403-4 Health and safety topics covered in formal agreements with trade unions	45			8,16
Training and Education					
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundaries	34			
	103-2 The management approach and its components	34-36			
	103-3 Evaluation of the management approach	-			
GRI 404: Training and Education 2016	404-1 Average hours of training per year per employee	39			4,5,8,10
	404-2 Programs for upgrading employee skills and transition assistance programs	37-38			8
	404-3 Percentage of employees receiving regular performance and career development reviews	39			
Local Communities					
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundaries	75,78			
	103-2 The management approach and its components	75-76 82-85			
	103-3 Evaluation of the management approach	-			

GRI Standard	Disclosures		Page Number	Omissions	Direct Answer	SDGs
Local Communities						
GRI 413: Local Communities 2016	413-1	Operations with local community engagement, impact assessments, and development programs	75-77			
	413-2	Operations with significant actual and potential negative impacts on local communities	75-77, 82			1,2
Customer Health and Safety						
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundaries	72			
	103-2	The management approach and its components	72-74			
	103-3	Evaluation of the management approach	-			
GRI 416: Customer Health and Safety 2016	416-1	Assessment of the health and safety impacts of product and service categories	72			
	416-2	Incidents of non-compliance concerning the health and safety impacts of products and services	72			16
Fair Evaluation						
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundaries	39			
	103-2	The management approach and its components	39			
	103-3	Evaluation of the management approach	-			
		Percentage of employees being evaluated for performance	39			

GRI Standard	Disclosures	Page Number	Omissions	Direct Answer	SDGs
Employee Satisfaction					
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundaries	42			
	103-2 The management approach and its components	42			
	103-3 Evaluation of the management approach	-			
	Employee satisfaction	42-43			
Expropriator and Customer Relations					
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundaries	59,75			
	103-2 The management approach and its components	64-67, 75-76			
	103-3 Evaluation of the management approach	-			
	Customer Satisfaction	65-66,71-72			
Impact of Traffic Congestion					
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundaries	61,78			
	103-2 The management approach and its components	61-64, 78-81			
	103-3 Evaluation of the management approach	61			
	Actions taken to alleviate traffic congestion	61-64, 78-81			
Land use Rights					
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundaries	75			
	103-2 The management approach and its components	82-85			
	103-3 Evaluation of the management approach	-			
	Number of expropriated	75			




Thank you

Opinion Survey of the Corporate Social Responsibility Report (CSR Report) Expressway Authority of Thailand (EXAT) 2019

1. Please specify your status in relation to EXAT

O Expressway customer
O Government sector as the owner
O EXAT officer
O Those affected by expropriation
O EXAT business partner
O Social
O Expressway surrounding community
O Other (please specify) .....

2. From which channel did you receive EXAT CSR Report 2019

O Social EXAT website
O Function meeting
O Seminar / Lecture
O Social Received from EXAT
O QR Code
O Other.....

3. Which aspects do you think are important for EXAT sustainable growth

O Economic (please specify.....)

O Social (please specify.....)

O Environment (please specify.....)

4. The level of your satisfaction with this CSR Report 2019

Completion of the content

O Very O Fairly O Low O Needs improvement

Key issues included in the report

O Very O Fairly O Low O Needs improvement

Interesting information

O Very O Fairly O Low O Needs improvement

Design of the report

O Very O Fairly O Low O Needs improvement

Writing style is easy to understand

O Very O Fairly O Low O Needs improvement

Overall satisfaction

O Very O Fairly O Low O Needs improvement

5. Do you think the key aspects important to EXAT sustainable growth have been completely specified in the report.

O Yes

O No (please specify the issues that should have been included.....)

6. Your suggestions for the improvement of next year's CSR report

.....

.....

This survey can be personally returned or sent by mail to

1. All EXAT toll plaza
2. EXAT One Stop Service, Head Office, Phaholyothin Road, Chatuchak
3. Good Governance Division, Office of Governor, The Expressway Authority of Thailand.
   2380, Phahonyothin Rd., Saenanikom Chatuchak District, Bangkok, 10900 Telephone: 0 2558 9800 Fax: 0 2940 1210

* * * We thank you for your kind attention and cooperation* * *



send

Corporate Social Responsibility Section,
Good Govermance Division, Office of the
Governor Expressway Authority of Thailand
2380 Paholyothin Road,
Senanikom, Chatuchak,
BANGKOK
10900


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2380 Phahonyothin Road, Saenanikom,
Chatuchak, Bangkok 10900
Tel. 0 2558 9800 Fax. 0 2561 2984
EXAT Call Center 1543
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Standard quick, correct, impressive and standard service

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CERTIFIED
ISO 14001:2015
Use saving resource, comply with rules, reduce accidents and care environment

The Expressway Authority of Thailand
ISO/IEC 27001:2013
Information security management system applied to data center (back office site) including physical and environmental control systems, network infrastructure systems and security infrastructure systems of Expressway Authority of Thailand (EXAT)