

# Sustainability Report 2017

รายงานความยั่งยืน 2560



# สารบัญ

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# Awards for Success

Thailand 5S Award 2017  
(Silver Award), 2nd Year  
Technology Promotion Association  
(Thai-Japan): TPA



Sustainability Report Award of 2017  
From the Thai Listed Companies  
Association



Green Industry Award,  
Level 4 Green Culture  
From the Ministry of Industry



Award Trophy and Certificate  
For Passing National Evaluations  
by Criteria of Disease-free Business Facilities  
For Physical and Mental Safety and Happiness  
At a Good Level  
From the Ministry of Public Health



Platinum Level Certificate  
Safety Standard System  
Preparation Project from TOSH



Trophy Award and Certificate  
Thai Chamber of Commerce Business  
Ethics Standard Test Award 2017  
From the Thai Chamber of Commerce  
and the Thai Chamber of  
Commerce Council



Corporate Carbon Footprint Certificate  
Certificate No: TGO CFO FY17-2-029  
From the Thailand Greenhouse  
Gas Management  
Organization (Public Organization)



# Message from the Leaders (G4-1)

## Mr. Poonphiphat Tantanasin, Chief Executive Officer

Thailand's economy in 2017 recovered from in 2016 with main driving factors from government investment to develop infrastructure and investments in mega projects. Growth in the manufacturing industrial sector slightly increased demand for electrical transformers. In the meantime, there are many distribution transformer manufacturers in the country and overseas. Thus, competitions using pricing strategies continue to be severe. Therefore, we used caution when bidding in domestic and overseas government sector and private sector projects under the best product standards and quality in order to offset losses from the previous year. This year is the first year in which we used our maximum production capacity of 4,162 transformers or 1,659,531 kVA as a result of improvements in employee capacity. In addition, we have modified the manufacturing process to be flexible with the most production development efficiency along with modifying work processes from sale to delivery according to total quality management principles (TQM) with consideration given to reducing impacts on the environment, communities and workers by building employee participation in work modifications with a significant influence on greenhouse gas management in 2017. Concerning investment in the energy business, the Company continually followed business strategies and gave importance to thorough risk management for the maximum benefit of stakeholders.

Because of employee resignations and work changes in significant positions during the previous year, we have made corrections and modifications to the system for fair payments and performance assessments in line with the organization's strategies to build satisfaction for every party, causing employee resignations to be lower than the previous year. However, employee life balance evaluations found moderate mean scores lower than outlined goals in order to create a strategy for building work-life balance according to goals. And in 2017, the Company reviewed anti-corruption practice guidelines to cover every dimension, subsidiary and joint venture in order to prepare for confirmation as a member of Thailand's Private Sector Collective Action Coalition against Corruption in 2018.

With regard to social participation and development, the Company continues to emphasize public sector participation in communities through activities, public association and community meetings with QTC. In 2017, we organized the 5Ss To the School Activity and supported income for disabled persons in the community according to recommendations from stakeholders in the community. And the Company continued good projects to benefit the general public and be a good social partner.

## Mr. Ruangchai Kritsnakriengkrai, Managing Director

Since 2012, we have continually researched and develop amorphous distribution transformers (AMDT) to increase energy conservation capacity and cut production costs to help customers access prices. In 2017, QTC received partial funding support from the National Innovation Agency (Public Organization) (NIA) to establish the first amorphous steel core production in Thailand. Operations have begun and are expected to be completed by early 2018. The Company will begin to promote sales by penetrating the high-end market with an emphasis on quality and maximum energy conservation to reflect our vision and obligation to be determined to develop environmentally-friendly products, processes and services along with adding value for stakeholders.

From economic views of the electrical transformer market in 2018, demand for electricity is expected to increase from government sector mega projects and investment promotion in every growing project or industry, all of which need transformer. This is a god opportunity for us to bid. In the meantime, however, there are risks from changes in government procurement policies to allow foreign manufacturers to bid, which may cause price competitions to be more severe. We have plans to support this risk with strategies to expand to foreign markets, particularly in the CLMV group with high

economic growth, and promote amorphous transformer sales to create new alternatives for customers. We are ready to deliver products with the best quality and environment protection value to customers domestically and overseas.

In closing, on behalf of the Board of Directors, executives and every employee, I would like to thank our shareholders, customers, trading partners, the general public in the community and all stakeholders who have always supported the Company. The Company promises to operate in line with our stated vision, obligations and sustainable development framework. Furthermore, we will dedicate ourselves to develop processes, tools, machinery and human capital to be ready for secure and sustainable entry into the era of Industry 4.0.



(Mr. Poonhiphat Tantanasin)  
Chief Executive Officer

(Mr. Ruangchai Kritsanakriengkrai)  
Managing Director





## About QTC (G4-17)

Business Information (G4-3)	: QTC Energy Public Co., Ltd.
Abbreviated Securities Name	: QTC
Registration Date	: 28 July 2011 (Securities Registration)
Registered Capital	: 429,240,725 Baht
Paid-up Capital	: 341,088,220 Baht
Industry Group	: Resources
Main Office (G4-5)	: 2/2 Soi Krungthep Kritha 8, Intersection 5, Krungthep Kritha Rd., Huamark, Bangkok, Bangkok, 10240, Tel. 02-379-3089-92, Fax. 02-379-3097
Manufacturing Factory	: 149, Moo. 2, Pluakdaeng-Huayprab, Mabyangporn, Pluak Daeng, Rayong, 21140, Tel. 03-889-1411-14, Fax 03-889-1420
Highest Ranking Executive	: Mr. Poonphiphat Tantanasin (Chief Executive Officer)
Main Business	: Operation in the business of manufacturing, distributing and providing maintenance services for transformers with capacity at 30-30,000 kVA in 1 phase and 3 phases and a voltage of no more than 36 KV. Transformers manufactured and distributed by the Company can be divided into the five following types (G4-PR3):

### 1. Distribution Transformer

Distribution transformers function to convert high voltage electricity from Metropolitan Electricity Authority or Provincial Electricity Authority distribution systems send along distribution lights at a voltage of no more than 36 KV to be lower at levels meeting power user needs such as industrial factories, residential homes and tall buildings, etc. Distribution transformers can be divided into the three following types:



**1.1 Hermetically Sealed Oil Type Distribution Transformer;**  
**Electric Power > 30 kVA < 4,000 kVA** – This type of transformer uses transformer oil as insulation for preventing short-circuits in the transformer and venting heat from wire coils in the transformer outside. The transformer's body is hermetically sealed to prevent air from coming into contact with oil in the transformer, giving this type of transformer excellent humidity protection properties, thereby preventing transformer oil from being easily degraded while also maintaining transformer oil insulation properties along with extending transformer maintenance time and expenses. This type of transformer is usually installed in the open.



**1.2 Open Type with Conservator; Electric Power > 30 kVA < 5,000 kVA** – This type of transformer is the original type of transformer and has been in use over a long period of time. Like hermetically sealed oil type transformers, this transformer uses transformer oil as insulation and coolant. However, open type transformers have a conservator installed to support transformer expansion during use with ducts to allow air to pass in and out. At the end of the duct is a bulb containing silica gel for absorbing humidity from the air before entering the transformer. This type of transformer require

## **2. Large Distribution Transformer (Electric Power > 5,000 kVA – 30,000 kVA with a voltage of no more than 36 KV)**



Large distribution transformers have high electric power capacity and use the same transformer oil as transformer oil in hermetically sealed oil type distribution transformers and open type transformers with conservators as insulation and a coolant. Large distribution transformers are specially designed for specific functions and customer needs. This type of transformer is suitable for major power users or power generators or distributors such as the Electricity Generating Authority of Thailand (EGAT) or solar energy producers, etc. This type of transformer is large and needs to be delivered with care. In some cases, transformer parts need to be disassembled during and reassembled for installation by an expert team at the installation site before delivery to customers.

## **3. Cast Resin Transformer**

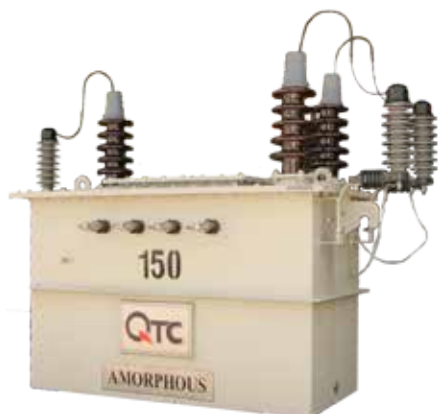


Dry type cast resin transformers are suitable for installation in buildings because dry type cast resin transformers do not use oil insulation. Cast high voltage wire coils are in epoxy resin insulation resistant to humidity, dust and the environment. Dry type cast resin transformers are used in projects such as tall buildings, residential buildings, condominiums, hospitals or shopping malls with limited space and need for transformers capable of being installed in a building. Furthermore, the Company invested in service goods and personnel readiness for customers in order to distribute cast resin transformers tested by international standards and create confidence among customers.



#### 4. Amorphous Distribution Transformer (AMDT)

Amorphous distribution transformers use amorphous raw materials to make transformer cores in place of silicon. Changes in raw materials have benefits including no load loss at only one-third the amount from silicon cores, enabling amorphous distribution transformer users to save on electricity costs. If amorphous distribution transformers replace many silicon core transformers, large amounts of electricity can be conserved at the national level with indirect effects on reducing global warming by reducing greenhouse gas emissions from electricity generation by power plants.



Amorphous Distribution Transformer  
By Metropolitan Electricity Authority Specs



Amorphous Distribution Transformer  
By Provincial Electricity Authority Specs

#### 5. Special Transformers

The Company designs and manufactures transformers according to functions and properties needed by customers such as earthing transformers, dry-type class F&H transformers, unit substation transformers and pad mounted transformers, etc.



Unit Substation



Earthing Transformer











Dry-Type Class F&H



Pad Mounted

## Services

The Company's services are 24-hour transformer-related services provided by teams of engineers and technicians with excellent knowledge, expertise and experience to support and facilitate customers who purchased QTC transformers and ordinary customers. In the case of QTC transformers, the Company provides emergency contact information on the side of every electrical transformer for customers. The following services related to transformers are provided by the Company for customers:


-  Transformer installation services.
-  Scheduled inspection and maintenance services.
-  Transformer repair and maintenance services.
-  Transformer oil filling and filtering services.
-  Transformer lease services.
-  Standard transformer testing services.
-  Transformer and electricity system consultation services.
-  Transformer tank manufacturing contracts.



Our expert service technician teams are ready to perform 24-hour service.

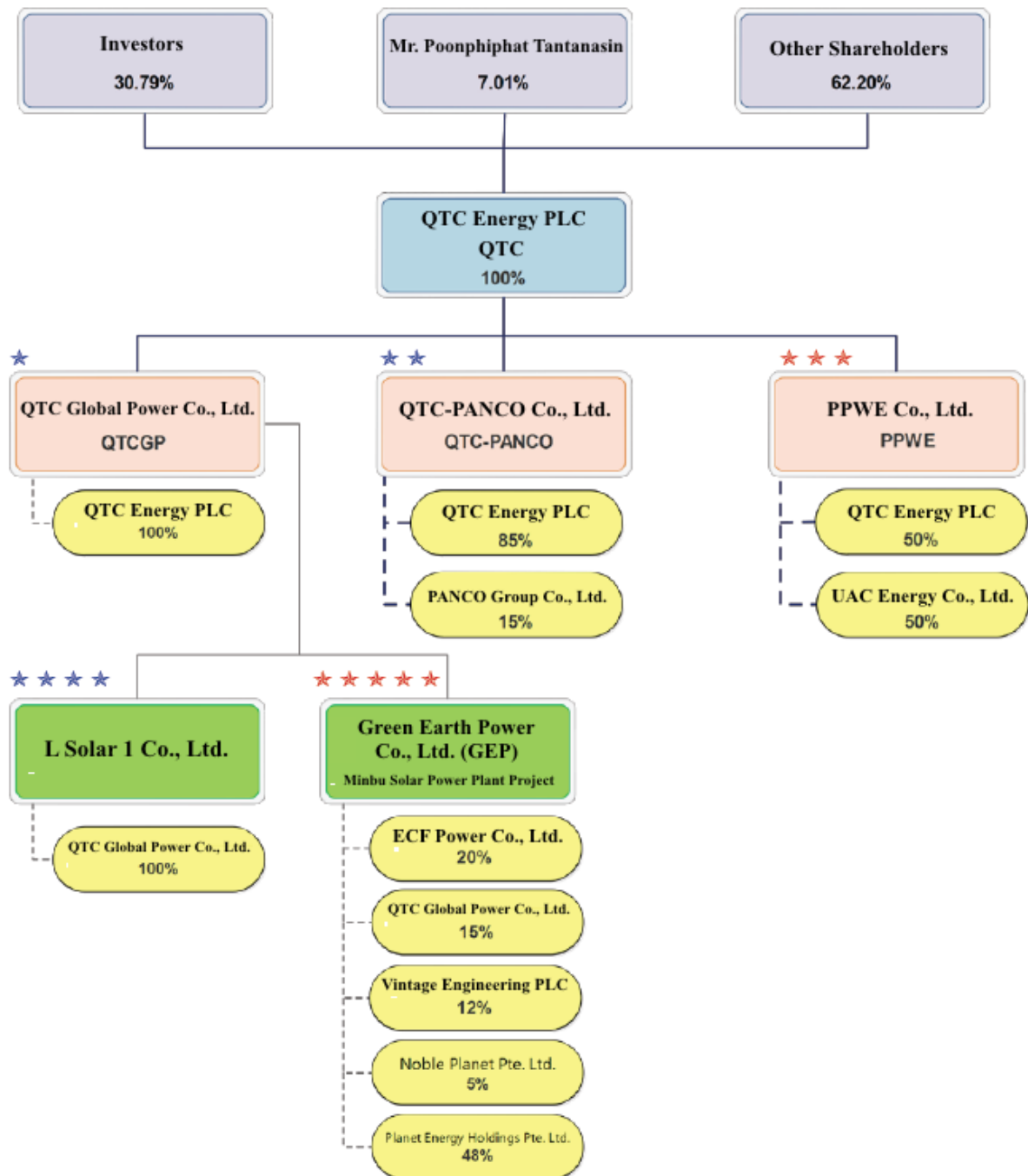


ISO/IEC17025 Standard Testing Laboratory

Target Market (G4-8) : QTC distributes its products under the  trademark. Domestic distributions are made to the government sector-state enterprises such as the Provincial Electricity Authority, the Metropolitan Electricity Authority, the Electricity Generating Authority of Thailand, etc., and the private sector such as users in industrial factories, power plants, hotels, condominiums and villages, etc. Overseas distributions are made to Australia, Japan, Panama and ASEAN member countries.

# Shareholding Structure (G4-6), (G4-7), G4-13)

Summary of Shareholding Structure as of 25 December 2017



Subsidiary and Joint Venture Information (★ = Subsidiary, ★ = Joint Venture)





QTC Global Power Co., Ltd. (QTCGP) is engaged in the electricity and other energy generation business. The company was founded on 28 September 2016 with registered capital of 140 million baht. QTC holds 100 percent of the company's shares.



L Solar 1 Co., Ltd. is engaged in the business of generating electricity from solar energy. The company was founded on 28 December 2009 with registered capital of 220 million baht. QTC Global Power holds 100 percent of shares on 20 September 2017.



Green Earth Power Co., Ltd. (GEP) is engaged in the business of generating electricity for distribution to the government sector and the private sector domestically and abroad. The company was founded on 30 April 1985 with registered capital of 25,755,800 baht.

QTC Global Power Co., Ltd. (QTCGP) holds 15 percent of shares on 15 June 2017 to invest in the business of the 220-megawatt Minbu Solar Power Plant in the Union of Myanmar (Burma). In addition, ECF Power Co., Ltd. holds 20 percent of shares, Vintage Engineering Public Co., Ltd. holds 15 percent of shares, Noble Planet Pte. Ltd. (Singaporean nationality) holds 5 percent of shares and Planet Energy Holdings Pte. Ltd. (Singaporean nationality) holds 48 percent of shares.



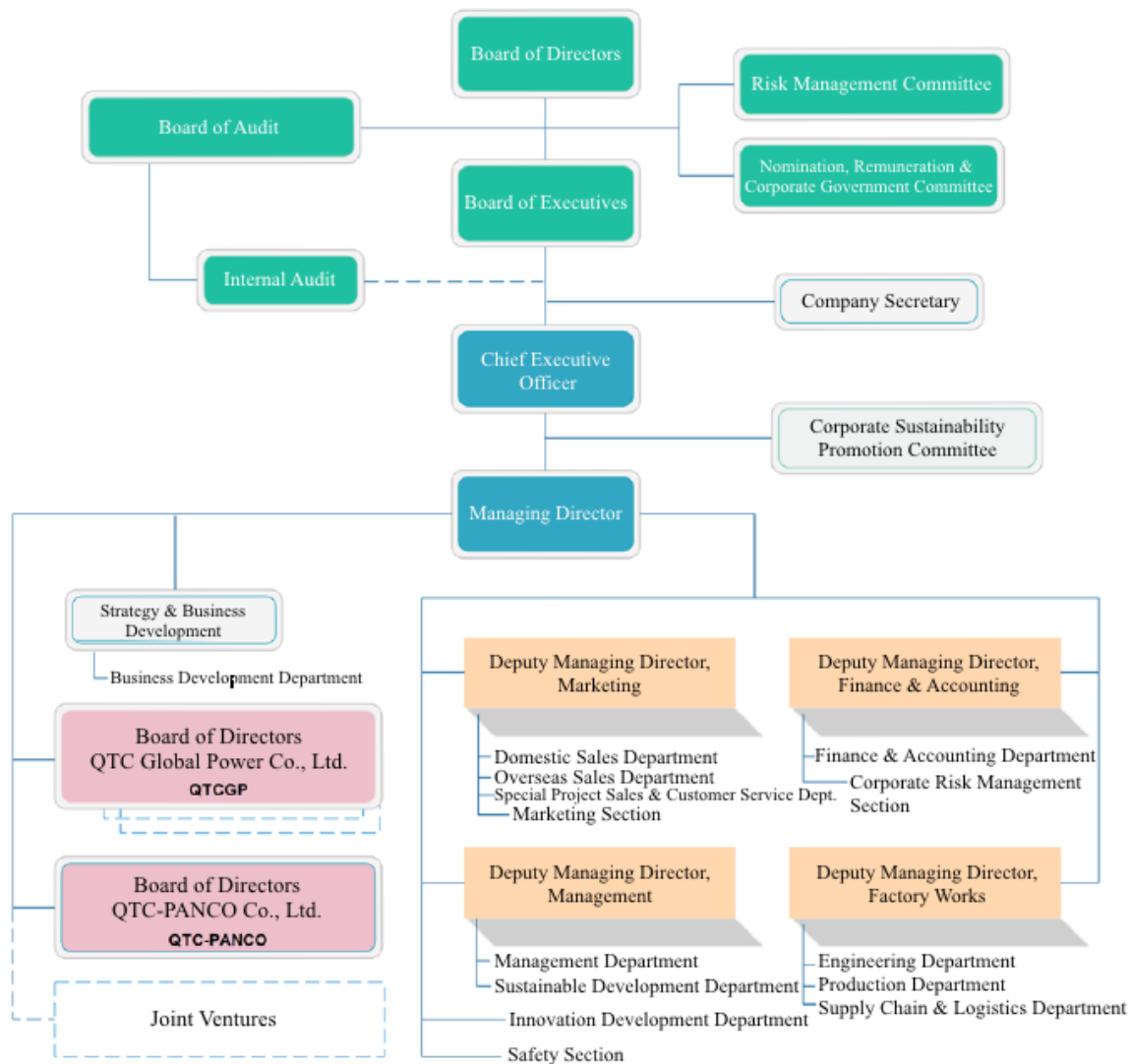
QTC-PANCO Co., Ltd. is engaged in the electrical transformer manufacturing and distribution business in Laos. The company was founded on 19 March 2015 with registered capital of 20 million baht. QTC holds 85 percent of shares and PANCO Group Co., Ltd. holds 15 percent.



PPWE Co., Ltd. operates an energy business. The company was founded on 12 January 2016 with registered capital of one million baht. QTC holds 50% of the company shares, and UAC Energy Co., Ltd. holds 50 percent of shares.

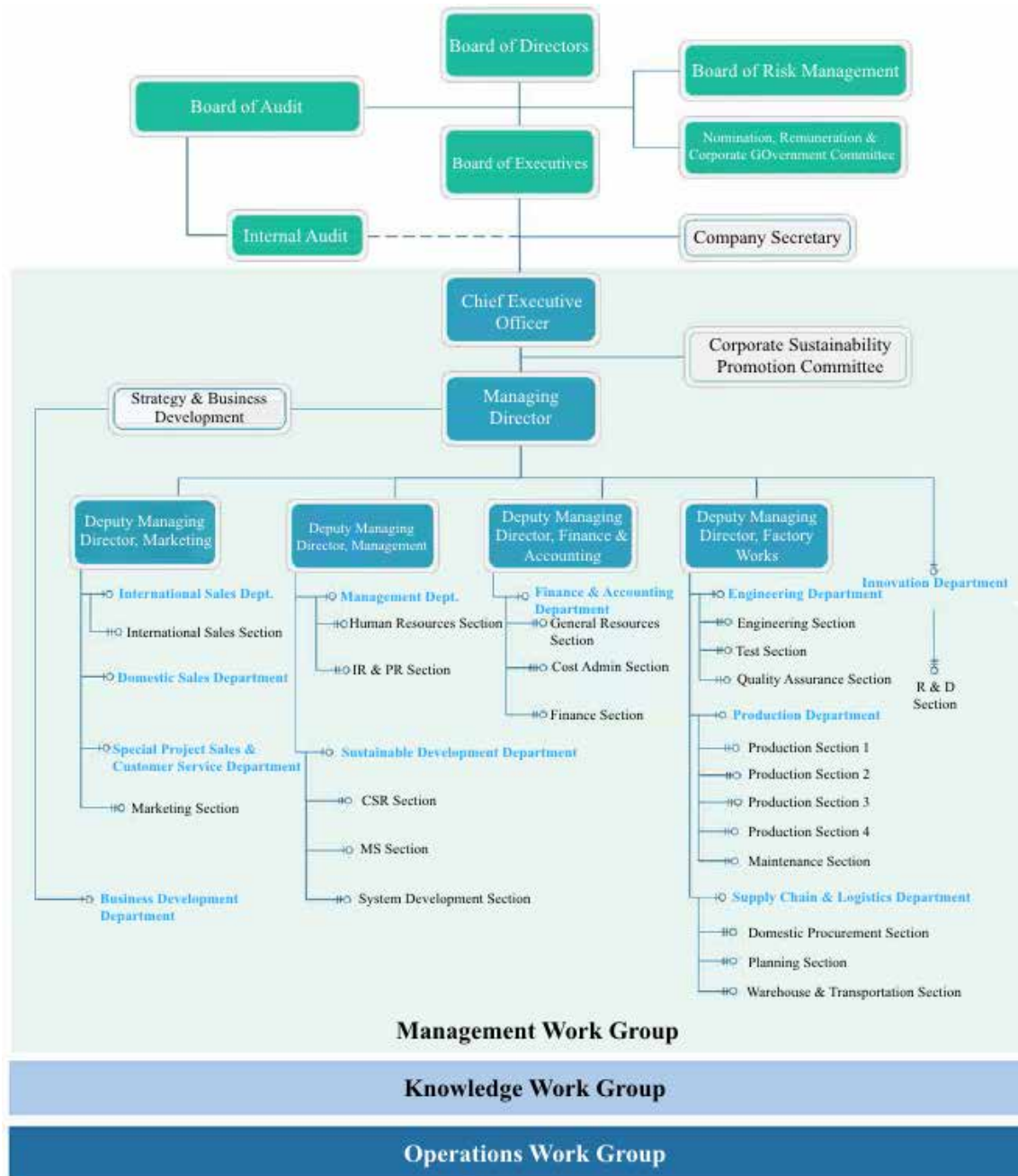
This report presents information about the sustainability performance of QTC Energy PCL not including every subsidiary or joint venture.

## Regulation Structure (G4-34) ,(G4-35) ,(G4-38)



- The Chairman of the Board is an independent director and separate from the Chief Executive Officer.
- The Board of Audit is composed of independent directors who assess the Internal Audit Team's performance and considers changing the Internal Audit Team.
- The Nomination, Remuneration & Corporate Government Committee appoint and transfer high-ranking executives in addition to assessing high-ranking executives' performance.
- The Corporate Risk Management Committee assesses the organization's economic, social, environmental and ethical risks along with preparing guidelines for preventing that risk. The Corporate Risk Management Committee reports to the Company's Board of Directors.
- The Corporate Sustainability Promotion Committee governs performance according to sustainable development policies by covering issues in the sustainability management framework and expanding results to subsidiaries. The Corporate Sustainability Promotion Committee reports to the Board of Executives.

## Corporate Structure: Only QTC Energy PLC (G4-9), (G4-LA12)



At the end of 2017, the Company had a total of 209 employees divided into:

- Management Work Group: 25 employees or 12 percent of all employees.
- Knowledge Work Group: 102 employees or 49 percent of all employees.
- Operations Work Group: 82 employees or 39 percent of all employees.



## Vision

“To be a technology provider with world-class standards in the power industry along with social and environmental responsibilities and good governance.”

## Mission

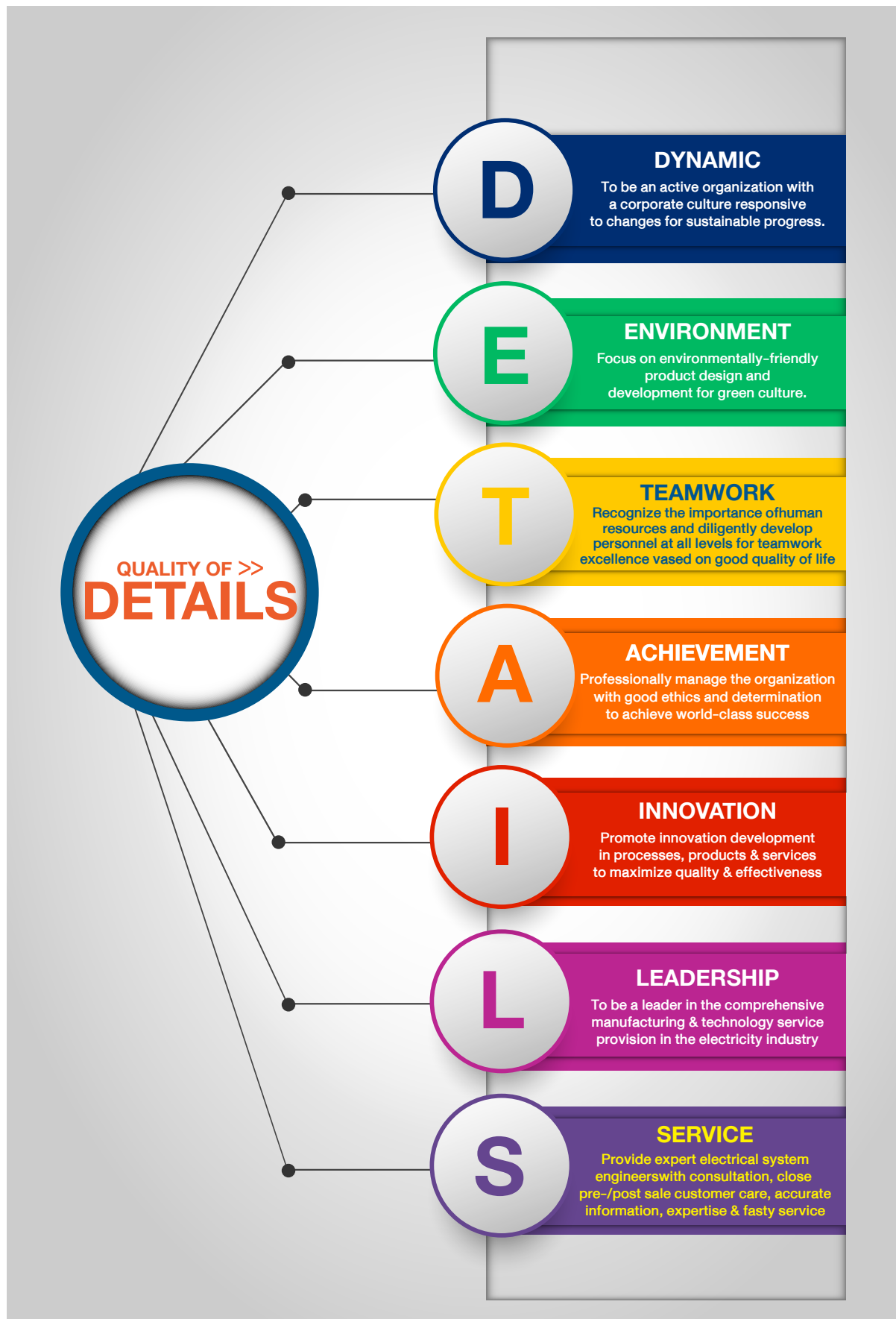
1. Providing integrated technology solutions for businesses in the power industry.
2. Developing environmentally-friendly products, services and internal processes to create added value in the value chain.
3. Developing human resources to enhance professional capabilities in both hard and soft skills.
4. Operating in governance along with corporate social responsibility.
5. Building long-term, sustainable growth in businesses to gain the trust of all stakeholders.

## Management Principles

1. Ethical, just and transparent management.
2. Product and service provision meeting international quality standards.
3. Focus on corporate social and environmental responsibility in strict compliance with human rights principles.



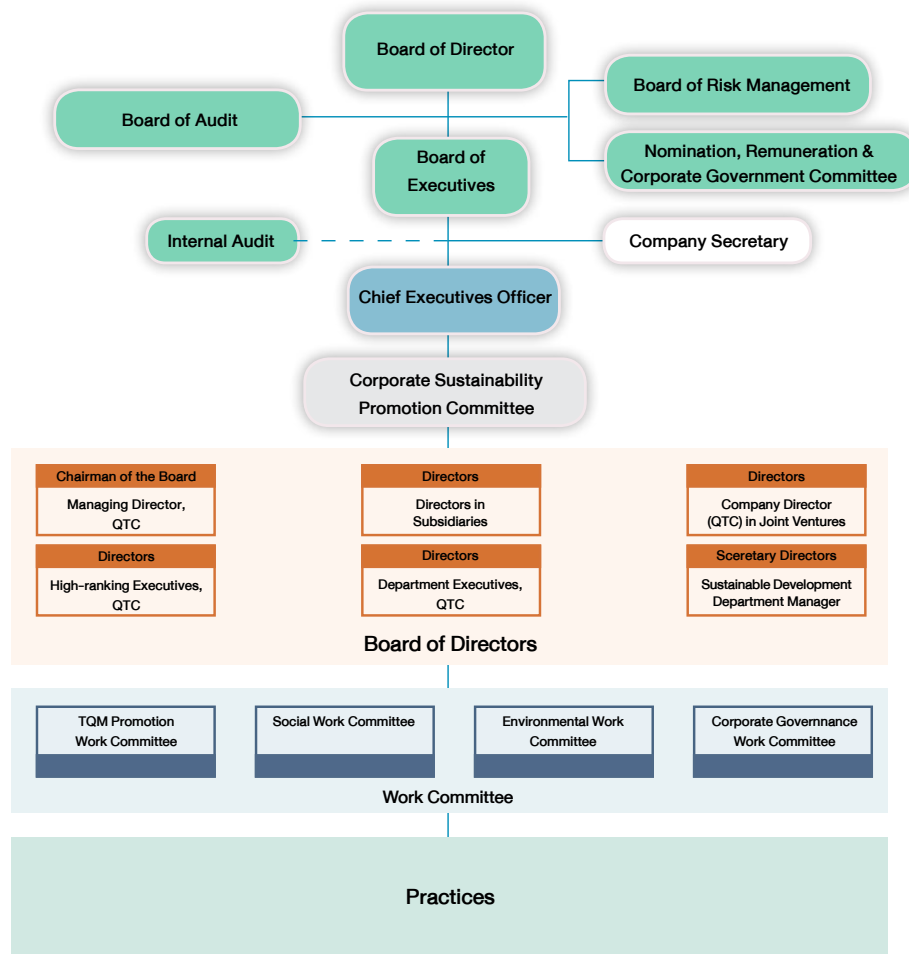
# Corporate Values for Sustainability



## QTC & Sustainability (G4-36)

The company has established the Corporate Sustainability Promotion Committee composed of department managers of various work sections. The Committee is authorized to monitor performance in line with policies and promote activities corresponding with the sustainable management framework and the sustainability equation, “Q+R=S”, with the Sustainable Development Department as the key steering organization.

### Corporate Sustainability Management Structure

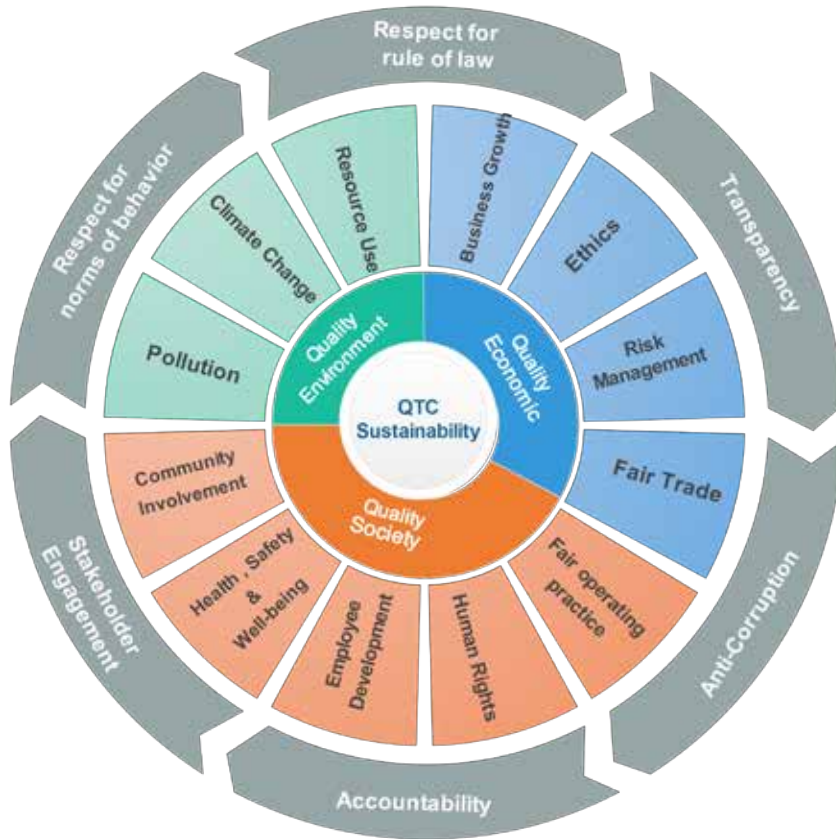


### Roles and Duties of the Corporate Sustainability Promotion Committee

- Set policies and objectives for sustainable development.
- Listen to recommendations from stakeholders through various channels such as ordinary shareholder meetings, public discussion stages, QTC-community meetings, customer complaints and complaints from other stakeholders, specifications, customer agreements, relevant laws, etc.
- Consider sustainable development issues to set development guidelines in concurrence with issues and proper care of stakeholders.
- Assign sustainable development work responsibilities to work committees and related work areas to implement structured activities.
- Monitor and test performance by topics of sustainability.
- Review policies, objectives and sustainability issues to remain current and appropriate for situations.



## QTC Sustainability Framework



Stability  
Prosperity  
Sustainability

People  
Processes  
Equipment and Machinery  
Products and Services

Develop good people who are responsible for self and others in addition to taking responsibility for subsequent processes, avoiding environmental impacts and ensuring safety for operators, energy-conservation and responsibility for products and services.

People  
Processes  
Equipment and Machinery  
Products and Services

Develop good, capable people, revise/develop work processes for the entire organization to create flexibility, revise/develop equipment and machinery to maximize effectiveness and create products and services with the highest quality.

## Sustainable Development Policies

“Quality of Details” forms an important foundation that will lead the company and other companies within the group toward sustainable growth. This means management that prioritizes creating quality in three aspects to establish balance, namely, economic, social and environmental balance based on international practices. The practice guidelines for implementation are as follows:

1. Conduct business honestly and fairly in compliance with the law and trade specifications while promoting clarity and transparency in corporate management to concur with international principles. In addition, support anti-corruption and prevent unlawful gain-seeking while exercising authority to create the greatest fair benefits for stakeholders.
2. Promote practices under human rights principles with awareness about the human dignity, rights, freedom and equality of individuals as protected by the Constitution of the Kingdom of Thailand and related international laws. In addition, respect the local traditions where the company or another company within the group is located.
3. Endeavor to improve and develop work procedures and services with the value chain based on Total Quality Management principles (TQM) to promote quality attitudes for personnel within the organization and added value for customers in addition to promoting long-term growth.
4. Encourage effective utilization of resources, which includes reduction and control of social and environmental impacts resulting from the company's operations, the operations of other companies in the group and related trade partners.
5. Pay attention to and place emphasis on the occupational and environmental health and safety of employees, trade partners and contacts to prevent loss of life and property, including work-related injury or sickness.
6. Manage personnel fairly and give importance to labor skill development in addition to promoting work happiness for effective steering of the organization.
7. Promote and create innovation with responsibility to society and the environment to increase effectiveness and efficiency with added value for the organization and stakeholders.
8. Create sustainable benefits for communities and society. Also support and engage in activities for public gain while promoting employees to have a good conscience for the public and performing good deeds for society.
9. Maintain firm commitment to managing risks in all areas in line with international standards to increase opportunities for success and to minimize the chances of failure and loss.

The activities under the sustainable development policies contain indices for monitoring and evaluating the effectiveness of the company's activities and activities of other companies in the group socially, economically and environmentally. They provide essential information for continuously and sustainably setting the corporation's development direction. Furthermore, the company is confident that the aforementioned policies will be effectively, extensively monitored and implemented by employees and executives on every level within the company and other companies in the group.

# Main Strategies for Sustainable Development

With the organization's vision to be a "world-class" leader and the corporate culture emphasizing "quality of details", combined with sustainable development policies, the company has set in place its main strategies for conducting business through risk management and impact assessment for stakeholders in all areas. Furthermore, indicators have been set for monitoring and evaluating economic, social and environmental work effectiveness leading to the objective of extensive implementation by executives and employees under QTC's sustainability equation of Quality + Responsibility = Sustainability". The key strategies are as follows:

## Economic Strategies

### Increase Competitive Potential with "Quality" + "Responsible" Products and Services

The company has set its business growth objectives to create sustainable value for all stakeholders and applies the Total Quality Management (TQM) system continually, which is now in its fourth phase, covering all work processes and the entire value chain to create innovations in processes as competitive advantages and increase value for customers while reducing socio-environmental impact.



### Expand the Business to Other Investments to Increase Income and Build Financial Strength

The Company has strategic plans to build security or the organization by expanding investments in energy businesses or other businesses with responsibility to society and the environment with a focus on cost-effective long-term returns for the organization and stakeholders in order to increase income and build financial strength. The Company specified risk analysis processes and prepared risk management plans according to standards.





## Environmental Strategies

### Green Culture

The Company emphasizes development to improve employees' thoughts and actions to create outcomes capable of mitigating environmental impacts as much as possible with coverage of life cycle business processes in line with ISO14001 standards, energy conservation according to ISO50001 standards, product innovation development to reduce environmental impacts, promotion of onsite modifications to reduce the organization's overall greenhouse gas emissions and build awareness of individual responsibility to the environment to create a green culture.

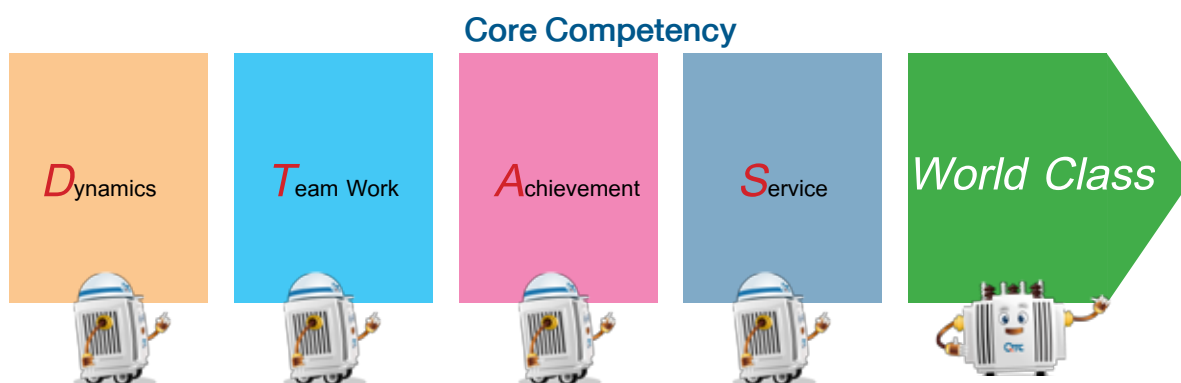


Turn off water and electricity after using. Modify-repair equipment when damaged. Change work methods to be balanced. Open your heart to conserve energy and the environment.

## Social Strategies

### Develop “People” in All Areas to Create “Skilled” + “Good” People

The company has set the organization's core competency based on corporate developmental guidelines and vision for use in setting the qualifications required for all people inside the organization as a foundation. Furthermore, capabilities for each work position have been set clearly to provide guidelines for developing employee work skills. Additionally, courses have been created for emotional and behavioral development in addition to strict enforcement of rules, regulations requirements and relevant laws to turn these people into capable workers and good people in society to create valuable work and coexist happily.



## Creating Safety Culture

The company gives importance to the occupational safety of employees and all stakeholders with emphasis on upgrading safety management with the objective of achieving zero accidents and a safety culture.



## Creating Work Life Balance

The company is well aware that happy employees in work and personal lives promote good living and good health, which influence and play a part in achieving success, security and career advancement for employees, the organization and society. Therefore, the company has created work mechanisms to achieve work – life balance for people within the organization with the main objective of creating sustainable happiness and sharing happiness with society in general.



## Building Trust in Stakeholders

The company treats stakeholders fairly and adheres to good governance principles while paying attention to potential impacts from its processes by adhering to the following practices:

- Listening to the opinions of stakeholders inside and outside the organization through meetings, the Safety Committee, the Welfare Committee, community discussions and annual meetings with QTC, comments and suggestion boxes, etc. for application to the creation of mutual benefits.
- Promoting indirect social investments with allies operating in businesses for society.
- Participating with communities in different areas of development for public benefit according to the organization's expertise and ability.
- Disclosing information about practices, business activities, environmental management, human resources development, etc. transparently and verifiably through its annual reports, sustainability reports, discussion forums, websites, etc.

# Stakeholders

## Identification of Stakeholders in the Value Chain and Impacts

The Corporate Sustainability Promotion Committee reviews impacts in the process throughout the entire value chain once in each year to identify stakeholders and significant issues through processes to identify work hazards and environmental impact assessment from work and products in a life cycle manner using participatory evaluation methods involving employees at all levels.

In addition to the internal evaluation of the organization, the Company has also created a forum for discussion in which communities can meet QTC once annually to hear out recommendations. Furthermore, the Company gives consideration to proposals from stakeholders through other channels such as general meetings of shareholders, expressions of opinion on webpages, etc., in order to use information in order to identify sustainability issues and specify stakeholders with the organization using criteria for considering all stakeholders in the QTC value chain (G4-2), (G4-12), (G4-26), (G4-HR9).

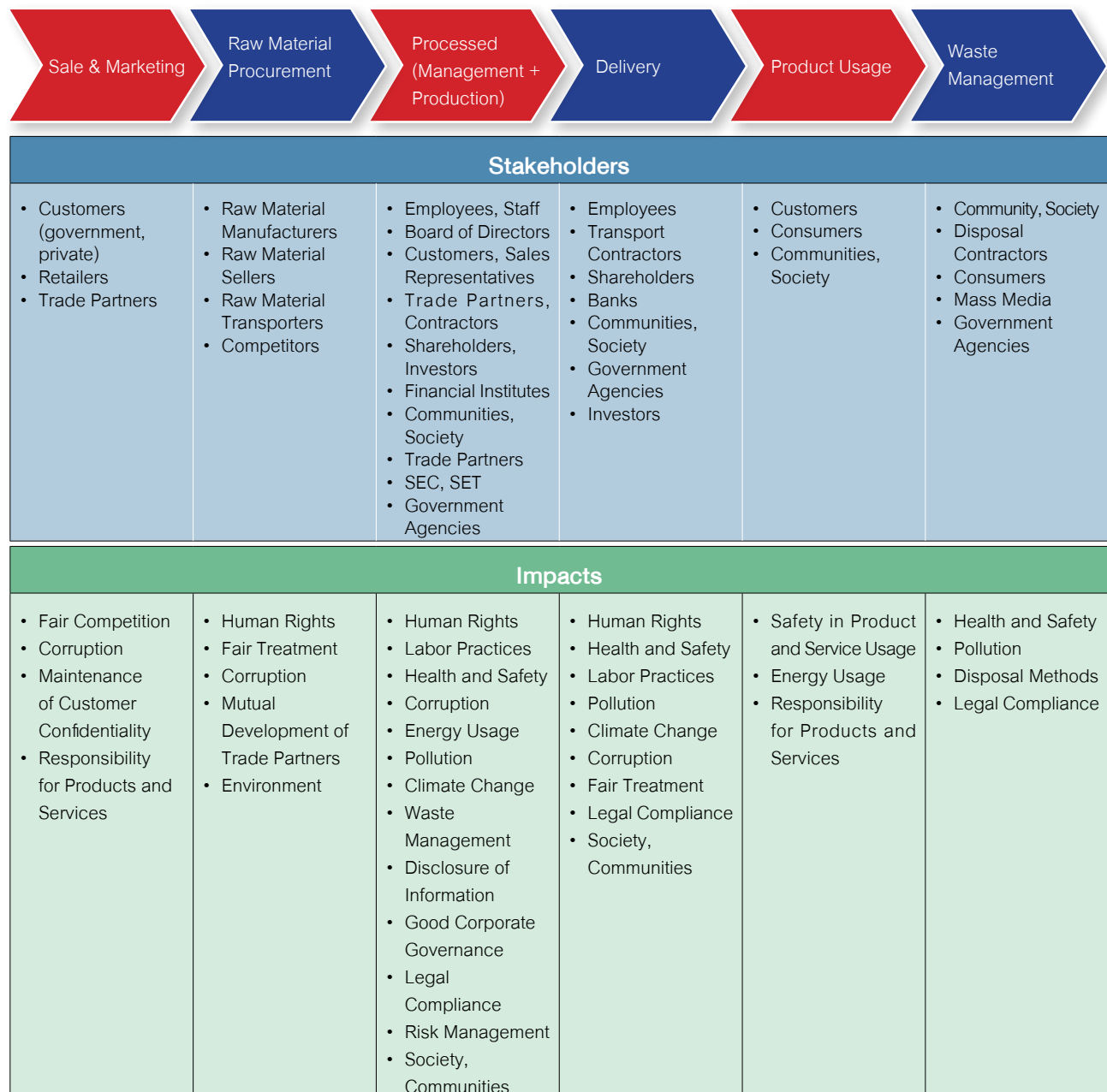


Chart Illustrating Indications during Production, Delivery and Post-Sale Services

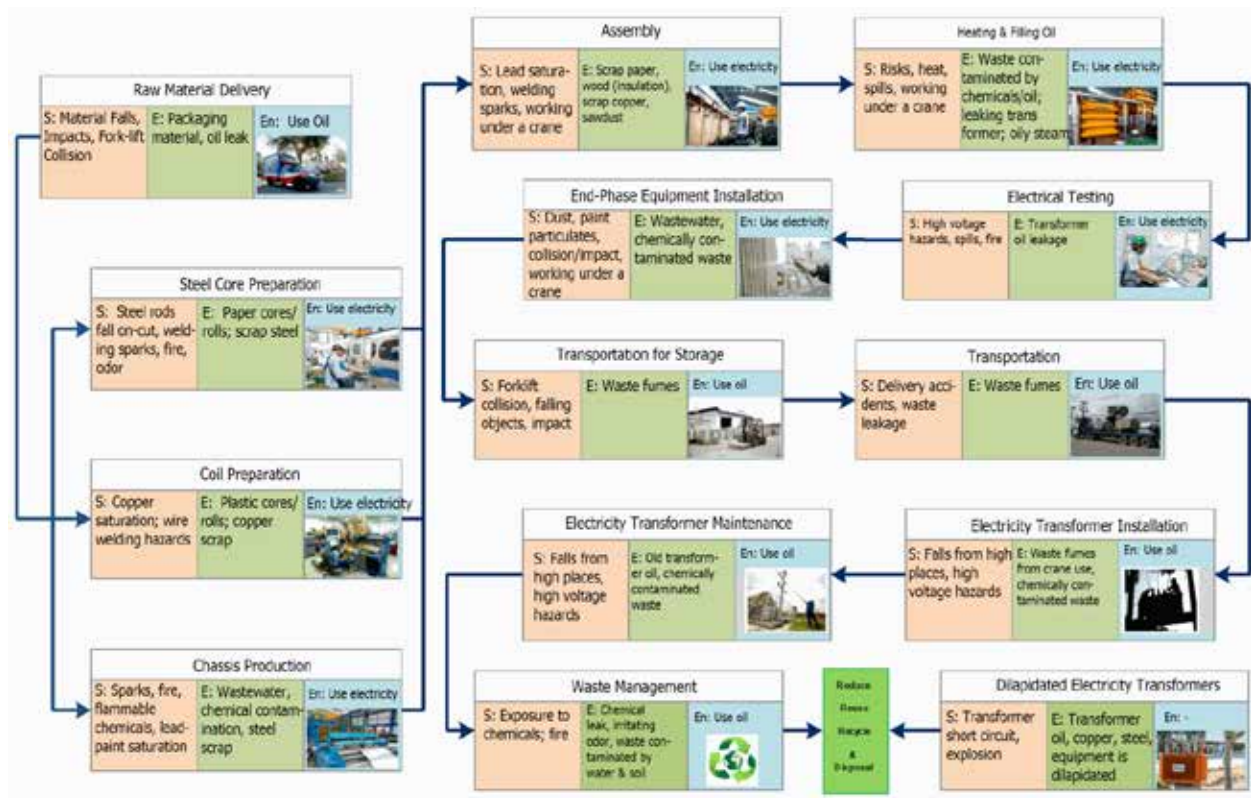
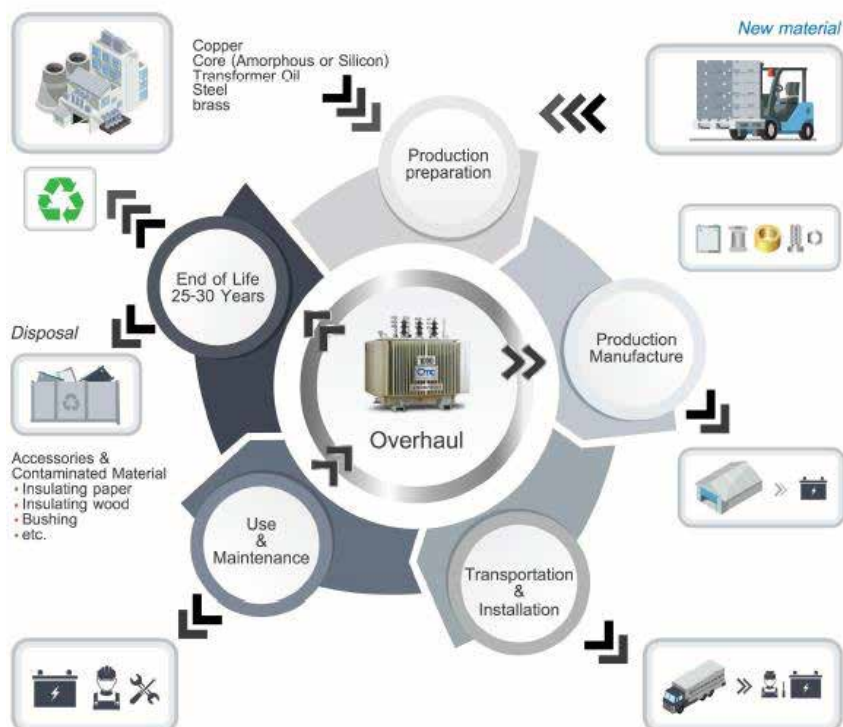


Illustration of QTC Transformer Product Life Cycle

















# Stakeholder Connection

Once stakeholders and their issues of interest have been identified in addition to their expectations, the Company will consider specifying communication and response methods in meeting the expectations of all groups of stakeholders.

## Working with Stakeholders

Stakeholders (G4-24)		Expectation Survey Methods (G4-26)	Expectations (G4-27)	The Organization's Response
<b>Employees</b> 	<b>Regular Employees</b>	<ul style="list-style-type: none"> <li>Monthly meeting of executives and employees.</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate salary raises.</li> <li>Appropriate welfare.</li> <li>Work safety.</li> </ul>	<ul style="list-style-type: none"> <li>Safety management pursuant to OHSAS18001.</li> </ul>
	<b>Temporary Employees</b>	<ul style="list-style-type: none"> <li>Suggestion activities, KAIZEN, QCC.</li> </ul>	<ul style="list-style-type: none"> <li>Inviting work environment.</li> <li>Equality and opportunities for advancements.</li> </ul>	<ul style="list-style-type: none"> <li>Environmental management pursuant to ISO14001.</li> <li>Provident Fund.</li> </ul>
	<b>Sub-contract Employees (Foreigners)</b>	<ul style="list-style-type: none"> <li>Listening to employee opinions and complaints.</li> <li>The Welfare Committee.</li> <li>The Safety Committee.</li> <li>Employee happiness survey.</li> <li>Corporate love and attachment survey.</li> <li>Risk assessment.</li> <li>Environmental impact assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Plans for skill and knowledge training.</li> <li>Good living.</li> </ul>	<ul style="list-style-type: none"> <li>Strictly adhere to rights policies and employment policies.</li> <li>Health promoting workplace project.</li> <li>Organizational health for sustainable happiness project.</li> <li>Modify wage payment and performance assessment systems.</li> <li>Modify career path development system.</li> </ul>
<b>Board of Directors</b> 	<b>Company Directors</b>	<ul style="list-style-type: none"> <li>Board of Directors' meetings.</li> <li>Board of Audit meetings.</li> <li>Nomination Committee meetings.</li> </ul>	<ul style="list-style-type: none"> <li>Correct compliance to laws and ethical principles.</li> <li>Transparency and accountability.</li> <li>Business success.</li> </ul>	<ul style="list-style-type: none"> <li>Good business governance in compliance with policies and strict enforcement.</li> <li>Report performance.</li> </ul>
<b>Shareholders/ Investors</b>  	<b>Shareholders Investors Analysts</b>	<ul style="list-style-type: none"> <li>Annual meetings of shareholders.</li> <li>Quarterly performance announcements.</li> <li>Financial analysts' meetings.</li> <li>Registered companies meet investors.</li> <li>Invitations for investors to observe production processes.</li> </ul>	<ul style="list-style-type: none"> <li>Good wages.</li> <li>Good governance over activities.</li> <li>Stable business and continuous growth.</li> <li>Correct, complete and up-to-date company information.</li> <li>Good risk management system.</li> <li>Good audit and control system.</li> </ul>	<ul style="list-style-type: none"> <li>Transparent, fair and accountable business governance.</li> <li>Appropriate dividend payment.</li> <li>Transparent disclosure of information.</li> <li>Strategic business plan preparation.</li> <li>Thorough risk management.</li> </ul>

Stakeholders (G4-24)		Expectation Survey Methods (G4-26)	Expectations (G4-27)	The Organization's Response
 Customers	Government Customers	<ul style="list-style-type: none"> <li>Meet-ups with customers/retailers.</li> </ul>	<ul style="list-style-type: none"> <li>Receive accurate technical product and service information.</li> </ul>	<ul style="list-style-type: none"> <li>Good corporate governance that is transparent and verifiable.</li> </ul>
	Private Customers	<ul style="list-style-type: none"> <li>Product exhibitions.</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate product and service prices.</li> </ul>	<ul style="list-style-type: none"> <li>Anti-corruption policies and promotion of quality management pursuant to ISO9001.</li> </ul>
	Foreign Customers	<ul style="list-style-type: none"> <li>Customer/retailer satisfaction surveys.</li> </ul>	<ul style="list-style-type: none"> <li>Transparent price competition.</li> </ul>	<ul style="list-style-type: none"> <li>Total Quality Management to improve product and service processes.</li> </ul>
	Domestic Retailers	<ul style="list-style-type: none"> <li>Technical knowledge provision to customers/retailers.</li> </ul>	<ul style="list-style-type: none"> <li>Receive quality products and services.</li> </ul>	<ul style="list-style-type: none"> <li>CRM system.</li> </ul>
	Foreign Retailers	<ul style="list-style-type: none"> <li>Opportunities for customers/retailers to observe production processes.</li> <li>Joint activities with customers/retailers.</li> </ul>	<ul style="list-style-type: none"> <li>Fair compliance of agreements.</li> <li>Option to choose energy-conserving products.</li> <li>Warranty for products and services.</li> <li>Customer confidentiality preservation.</li> </ul>	<ul style="list-style-type: none"> <li>Ethics in maintaining customer confidentiality.</li> <li>Product certification pursuant to laboratory standard ISO17025.</li> <li>Development of energy-conserving products by R&amp;D team.</li> <li>Visits to observe production processes.</li> </ul>
 Trade Partners	Deliverers Contractors	<ul style="list-style-type: none"> <li>Annual deliverer and contractor evaluations.</li> <li>Production process, product quality inspection and discussions for improvement.</li> </ul>	<ul style="list-style-type: none"> <li>Receive accurate information quickly and according to conditions and schedule.</li> <li>Fair compliance to agreements and payment terms.</li> <li>Fair and transparent price competition.</li> <li>Knowledge provision and raw material production process</li> </ul>	<ul style="list-style-type: none"> <li>Specify clear procurement policies without preferential treatment.</li> <li>Development of trade partners through recommendations, knowledge provision, understanding about developing raw materials to be better than standard specifications.</li> <li>Have anti-corruption policies and promote practice.</li> </ul>
 Trade Competitors	Competitors	<ul style="list-style-type: none"> <li>Meetings and conversations.</li> <li>News and information.</li> <li>Group member meetings.</li> <li>Marketing activities.</li> </ul>	<ul style="list-style-type: none"> <li>Fair and transparent trade competition.</li> <li>Exchanges of information about products, raw material sources and tools and machinery used in production.</li> </ul>	<ul style="list-style-type: none"> <li>Compliance to ethics principles to operate business fairly and transparently.</li> </ul>
 Waste Disposers	Waste Disposers  Waste Processors	<ul style="list-style-type: none"> <li>Exchanges of knowledge about legal specifications and correct practices.</li> </ul>	<ul style="list-style-type: none"> <li>Strict compliance to agreements.</li> <li>Correct actions pursuant to the law.</li> </ul>	<ul style="list-style-type: none"> <li>Monitor and inspect actions of disposers.</li> <li>Evaluate waste disposers' performance.</li> </ul>

Stakeholders (G4-24)		Expectation Survey Methods (G4-26)	Expectations (G4-27)	The Organization's Response
 Community and Society	Communities Around the Factory	<ul style="list-style-type: none"> <li>Organizing activities with communities/society.</li> <li>Participation on community and social development.</li> <li>Annual public hearing activities where communities meet with QTC.</li> <li>News and information.</li> </ul>	<ul style="list-style-type: none"> <li>Friendliness to one another.</li> <li>Support for community activities.</li> <li>Support for products made by disabled persons in the community.</li> <li>Support for activities in social businesses.</li> <li>No negative safety and environmental impacts on communities and society.</li> <li>Transparency in operations.</li> <li>Compliance with human rights and anti-corruption principles.</li> </ul>	<ul style="list-style-type: none"> <li>Support public activities.</li> <li>Create volunteer employees to participate in public activities.</li> <li>Environmental management with ISO14001 standards.</li> <li>Energy management with ISO 50001 standards.</li> <li>Safety management with OHSAS18001 standards.</li> <li>Human rights policies and support for practice.</li> <li>Anti-corruption policies and support for practices.</li> <li>Suitable procurement of products from disabled persons in the community for the Company's operations.</li> <li>Indirect investment in social businesses.</li> <li>Annual performance reports at association activities and other media.</li> </ul>
	General Society			
 Creditors	Financial Institutes	<ul style="list-style-type: none"> <li>Meetings and discussions.</li> <li>Quarterly performance announcements.</li> <li>Shareholder meetings.</li> </ul>	<ul style="list-style-type: none"> <li>Ability to comply with contract terms and agreements.</li> <li>Transparency in operations.</li> </ul>	<ul style="list-style-type: none"> <li>Strict compliance with terms and agreements in contracts.</li> <li>Business visits and tours.</li> </ul>
 Mass Media	Newspaper Television Radio Magazine Online Media	<ul style="list-style-type: none"> <li>Meetings with mass media at different occasions.</li> </ul>	<ul style="list-style-type: none"> <li>Accurate and fast news and information on business progress.</li> </ul>	<ul style="list-style-type: none"> <li>Meet and visit with mass media at least once a year.</li> <li>Invite mass media to visit the business.</li> </ul>
 Government Agencies	<ul style="list-style-type: none"> <li>SEC</li> <li>SET</li> <li>Revenue</li> <li>Provincial Industry</li> <li>Provincial Labour</li> <li>Provincial Resources</li> <li>Provincial Transport</li> <li>Mabyangporn TAO</li> <li>Chamber of Commerce</li> <li>Federation of Industries</li> </ul>	<ul style="list-style-type: none"> <li>Meetings and explanations of government agencies.</li> <li>Business inspections and visits.</li> <li>News and information.</li> </ul>	<ul style="list-style-type: none"> <li>Ability to comply with related laws.</li> <li>No social and environmental effects.</li> <li>Development of the organization's ability to participate in modifying environmentally-friendly production processes to reduce impacts.</li> <li>Cooperate with the government sector to provide information for use in development.</li> <li>Support government sector projects with benefit for the greater good.</li> </ul>	<ul style="list-style-type: none"> <li>Comply with rules and regulations prescribed by the law in every area.</li> <li>Complete and punctual tax payments of every type.</li> <li>Develop processes to seek opportunities for improvement and reduce environmental impacts.</li> <li>Transparent disclosure of information.</li> <li>Report information according to legal specifications.</li> <li>Annual reports.</li> </ul>

# About This Report

## Origin of the Report (G4-28) , (G4-29), (G4-30) , (G4-32)

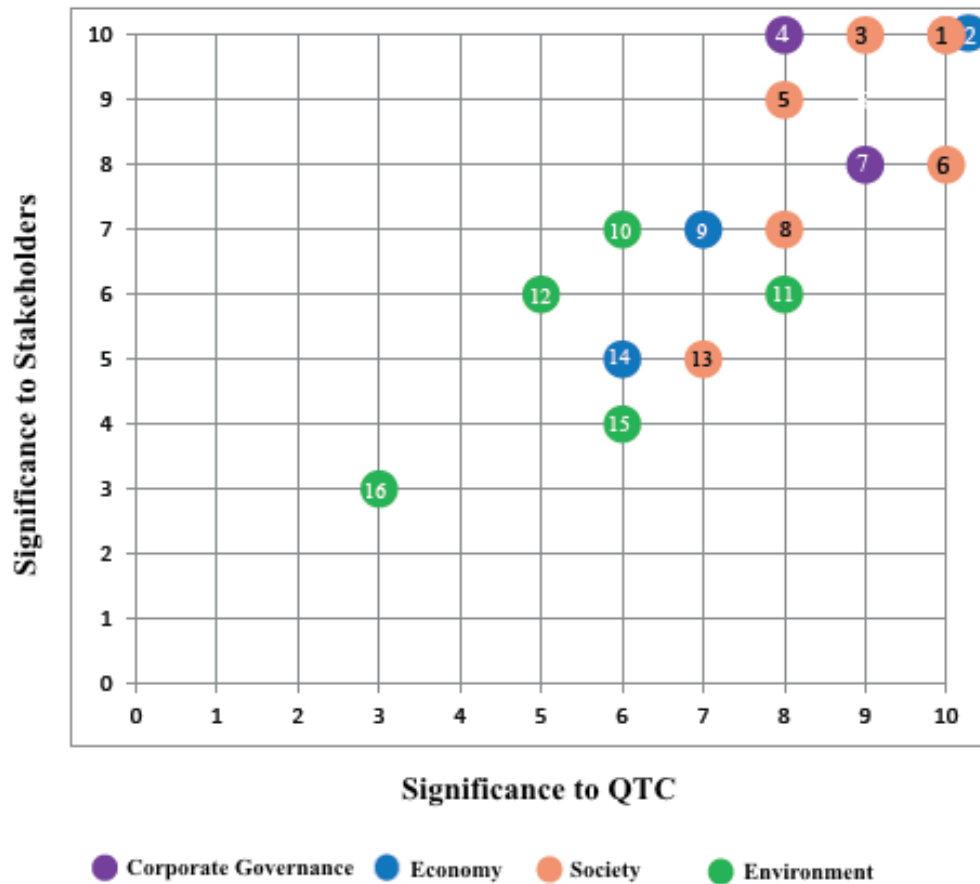
This report was drafted to demonstrate the performance of QTC Energy PCL. in areas relevant to corporate sustainability management, which is linked to economic, social and environmental aspects, including good corporate governance. The company initially drafted and disseminated its first report in 2014 and has done so consistently every year. This is the fourth report for the performance during the year from 1 January – 31 December 2017. Significant issues for business sustainability and abilities to meet stakeholder expectations were considered, and reporting guidelines referenced concur with the Global Reporting Initiatives Guideline Version 4.0 (GRI G4) Framework at the core level.

### Principles for Issue Selection

1. **Issue Identification (G4-19):** Considerations are made regarding the source information, beginning from the corporate sustainability framework, and information from stakeholders inside and outside the organization on issues to which each group gives importance by each group of stakeholders or expectations for impacts on the sustainability of the organization economically, socially, environmentally and good corporate governance in order to identify issues that are important to the organization and stakeholders using assessment procedures and weights according to the criteria specified by the company.
  - **Inside the Organization:** Meetings of responsible persons, the Corporate Sustainability Promotion Committee, the Risk Management Committee, the Welfare Committee, the Safety Committee were convened on issues obtained from measuring employees' attachment to the organization, issues obtained from the happiness survey of employees within the organization by the Happinometer and the comment box. Information was collected about the meeting, survey results and suggestions of employees in each agenda for analysis of sustainability expectations for employees and the organization to be designated as issues.
  - **Outside the Organization:** Meetings of shareholders, meetings of the Board of Directors, meetings with customers, complaints, customer satisfaction survey results, community discussions, QTC meets the communities, development plan of the government and relevant government agencies. Information was collected on opinions, expectations and recommendations by interviews, questionnaires, official and unofficial discussions and analysis of information about expectations and trends of the country's development to designate issues.
2. **Prioritization of Issues (G4-20):** Once issues that are significant to the organization and stakeholders have been specified, they are to be given weighted scores covering impacts to stakeholders inside and outside the organization. The company has specified scoring criteria pursuant to the practice guidelines in ISO14001, ISO18001, ISO50001, ISO26000 and consistent to the context of the organization, where the GRI G4 have not yet been referenced. Consideration of prioritization led to the specification of significant issues in the Materiality Matrix as follows:



## Materiality Matrix (G4-19)

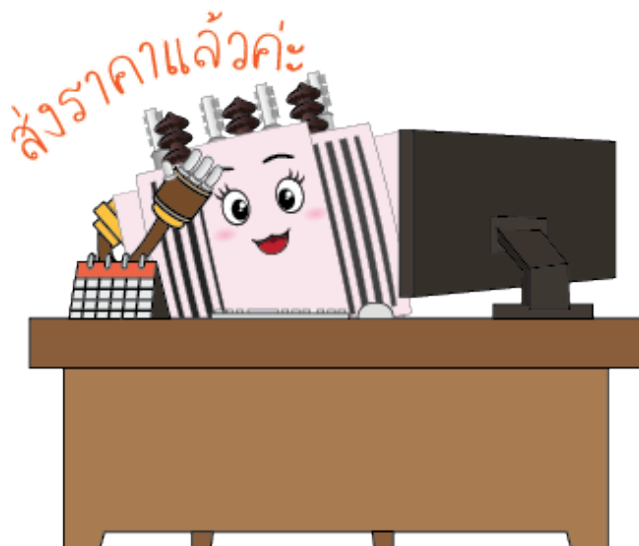


- |  |   |
|--|---|
| 1 Safety and Health of Employees           | 9 Standards and Innovation                                  |
| 2 Business Growth                          | 10 Management of Wastes and Scrap Materials                 |
| 3 Employment and Human Rights              | 11 Environmentally-friendly Production Process and Products |
| 4 Corporate Governance                     | 12 Climate Change   |
| 5 Employee Care                            | 13 Corporate Social Responsibility                          |
| 6 Employee Development                     | 14 Trade Partner Development                                |
| 7 Risk Management                          | 15 Resource Utilization                                     |
| 8 Responsibility for Products and Services | 16 Biodiversity   |










The presentation of important issues to the Corporate Sustainability Promotion Committee in 2017 was no different from in 2016 due to no changes in stakeholders' expectations shown on the table of work with stakeholders and showed no significant effects on the issue of sustainability. Only the issues of corporate governance and risk management were separated from the economic aspect to clarify the report.

3. **Scope of the Report (G4-18):** This report presents information about the sustainability performance of only QTC Energy PCL. from 1 January – 31 December 2017 covering key issues in every activity of the company excluding QTC Global Power Co., Ltd., QTC-PANCO Co., Ltd. in the People's Democratic Republic of Laos (subsidiary), and PPWE Co., Ltd. (joint venture), Green Earth Power (Thailand) Co., Ltd. in the Union of Myanmar (joint venture) and L Solar 1 Co., Ltd. (subsidiary of OTCGP) except for reports on economic issues. Reports performance according to business strategies cover performance in subsidiaries and joint ventures of QTC.
4. **Report Certification (G4-33):** This report and its indices were not examined and certified by qualified external agencies except for the organization's Carbon Footprint Organization (CFO) report certified by SGS (Thailand) Co., Ltd., Certification No. TH-ENV-2018-00061-001. However, this report was certified by the Company's Board of Directors on 22 February 2018 and the Company has no plan to send the entire report to be examined and certified by external agencies.
5. **Inquiries (G4-31):** This report was prepared for stakeholders identified by the organization including educational institutes, students, interested persons and ordinary persons. In cases of any inquiries or additional recommendations, please contact the Sustainable Development Department of QTC Energy PCL., Email: [sureeporn.m@qtc-energy.com](mailto:sureeporn.m@qtc-energy.com), Tel: 038-891-411, Fax: 038-891-411, Mobile Phone No: 088-203-0128.

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Please Express Your Opinions to  
The Value of This Report Online  
By Scanning the QR Code



# Sustainable Development Issues (G4-20) , (G4-21)

Key Development Issues	Content Reported	QTC SD-Framework	SDGs	Pages
<b>Key Corporate Governance and Risk Management Issues</b>				
Corporate Governance	<a href="#">Q</a> Good Corporate Governance ☉ <a href="#">Q</a> Anti-corruption ☉	Transparency, Ethics Anti-Corruption Respect for Rule of Law		31-34 35-38
Risk Management	<a href="#">Q</a> Risk Management ☉	Risk Management		39-44
<b>Quality Economic Issues</b>				
Business Growth	<a href="#">Q</a> Economic Results ☉ <a href="#">Q</a> Investment in Other Businesses ☉ <a href="#">Q</a> Distribution of Value to Stakeholders ☉	Transparency Business Growth		46-47 48 49
Standards & Innovation	<a href="#">Q</a> Work Standards ● <a href="#">Q</a> Product Standards ☉ <a href="#">Q</a> Innovation ☉	Business Growth Fair Trade		50-52 52 53-56
Trade Partner Development	<a href="#">Q</a> Trade Partner Development	Fair Operating Practice		57
<b>Quality Society Issues</b>				
Employee Safety and Health	<a href="#">Q</a> Safety ☉ <a href="#">Q</a> Employee Health ●	Transparency		59-66 67-70
Employment and Human Rights	<a href="#">Q</a> Employment ☉ <a href="#">Q</a> Human Rights ☉	Health, Safety & Well-being		71-74 75
Employee Care	<a href="#">Q</a> Employee Care ☉	Human Rights		76-80
Employee Development	<a href="#">Q</a> Employee Development ●	Employee Development		81-83
Product and Service Responsibilities	<a href="#">Q</a> Product and Service Responsibilities ☉	Accountability Stakeholder Engagement		84-85
Social Responsibilities	<a href="#">Q</a> Community Development ☉ <a href="#">Q</a> Social Investment ☉ <a href="#">Q</a> Social Activities ○	Community Involvement Stakeholder Engagement		86-94
<b>Quality Environment Issues</b>				
Waste and Scrap Material Management	<a href="#">Q</a> Waste and Scrap Material Management ☉	Transparency Pollution		96-98
Environmentally-friendly Production Processes & Environmentally-friendly Products	<a href="#">Q</a> Environmentally-friendly Production Processes ☉ <a href="#">Q</a> Environmentally-friendly Products ☉ <a href="#">Q</a> Pollution Control ☉	Transparency Respect for Rule of Law Pollution		99 100 101-102
Climate Change	<a href="#">Q</a> Carbon Footprint Organization ☉ <a href="#">Q</a> Greenhouse Gas Emission Reduction Activities.☉	Climate Change		103-105 106
Resource Utilization	<a href="#">Q</a> Energy ☉ <a href="#">Q</a> Water ☉	Resource Use Respect for Rule of Law		107-108 109
<b>Other Issues</b>				
Biodiversity	<a href="#">Q</a> Project to Plant Trees inside the Factory	Climate Change		110

**Scope of Impacts:** ● = Inside Organization, ☉ = Inside-outside Organization, ○ = Outside Organization

# PERFORMANCE





## Good Corporate Governance

### Q Good Corporate Governance

The company has always given importance to good corporate governance and has created “business ethics” and “good corporate governance policies” in writing as practice guidelines for directors, executives and employees in operating business. Concurrently, the company has appointed the “Nomination, Remuneration & Corporate Government Committee” to perform duties in recruiting, selecting and nominating suitable individuals for director and high-ranking executive positions along with considering remuneration for the Board of Directors and high-ranking executives according to specified criteria in addition to overseeing good corporate governance and giving consideration to improving good corporate governance policy annually in order to concur with international standards and suit changing circumstances with each term lasting three years. At present, the Committee is composed of three directors, one committee secretary and two independent directors including a Chairman who is an independent director. In 2017, the Committee convened a total of three meetings.

Recruitment and appointment criteria for directors, independent directors, high-ranking executives and remuneration consideration criteria were clearly specified by the Company in the recruitment and remuneration consideration policy.

 <http://qtc-th.listedcompany.com/charters.html> (G4-36) , (G4-40) , (G4-41) , (G4-52) , (G4-53)

#### Nomination, Remuneration & Corporate Government Committee



#### Methods for Communicating “Business Ethics” and “Corporate Governance Policies” with Stakeholders

(G4-56),(G4-57),(G4-58)

Stakeholders	Communication Channels						1. <a href="http://qtc.listedcompany.com/code_of_conduct.html">http://qtc.listedcompany.com/code_of_conduct.html</a> 2. <a href="http://qtc-th.listedcompany.com/cg_principle.html">http://qtc-th.listedcompany.com/cg_principle.html</a> 3. <a href="http://qtc-th.listedcompany.com/charters.html">http://qtc-th.listedcompany.com/charters.html</a>
	Portable Handbooks	Training	Explanatory Meetings	Annual Meetings	Stages of Association	Shareholder Meetings	
Inside the Organization	✓	✓	✓	✓	-	-	✓
Outside the Organization	-	-	-	✓	✓	✓	✓

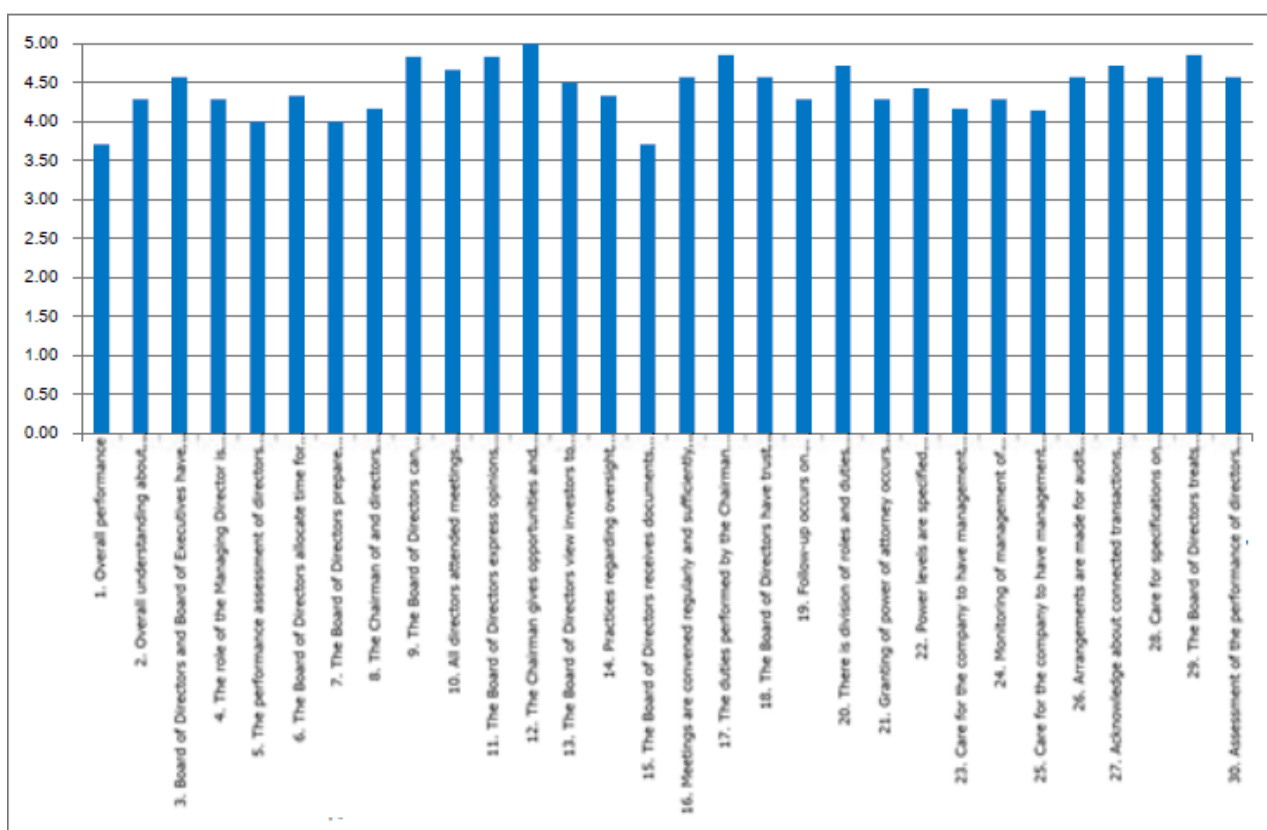
## Performance Assessment (G4-43) , (G4-44)

The Board of Directors has scheduled assessment of the Board of Directors' performance in addition to the ability to perform the duties of the Chief Executive Officer at least once annually. In 2017, the assessment results were as follows:

1. The Board of Directors was assessed with reference to the self-assessment forms for boards of directors of the Corporate Governance Center, Stock Exchange of Thailand, of 2015, to appropriately modify 30 questions. All seven directors completed self-assessments in December 2017 and scores from each question were averaged except for the eighth director, Mr. Surot Lamsam. Because Mr. Surot was appointed by Shareholder Meeting No. 2/2560 on 29 August 2017, self-assessments were not completed.

Graph of Self-assessment Results of the Board of Directors of 2017

Full Score: 5 Points. Average Score: 4.43 Points. Scores are at an excellent level.



2. The Chief Executive Officer's performance capabilities assessment was conducted with reference to the self-assessment forms for boards of directors of the Corporate Governance Center, Stock Exchange of Thailand, of 2011: Eleven sections were modified. Six directors performed assessments independently in December 2017. Scores from each topic were obtained from mean scores of six directors except for the eighth director, Mr. Surot Lamsam. Because Mr. Surot was appointed by Shareholder Meeting No. 2/2560 on 29 August 2017, self-assessments were not completed. Assessment results in the area of sales and profits were at Level 2 with a need for further improvement.

Graph Showing Assessment of the Performance Capabilities of the Chief Executive Officer



### Good Governance Evaluation Results by IOD (Score: 100 Points)



### Annual Shareholder Meeting Quality Assessment Results (Score: 100 Points)



## Anti-Corruption

The Company gives importance to improving internal processes to create transparency in practice with verifiability. In 2017, the Company modified anti-corruption policies for the fourth time on 7 September 2017 and clearly prepared associated practice guidelines along with registering control in document systems. Corruption is a risk issue in risk management. Their transparency was examined by BK IA & IC Co., Ltd., which audits the company's internal control system once every quarter and reports to the Board of Audit composed of three independent directors and one independent secretary with each holding a term of three years. In 2017, a total of three meetings were convened to monitor, audit and assess results (G4-57).



Anti-corruption Policy: [http://investor-th.qtc-energy.com/anti\\_corruption\\_policy.html](http://investor-th.qtc-energy.com/anti_corruption_policy.html)

### Board of Audit



### Methods for Communicating “Business Ethics” and “Corporate Governance Policies” with Stakeholders

Stakeholders	Communication Channels								1. <a href="http://qtc.investor-th.qtc-energy.com/misc/CG/20170911-qtc-anti-corruption-policy-th.pdf">http://qtc.investor-th.qtc-energy.com/misc/CG/20170911-qtc-anti-corruption-policy-th.pdf</a> 2. <a href="http://qtc-energy.com/index.php/purchasing-policy/">http://qtc-energy.com/index.php/purchasing-policy/</a>
	Portable Handbooks	Training	Explanatory Meetings	Annual Meetings	Stages of Association	E-mail	Mail	Shareholder Meetings	
Inside the Organization	✓	✓	✓	✓	-	✓	-	-	✓
Outside the Organization	-	-	-	✓	✓	✓	✓	✓	✓



## Implementing Policies (G4-SO4)

### Training, Meeting and Building Understanding with Employees

In 2017, the Company modified policies and prepared associated practice guidelines along with providing training on “Practice Guidelines in the Anti-corruption policy” for every employee to understand and practice consistently with policies. Furthermore, in 2017, the Company will specify for this course to be mandatory in every employee’s training including new and old employees, who need to regularly review understanding or review after every modification to the policy or practice guidelines.



*Training and Explanation of the Policy and Practice Guidelines to Employees on 7 NOV 2017*

### Anti-corruption Rallies

The Company organized anti-corruption rallying activities inside the organization and prepared a mascot, Mr. Details, to demonstrate the Company’s participation in rallies on International Anti-corruption Day 2017 to build awareness among employees at every level and express executives’ determination. Furthermore, the Company regularly sends employees to participate in activities organized by external agencies such as seminars, meetings, public sector activities, etc., in order to apply external information or methods in the organization.



## Notifying Trade Partners of Related Policies and Practice Guidelines


The Company created a No Gift Policy signed by the Company's top executive (the Chief Executive Officer) on the website's first page during the New Year's Day festival and sent the No Gift Policy to the Company's trade partners by email. The Company assigned the Manager, Sustainable Development Department, to represent the Company in procurement for transparency in operations and confidence that all of the Company's trade partners acknowledged this policy.



Nevertheless, during the New Year's Day festival, stakeholders who have good relationships with the Company continue to present New Year's Day baskets, calendars and OTOP products to the Company and give New Year's Day blessings according to tradition. Accepted gifts were recorded and reported pursuant to practice guidelines on giving-receiving gifts and hosting guests (QTC\_HM\_006) to the Board of Executives.

 <http://investor-th.qtc-energy.com/misc/CG/20170911-qtc-anti-corruption-policy-th.pdf>

## Reporting Complaints/Clues (G4-58)

In 2017, the Company modified practice guidelines on "Reporting Complaints/Clues" (QTC\_HM\_008)  <http://investor-th.qtc-energy.com/misc/CG/20170911-qtc-anti-corruption-policy-th.pdf> to create clarity, proper practice and specify appropriate punishments in addition to ensuring safe protection measures for reporters.

Two channels were specified for reporting complaints/clues.



1. By mail addressed to the Board of Audit, QTC Energy Public Co., Ltd.  
2/2, Soi Krungthep Kritha, Intersection 5, Krungthep Kritha Rd., Hua Mak, Bangkapi, Bangkok, 10240.



2. By e-mail: [audit@qtc-energy.com](mailto:audit@qtc-energy.com)

The independent Board of Audit will receive complaints/clues.

## Requesting Confirmation as a CAC Member

In the Company's anti-corruption operations in 2017, the Company planned to request confirmation for membership in Thailand's Private Sector Collective Action Coalition Against Corruption (CAC) in the fourth quarter. However, due to issues regarding data collection completeness and inability to prepare plans for internal auditors to examine according to policies, practice guidelines and self-assessments related to anti-corruption measures in 71 items, the Company needed to reschedule confirmation request plans in 2018 by 18 months after declaring intentions.




## Thai Chamber of Commerce Business Ethics Standard Test Award 2017

The Company received the Thai Chamber of Commerce Business Ethics Standard Test Award 2017 certificate and trophy as an ethically managed organization in compliance Thai Chamber of Commerce ethical principles. The award was considered by the Ethics and Anti-corruption Promotion Committee, Thai Chamber of Commerce, and presented by Pfr. Dr. Kasem Wattanachai, Privy Councilor, on 18 December 2017 at Nonthaburi Room 1, NACC Office (Sanam Bin Nam), Nonthaburi.



## Risk Management (G4-2) , (G4-45,46,47,48,49)

In order for the Company's operations to achieve business objectives, maintain obligations and concur with the organization's vision of becoming a world class company under constantly changing economic, social and environmental challenges, the Company has set in place corporate risk management policies  <http://qtc-energy.com/index.php/risk-management-policy/> and specified risk management processes based on international COSO standards in addition to creating channels for systematic reporting, monitoring and assessments covering economic, social and environmental dimensions. The risk management structure is as follows:

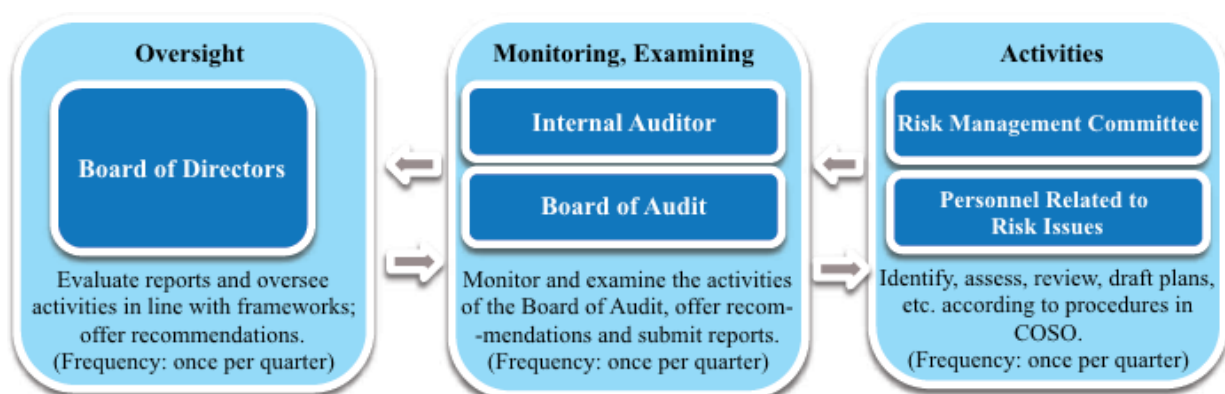
### Risk Management Committee



### Risk Management Procedures

The company has specified that the Board of Risk Management set agendas in meetings to identify, review, assess results, etc. pursuant to the COSO standard at least once per quarter. If any changes occur in situations with potential risks for the company, the Chairman of the Board of Risk Management has the authority to immediately summon the Board of Risk Management for a meeting to assess the aforementioned risks. Additionally, the Board of Audit and the Internal Auditor are in charge of monitoring and examining the activities of the Board of Risk Management and offering recommendations and making reports to the Board of Directors.

### Chart Showing Risk Management Procedures



# Significant Risks

## 1. Economic Risks

### 1.1 Income Inconsistency and Dependence on Major Customers

Most of the Company's income was from bidding in the government sector, state enterprises (electricity authorities), major contractor customers, the electricity generation industry and megaprojects. Biddings or megaprojects are usually connected to political situations. Furthermore, the number of electrical transformer manufacturers in Thailand has increased with foreign competitors from free trade, resulting in considerable price competitions and uncertain income from major customer groups. The Company continues to apply a strategy of building quality of goods and services to become accepted and add value to customers by using Total Quality Management (TQM) to drive and modify processes to be flexible with lower costs and higher quality. The Company uses strategies to build relationships and attachment to goods and services while also expanding overseas markets. Moreover, the Company diversified risks by investing in energy businesses domestically and abroad under QTCGP, a subsidiary.

Regarding overall income in 2017, most of the Company's income was earned from bidding in the government sector and state enterprises (the Metropolitan Electricity Authority and the Provincial Electricity Authority). Due to a relatively low number of biddings, price competitions were significant. In 2017, the Company needed to enter biddings to gain work by lowering prices to compete in biddings, resulting in low capital gain, despite a 216.82 percent rise in income from biddings from 2016. Furthermore, in 2017, Thailand remained in economic and investment slowdown, particularly for power plant customers who rescheduled investments, causing income in Thailand's private sector to shrink slightly by -0.29 percent from income in 2016. Foreign customer groups became clearer. The Company was able to compete using product quality strategies. Thus, income in this group grew by 120.23 percent from 2016

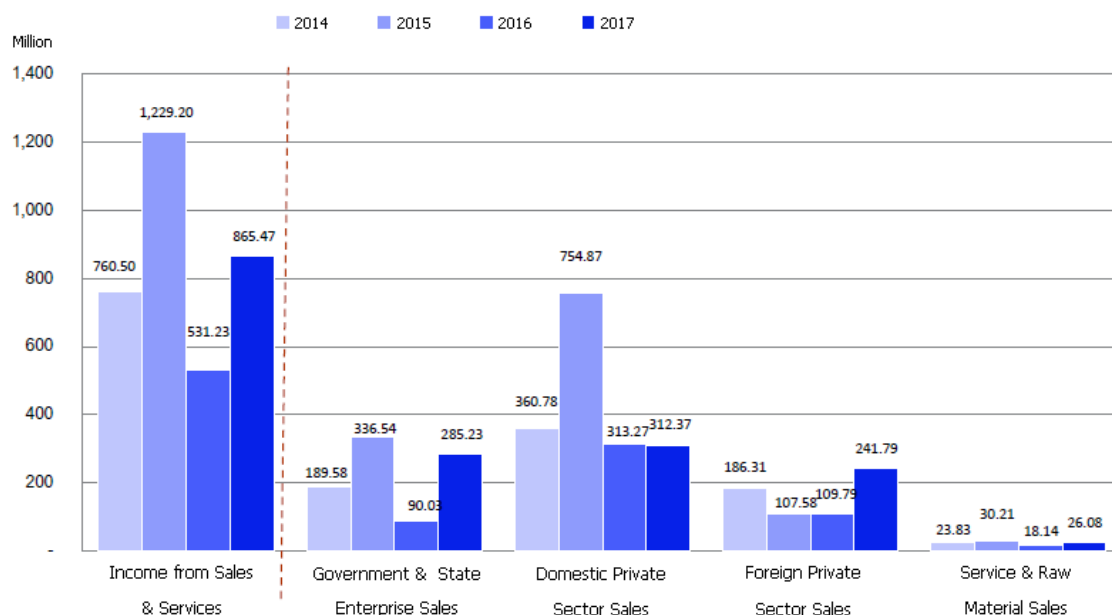


Chart Showing Sales Comparison by Customer Group



## 1.2 Foreign Currency Exchange Rate and Raw Material Price Fluctuations

A forward contract policy was implemented to mitigate foreign currency exchange rate risks and raw material price fluctuations caused by the global economy. This is because the Company needs to import raw materials such as silicon, copper sheets, special equipment and transformer oil, etc., from overseas at a value of 60 percent of all raw material value. Furthermore, products were shipped overseas to be sold at a value of 20 percent of sales. From performance in 2017, the Company profited from exchange rates at 1,145,324.00 baht.

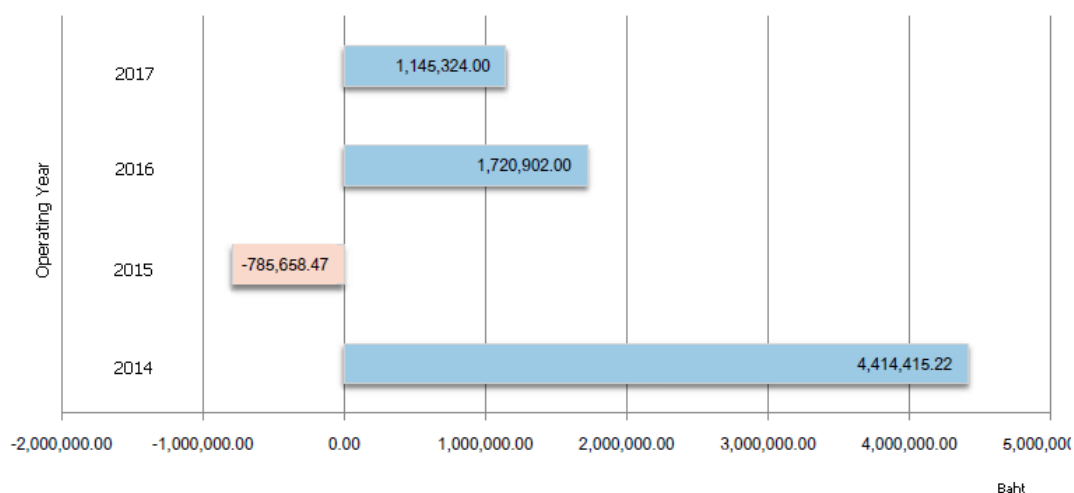


Chart Showing Forward Contract Results

## 1.3 Investment in Other Businesses

In 2017, the Company began investing in energy businesses domestically and overseas with connections to the transformer business through QTC Global Power Co., Ltd. (QTCGP), a subsidiary. The energy business is a business in which most of QTC's personnel have no expertise. Thus, the Company recruited personnel with investment knowledge and capabilities to perform work and employed special consultants to study project information, economic, social and environmental impacts. The Company presented this issue to shareholders for approval prior to investment decisions. In 2017, the Company invested in two major projects consisting of: Green Earth Power (Thailand) Co., Ltd. at 15 percent (Investment Value in 2017 = 269.05) to invest in the 220-megawatt Minbu Solar Power Plant in the Union of Myanmar (Burma). The project is currently ongoing; and the Company purchased L-Solar 1 Co., Ltd. from Loxley PCL at a value of 538.01 million baht and perceived income from electricity sales in September 2017.

Nevertheless, the Company places importance on risk management in new businesses by purchasing investment risk insurance and monitoring performance closely in order to enable the Company to oversee shareholders' benefits to be as cost-effective as possible.

## 2. Social Risks

### 2.1 Employee Health and Work Safety

The company gives the utmost importance to the work safety of employees and contacts visiting the company's factory with awareness of the risks for loss of life and property of employees, contacts and the organization as a whole. In 2015, the total number of accidents causing injury and property damage was 31 times, the highest number over a three year period. Therefore, the company upgraded its safety management as risks for control and declared 2016 as the year to promote a safety culture with "Start Safe, Work Safe, Finish Safe". In 2016, the total number of accidents decreased by up to 45.16 percent. However, safety management in 2017 resulted in a 35.29 percent increase from 2016 in the number of accidents. The Risk Management Committee became aware of this risk during the first month of the year. Risks were caused by an increase in production volume in 2017, resulting in increased risk of accidents as in the past. Therefore, the Company instructed the safety team to participate in the Project to Prepare Safety, Occupational Health and Environment Standards for Small and Medium Enterprises organized by the Thailand Institute of Occupational Safety and Health (Public Organization) (TOSH) in order to improve work safety efficiency. The details are accordingly presented under "Employee Health and Safety".

### 2.2 Departures in the Engineering Profession and Employees in Significant Positions

In 2017, the Company expanded risk of electrical engineer departures to employees in other significant positions due to employees' importance to QTC business operations. QTC needs employees' knowledge and skills to develop goods/services, customer support and problem analysis by adhering to the following development plans for risk reduction continuing from 2016:

- Project to develop wage structure and improve wage and remuneration management structure.
- The project was completed in the first quarter of 2017 and officially announced. The project used a budget of 600,000 baht to employ the project's consultants.
- Project to develop career paths.
- The project to develop career paths was carried out in 2017 and remains incomplete. The project will continue in 2018.
- The project to build organization happiness is an ongoing project aimed at creating happiness in the organization.
- Projects' performance is reported under "Employment and Human Rights" and "Employee Care".

### 2.3 Compliance with Laws and Trade Agreements

Due to the characteristics of the Company's business, the majority of income will be gained from government auctions, state enterprises auctions and auctions for large private projects involving large quantities of material procurement for production. Furthermore, the Company requests permission from and reports to government agencies continually. If the Company's operations are not consistent with laws or trade agreements, the Company would damage the Company's reputation and be at risk of violating laws and specifications. These are issues monitored by stakeholders. Thus, the Company continually modified policies and anti-corruption practice guidelines along with preparing steps for actions related to trade agreements or operations required to be consistent with laws to enter document control systems and information in ISO9001 standards. In addition, the Company prepared systems to evaluate compliance with laws and reports to the Board of Directors on a quarterly basis. In 2017, the Company had inconsistent actions in eight legal issues because the aforementioned laws were enforced during the year and require time for operations. All of the aforementioned issues were

laws involving internal management such as arrangements for factory nurses due to employee numbers meeting legal specifications during the year, laws concerning requirements for factory chemical controllers due to amount of chemical use meeting legal specifications and controller registrations require test applications in rounds organized by the government, etc. Nevertheless, the Company prepared work plans to comply with every issue.

In 2017, the Company paid a surcharge fine of 2,255,444.00 baht to the Customs Department for errors in displaying copper wire raw material import taxes in 2011. In the aforementioned case, the Company operated through a shipping service provider. However, the error is under the Company's responsibility and the Company has created measures to prevent repetitions of the problem by having Foreign Procurement, Overseas Sales Department, check product and raw material import-export tariffs with shipping service providers on every occasion.

### 3. Environmental Risks

#### 3.1 Waste and Scrap Material Management

In production processes and servicing of the company's electrical transformers, scrap materials are produced in addition to hazardous wastes that require controlled disposal pursuant to the announcement of the Ministry of Industry on disposal of wastes or scrap materials. At present, the company commissions the services of licensed waste disposal providers. Waste disposal service providers are both service providers who dispose of waste and service providers who reuse waste. The potential risk is irresponsibility on the part of the waste disposers, which might dispose, discard or destroy the company's wastes without undergoing authorized procedures and thereby cause impacts to the environment and society as is frequently shown in the news. In such cases, the company responsible for creating the wastes is held liable, leading to damage to reputation. Therefore, in order to prevent the aforementioned potential risk, the company exercises special stringency in sending wastes for disposal, ranging from waste sorting, selecting waste disposers, inspecting disposal locations, disposal procedures along with understanding between the company and waste disposers on legal compliance. In 2017, no errors were encountered in this issue. However, this issue remains a significant risk issue without good governance. Performance is reported under "Waste and Scrap Material Management".

### 4. Business Interruption Risks


Corporate risk assessments revealed the issues capable of interrupting the Company's business operations to be a flood at the Bangkok Main Office and fires at the Bangkok Main Office and the factory in Rayong. Thus, the Company made the following preparations to handle emergencies:

- The Company prepared fire prevention and suppression plans along with holding annual drills.
- The Company prepared information recovery plans along with holding at least one drill per year.
- The Company purchased insurance policies to cover every risk related to fires, floods, earthquakes, theft and accidents from product transportation.
- In 2018, the Company will prepare Main Office protection and flood evacuation plans.


In 2017, no events occurred with effects on lives, properties and the Company's production process.

## Performance Indicators in Corporate Governance and Risk Management



In 2017, the Company clearly specified corporate governance objectives and goals to use as information in management, monitoring and revisions with the following results:

Objective:	To create anti-corruption knowledge, understanding and awareness among the organization's employees and stakeholders in addition to adherence to business ethics in order to prevent violations of the law and policies.
Goal 1:	he Company's employees have knowledge and understanding of policies and practice guidelines.
Indicator :	100% of employees.
Result :	 77% (166 out of 215 employees trained). The Company failed to achieve the goal. Operations will continue in 2018.

---

Goal 2:	takeholders, trade partner groups and related government agencies acknowledge policies and practice guidelines.
Indicator :	100%
Result :	 80% (Domestic trade partners received notification at 100% via email using the "Request a Delivery Receipt" and "Request a Read Receipt" options. Overseas trade partners and government agencies have not taken action in writing. However, mascots are shown at welcoming points at the Bangkok office and the factory in Rayong. The Company failed to achieve the goal. Operations will continue in 2018.

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Goal 3:	Compliance with laws and the Company's policies.
Indicator 1 :	 No complaints regarding illegal actions or policy violations (Zero).
Result :	No complaints or clues reported.
Indicator 2 :	No surcharge fines related to taxes or other surcharge fines (Zero).
Result :	 The Company failed to achieve the goal. In 2017, the Company was fined by the Customs Department at 2,255,444.00 baht from errors in displaying import taxes in 2011.

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SUPER LOW LOSS TRANSFORMERS

# หม้อแปลง ประหยัดพลังงาน

SAVE THE WORLD • SAVE YOUR MONEY

Maintenance Service

## 24 Hrs

**Preventive  
maintenance**

helps transformers  
have long useful  
life with working  
mechanism and  
component  
maintenance.

## 3Pros SUPER LOW LOSS An energy-saving transformer



**Saves energy** by replacing silicon alloy in steel cores with amorphous alloy, cutting no load loss (NLL) by 65-70%.



**Reduces expenses** with lower loss. Helps to ease burdens from electrical bills. Worthy of long-term investment from conservation compared with cost of future energy loss.



**Save our planet** by reducing CO2 emissions with environmental-friendliness. Super Low Loss parts can be seamlessly enter the recycling process.

## SUPER LOW LOSS: HOW MORE IS SAVED?!



**49,196**

BAHT SAVED



**7.15**

TON SAVED



**923**

WATT SAVED



**1,924**

WATT SAVED

\*The result of using 1,000 kVA 3Ph Super Low Loss Transformers



## Business Growth (G4-9) , (G4-EC1)

### Economic Results

As of the end of 2017, the Company had performed at a loss based on the financial statements of QTC Energy PCL (only), not including the performance of subsidiaries and joint ventures. The primary reasons are as follows:

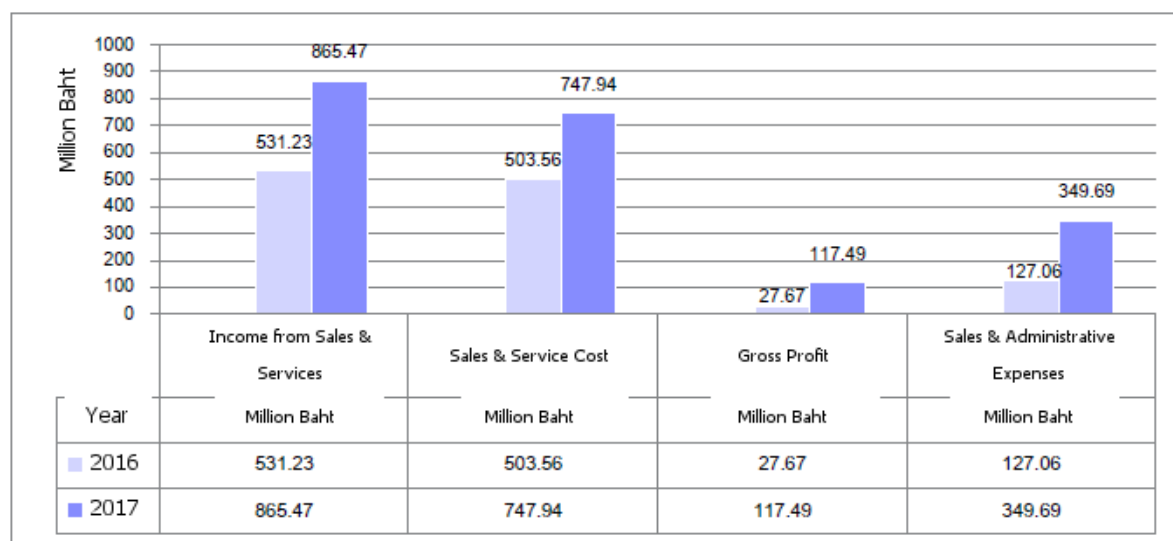


Chart Showing Comparison of Economic Performance between 2016 and 2017

- Income:** In 2017, the Company had income from sales and services at 865.47 million baht, an increase from 2016 by 62.92 percent. The Company failed to achieve the business goal of one billion baht as a result of economic and political factors causing delayed investment in projects, particularly among power plant customers who rescheduled investments and caused income from the Thai private sector to shrink by 0.29 percent from 2016. Thus, the Company was unable to push sales to achieve goals.
- Gross Profit:** In 2017, the Company had a gross profit of 14 percent from sales and the Company had sales and service cost at 86 percent from sales, an improvement from a gross profit of 5 percent in 2016 and a sales and service cost of 95 percent from income in 2016.
- Sales and Administrative Expenses:** In 2017, the Company had sales and administrative expenses at 40 percent from rises in income from 2016 when sales and administrative expenses were at 24 percent of income. This was because the Company set an allowance for depreciation of investments and subsidiary loans in 2017 at 196.15 million baht, resulting in corresponding rises in sales and administrative expenses in 2017.

Table Showing Economic Results

Item	Unit	2014	2015	2016	2017
Income from Sales and Services	(million baht)	760.50	1,229.20	531.23	865.47
EBITDA	(million baht)	114.95	200.05	(48.45)	(159.43)
Net Profit (Loss)	(million baht)	54.70	119.17	(79.33)	(219.34)
Accrued Profit (Loss)	(million baht)	222.19	305.36	162.03	(68.79)
Net Profit per Share	(baht)	0.28	0.60	(0.33)	(0.81)
Rate of Asset Returns	(%)	7.63%	13.51%	-6.94%	-14.25%
Rate of Shareholder Returns	(%)	11.48%	22.70%	-11.94%	-20.07%

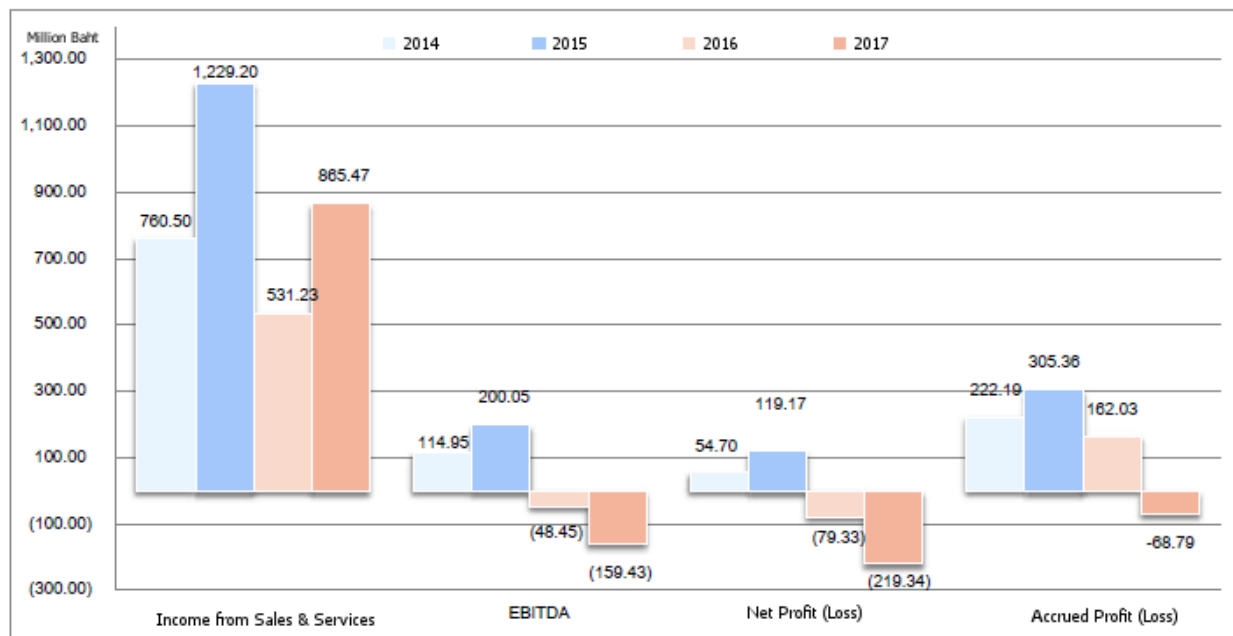


Chart Showing Comparison of Economic Results

From economic views of the electrical transformer market in 2018, the Company's expects increased demand for electricity from the government sector's megaprojects and investment promotion. In the meantime, however, the Company has risks from changes in government procurement policies allowing manufacturers from abroad to enter price competitions. This may cause heightened competition using pricing strategies. The Company plans to manage this risk with strategies to expand to markets overseas, especially in CLMV countries with high economic growth, in addition to promoting Super Low Loss amorphous transformer sales to create new options for customers. Furthermore, in 2018, the Company will perceive income from investment in subsidiaries at higher proportions.

## Investment in Other Businesses

In 2017, the Company began clearer investment in a subsidiary, QTC Global Power Co., Ltd. (QTCGP). QTCGP operates business by investing in renewable energy domestically and abroad. QTC holds 100 percent of shares in QTCGP. Significant investments of QTCGP in 2017 consisted of:

1. Purchase of the solar energy generation business, L-Solar 1 Co., Ltd., from Loxley PCL at a value of 538.01 million baht. QTCGP began perceiving income from electricity sold by L-Solar 1 in September 2017 (Performance information according to the consolidated financial statement is reported in the Annual Report of 2017).



<https://www.set.or.th/set/companyfinance.do?symbol=QTC&language=th&country=TH&type=balance>



2. Investment in Green Earth Power (Thailand) Co., Ltd. (GEP) at 15 percent to operate the 220-megawatts Minbu Solar Power Plant in the Union of Myanmar (Burma). The project is ongoing (The performance information in the consolidated financial statement is reported in the Annual Report of 2017).



<https://www.set.or.th/set/companyfinance.do?symbol=QTC&language=th&country=TH&type=balance>



Location of the @ Minbu Solar Power Plant, Union of Myanmar



## Distribution of Value to Stakeholders (G4-EC9)

<b>Distribution of Value to Shareholders</b>	
Dividends to Shareholders	0.00
Dividends per Share	0.00
<b>Personnel Investment</b>	
Employee Wages	96,216,233.00
Remuneration for Executive Directors and the Company's Directors	20,734,200.00
<b>Social Investment</b>	
Donations	35,000.00
Contributions for Social Enterprises: SE (Indirect)	113,558.00
Activities for Society	320,441.21
Funds for Promoting and Improving Quality of Life among Disabled Persons	219,000.00
Product Procurement from Disabled Persons in Communities	19,850.00
<b>Environmental Investment (G4-EN31)</b>	
Internal Environmental Management Cost	204,999.50
Waste and Other Management Cost	389,882.50
<b>Sharing of Value with Business Partners (Raw Materials)</b>	
Domestic Procurement	385,595,506.60
Overseas Procurement	179,195,688.34
<b>Other Economic Value</b>	
Financial Cost (Interest)	11,271,210.00
Taxes Paid to the Government**	374,532.00

**Table Showing Comparison of Sharing of Value to Stakeholders**

Stakeholder Groups	Unit	2014	2015	2016	2017
Trade Partners (Raw Materials)	(ล้านบาท)	447.66	774.09	426.7	564.79
Employees	(ล้านบาท)	89.14	112.87	88.63	116.95
Shareholders	(บาท)	0.18	0.32	0.03	0
Financial Institutes (Interest)	(ล้านบาท)	7.54	8.77	7.76	11.27
Community & Society	(ล้านบาท)	0.34	0.28	0.31	0.49
Environment	(ล้านบาท)	-	-	-	0.59
Quality of Life Promotion and Improvement for Disabled Persons.	(บาท)	219,000	219,000	219,000	219,000
Government Sector	(ล้านบาท)	14.9	42.78	0.39	0.38

\* Salaries, wages, benefits, social security funds, the Provident Fund and personnel development expenses (not including the Board of Executives)

\*\* Because the company experienced a loss in 2017, it was not necessary to file juristic income taxes. For the company's value-added tax, more tax credit was transferred than sales tax. Hence, the company used the tax credit. The taxes occurring in 2017 were property taxes and signage taxes.

# Standards and Innovation

## Work Standards

The company applies the Total Quality Management system to improve internal processes covering management, sales, production, delivery and services in all processes in order to upgrade work to meet production standards and achieve management excellence since 2014. The first phase began in 2014 and reached the fourth phase in 2017. Work has proceeded according to the specified development plan under monitoring and assessment of the TQM Promotion Committee, which is composed of two sub-committees, namely, the Cross Functional Sub-committee and the TQM Promotion Committee. Additionally, processes have been set to be examined by external consultants once monthly for two days each time. In 2017, the processes that are significant to business processes such as bidding processes and bidding form monitoring, are examined in order to increase job acquisition opportunities. Production round modification processes in each production station were monitored to increase production capacity and processes for examining product quality during production were examined, etc. In 2017, development plans originally meant to end in 2018 in Phase 5 were extended to 2019 due to opportunities for enhancing efficiency in other processes and to prepare an application for the TQA Award in 2019 – 2010 by achieving better quality. In 2017, the total amount of funds spent in TQM system development equaled 750,276 baht.



Image of the Atmosphere at Examinations of Processes Undergoing Modification

The Company applied international standards in the organization by considering needs of domestic and foreign customers, legal enforcement and specifications, consent from executives and employees in order to improve personnel capabilities, build confidence among customers and stakeholders while also increasing opportunities to enter competition. Applied standards include applications for certification by trusted agencies at the national and international levels and references for suitable application without certification requests. The list of standards is as follows (not including lists of accounting standards and product quality control standards):

**Table Showing Work Standard Certifications Applied for by the Company**

No.	Standards	Assessment Frequency	Certification Agency	Certification No.
1	ISO14001:2015	Once a Year	SGS-NAC	TH08/1236
			SGS-UKAS	TH08/1235
2	OHSA18001:2007	Once a Year	SGS	TH08/1237
3	ISO9001:2008	Once a Year	SGS-NAC	TH00/2729
			SGS-UKAS	TH00/2728
4	ISO50001:2011	Once a Year	SGS	TH15/8844
5	ISO/IEC17025	Once a Year	TISI	15T016/0219
7	Green Industry Level 4	4 Years/Time	Ministry of Industry	4-116/2559
8	Q-Mark (Trade and Services)	4 Years/Time	The Thai Chamber of Commerce Council, the Thai Bankers' Association, the Federation of Thai Industries	Q002/2559
	Q-Mark (Production)			Q004/2559

**Table Showing Standards Used for Referencing**

No.	Reference Standards	Remarks
1	ISO26000	Referenced as practice guidelines.
2	ISO14064	Referenced as practice guidelines for preparing reports on greenhouse gases and certification applications in each year.
3	COSO-FRM	Referenced as corporate risk management guidelines.



ISO/IEC17025 Standard Testing Laboratory



Furthermore, the Company uses the 5S system continually as a base for modifying and improving work processes and standards in order to have every employee in the organization follow 5S guidelines as a habit, creating a strong Quality of Details corporate culture. In 2017, the Company supported the 5S team to enter the 5S Award 2017 and received the Silver Award.



Image of Results and the 5S Award 2017 (Silver Award) at BITEC, Bang Na: 3 NOV 2017

## Product Standards

QTC's electrical transformers are designed, manufactured and tested pursuant to IEC60076, TIS 384-2543 and customer standards or standards of trade partner countries such as ANSI, IEEE, JIS, etc. Furthermore, the company also submits electrical transformers for short circuit performance test by the KEMA Institute of the Netherlands and CESI, Italy, continuously for each size in order to guarantee the quality of QTC's electrical transformers. In 2017, the Company sent three items of transformer products to be tested at CESI. All three items passed testing. Two out of the three items tested were amorphous transformers successfully developed only by the Company in Thailand and in Asia. The Company was able to design and manufacture amorphous transformers to resist short circuit performance.



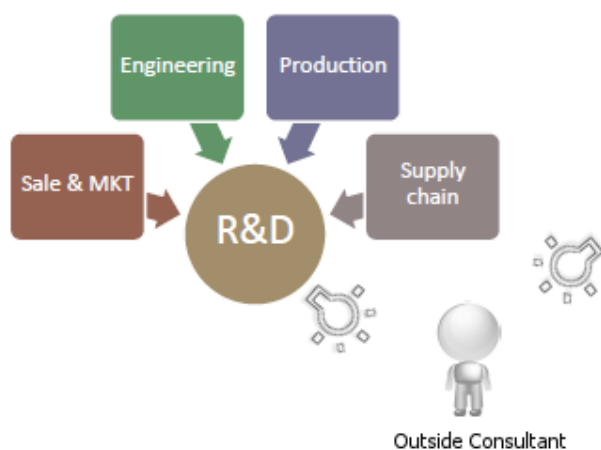
Images after Amorphous Transformers Passed the Short Circuit Performance Test

At the CESI Testing Room, Italy

## Innovations

The research and development process of 2017 has ongoing projects from the previous year and several new projects for developing internal processes and the Company's products and services. The Company aims to create benefit covering economic, social and environmental aspects. The Company expended a research and development budget of approximately 3,000,000 baht in 2017.

Development Model at the Process Level



Individual KAIZEN Development Model



### Process Supporting Innovation Development in the Organization

The research and development process of 2017 has ongoing projects from the previous year and several new projects for developing internal processes and the Company's products and services. The Company aims to create benefit covering economic, social and environmental aspects. The Company expended a research and development budget of approximately 3,000,000 baht in 2017.



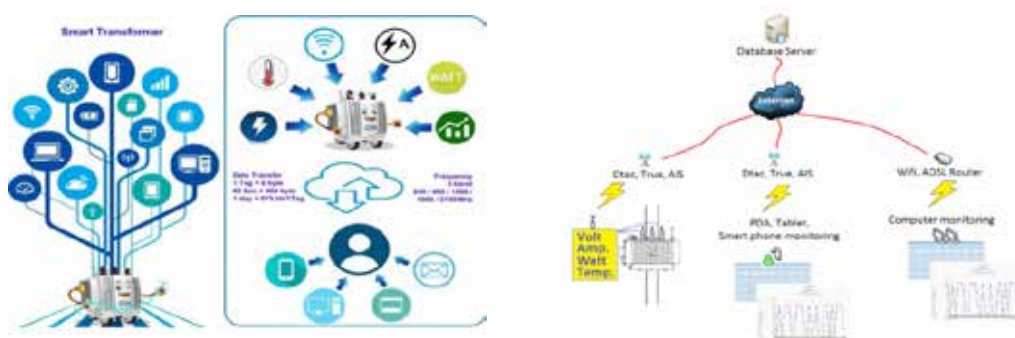
- **Body Production Capacity Expansion Project**



Building Model and Machinery Installation Designs for Factory Buildings No. 5 and 6

This project is aimed at reducing problems from failure to deliver products on time and increasing transformer body quality as a result of customer complaints. In the past, the Company dedicated efforts to develop trade partners in order to be able to manufacture transformer bodies for delivery to the Company at specified times and quality. However, because trade partners also have the Company's competitors as trade partners, some design secrets may have been revealed and trade partners' production quality may not be consistently controlled. Therefore, the Company decided to develop transformer body production processes by applying concepts to use advanced production technology, reduce dependence on manual labor and increase production capacity and quality. Building construction has begun and machines have been selected according to operating plans. The Company expects to be able to begin production in mid 2018.

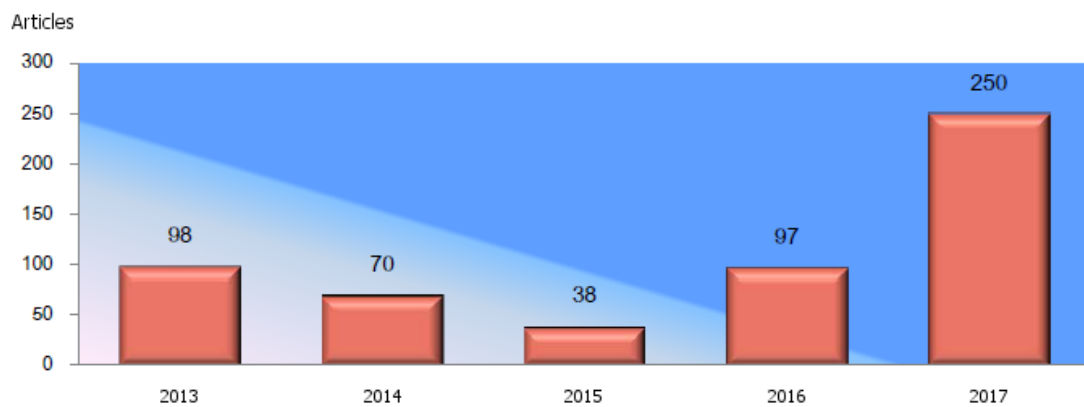
- QTC Smart Transformer System Development Project



### QTC Smart Transformer Function Model

In this project, the engineering team developed applications with special equipment producers and Thailand's major Internet service providers. This special equipment is installed on transformers and functions to measure pressure, currents, temperature, etc., before transmitting data via the Internet. Data is stored on the Company's servers. Customers can check transformer functions via mobile applications, thereby reducing transformer inspection time, working manpower and risk from work accidents. The transformer is currently installed and used in the Company. The Company has a goal to produce transformers and present sales as an additional option for ordinary customers by mid-2018.

In 2017, the Company promoted and improved work by the KAIZEN model. The Company modified thinking processes to analyze problems, solution guidelines and calculate effectiveness in order to create more convenience and ease of use along with building motivation for employees to participate more. The Company considered giving awards at several levels and organized the QTC KAIZEN Award internally to help employees at the operating level express in a venue prepared by the Company. This activity added much value for employees and the Company. In 2017, the Company had 250 KAIZEN articles with nine articles considered for the QTC KAIZEN Award 2017. These nine articles modified by employees were calculated for efficiency, resulting in the Company's ability to save 75,194.90 baht per year.



Employees' KAIZEN Statistics



KAIZEN Award, Outstanding Level



KAIZEN Award, Excellent Level



KAIZEN Award, Recognition Level



KAIZEN Star Award



## Modifications to Outstanding KAIZEN Work

### “QR Code Test Report @ Nameplate”

The Company's policy to focus on developing work methods to support new technologies and meet customer needs can create differences from competitors and can solve or prevent problems from internal work. This is a major question for a heavy industry industrial product such as electrical transformers: How can electrical transformers link with digital technology?

The aforementioned concept was the start for the Transformer Engineer work group, a collection of testing teams, designing teams and IT teams who aim to “change” in order to modify work methods and create more value for customers by using lasers to create name plates. Current lasers have many capabilities to create patterns on name plates. In addition, the designing team was instructed to create 1 QR code for each electrical transformer along with ordering the laser's program to shoot data on the name place along with the QR Code. The IT team supported by creating a database and developing applications for use on the Internet. The aforementioned QR code is bound to test results for that electrical transformer and customers can check transformer test results by scanning QR codes. Outside persons who are not electrical transformer owners will be unable to scan QR codes because the teams created a secret code for only customers. Furthermore, service technicians, the Sales Department or other departments with need to use test results can view test results through the Internet with clearly specified using rights.




Developer Team : From Left to Right

1. Mr. Yingyot Litrakunpanit(IT)
2. Mr. Surat Panomai (TEST)
3. Mr. Nattawut Nintet (DESIGN)

“This adds value to our products and services by using on-hand  
resources to create maximum benefit for the organization, operators and customers”

## Trade Partner Development (G4-EN32)

Since the majority of QTC's trade partners are SMEs, which lack the capital to apply for certification for various standards desired by the company, uses purchase and employment policies that cover quality, ethics, social and environment for trade partners to follow the guidelines of QTC at least. The qualifications of trade partners are assessed at least once annually to keep them registered as QTC's trade partners. If assessments find indicators that a trade partner lacks any qualification, the QTC work team will provide consultation and recommendations as well as opportunities for improvement in order to ensure correct practice.

Procurement Policy  <http://qtc-energy.com/index.php/purchasing-policy/>

### Development of Important Trade Partners

In 2017, the procurement and raw material planning team selected Siam Win Born Co., Ltd., a company located only two kilometers from QTC's factory that operates in the business of delivering sheet metal and metal pipes, etc., which are materials used in electrical transformer structures at a significant amount in each year. In the past, the Company found metal deliveries to be insufficient for meeting needs. Therefore, the procurement and planning team implemented TQM knowledge to modify stock delivery and preparation processes for Siam Win Born Co., Ltd. by preparing a container-less KANBAN system for calling (QTC) and filling (Siam Win Born) metal sheets to be consistent with production needs. The Company received good cooperation from executives of Siam Win Born Co., Ltd. At the same time, the Company notified the Company's estimated use at each time for Siam Win Born Co., Ltd. to be aware in advance in order to manage stocks with accuracy and punctuality, enabling the Company to reduce metal sheet storage areas with materials ready for use in production at all times. Siam Win Born Co., Ltd. received KANBAN warehouse management knowledge and can apply knowledge to other trade partners, giving Siam Win Born Co., Ltd. regular income. Furthermore, the aforementioned company is a good trade partner for QTC with the ability to effectively comply with QTC's procurement policy. Thus, the companies made trade agreements to deliver quality materials on time and QTC provided metal sheet usage figures for the entire year based on suitable market price bases while maintaining qualifications of good trade partners according to procurement policies. In 2017, the Company ordered 11.86 million baht in materials from Siam Win Born Co., Ltd.




### Trade Partner Indicators

Objective: To improve important trade partners' ability to follow specified procurement policies.

Goal 1 : Raw materials ready for production.

Indicator : Major trade partners are capable of delivering raw materials according to specifications at > 95%/year.

Result :  Goal achieved. (In 2017, raw materials were called for 725 times and 3 deliveries failed to be delivered on schedule, a ratio of 99.59%).

Goal 2 : Major trade partners comply with procurement policies.

Indicator : Mean AVL assessment scores in quality, environment and good governance > 75%.

Result :  Goal achieved. In 2017, AVL was at %45.



# SUPER LOW LOSS Transformer

Saves Energy **More Than**

Ordinary Transformers by **40%**



## Employee Safety and Health

### Safety (G4-LA5, G4-LA6)

Employee work safety is considered the most important issue for all employees at every level, as well as other related stakeholders. In 2017, the Company continued to consider work safety a risk that needs to be controlled while also creating a safety culture for employees' benefit.

**Safety Culture**



**Zero Accident**

### Standard System

For safety, occupational health and work environment, QTC proceeds in compliance with the specifications of OHSAS18001 and is certified by SGS (Thailand) Co., Ltd. twice per year. The Company has clearly specified the following personnel and operating framework:

#### Safety, Occupational Health and Work Environment Management Framework



(G4-LA5)

List of the Safety Committee (Saf. Com.) in 2017  
(From election in 2016)

First Name-Last Name	Position	Remarks
1. Mr. Charoensak Sarawong	Committee Chairman	-
2. Mr. Naka Kamkong	Director	
3. Mr. Kraiyot Promjarern	Director	
4. Mr. Kanoksak Naopotong	Director	
5. Mr. Kosin Moontep	Director	
6. Miss Jutamanee Rotjansang	Director	
7. Miss Saowalak Lila	Director/Secretary	
Calculated as 2.79 percent of all employees on the Committee.		

Furthermore, in 2017, the Company applied to participate in the Project to Prepare Safety, Occupational Health and Environment Standards for Small and Medium Enterprises organized by the Thailand Institute of Occupational Safety and Health (Public Organization) (TOSH) to improve operations from OHSAS18001 standards. After participating in the project, the Company modified risk analysis and assessment processes to be more thorough. In addition, the Company's internal auditing team modified internal assessment systems along with training employees in risk assessment and evaluations according to modified processes.



Image of the Project's Consultants Providing Consultation at the Factory in Rayong

Assessment of outcomes during and after participation in the project during the fourth quarter of 2017 revealed lower accident rates. Furthermore, the Company is considered to have system modification ability at the Platinum level by the project committee. In addition, the Company's executives were honored as one of the three business operating facilities to have participated in the CEO Sharing Forum to pass on experiences related to guidelines in preparing safety standard systems in the workplace for attendants on 19 December 2017 at Chao Phraya Park Hotel, Bangkok.



The Company Received a Platinum Certificate  
from Mr. Chaitana Chaimongkon, Dir., TOSH

CEO Sharing Forum

Award Ceremony for the Project to Prepare Safety, Occupational Health and Environment Standards  
19 December 2017 at Chao Phraya Park Hotel, Bangkok



## Support from High-ranking Executives

The Company's executives at every level have given importance and provide support, time, supporting equipment, personnel and necessary budgets for safety management operations. A high-ranking executive was placed as the Chairman of the Safety Committee in order to closely govern the Committee, monitor results and report performance to the Executive Board on a monthly basis in addition to making quarterly performance reports to the Board of Directors. In 2017, the Company's budget for safety improvement and promotion amounted at 1,328,700.84 baht.



## Mobilization of Knowledge into Practice

The Company uses many channels to transfer knowledge and improve employees' work safety skills such as training in necessary courses, KYT and safety group activities, practice for real learning, sharing experiences from persons who encountered accidents, developing necessary skills to assist victims, using video media or public relations documents and news to help employees, including outside workers working in the Company have awareness regarding safety, generosity and preventing accidents from occurring to themselves, colleagues and the Company's property.



## Enforcement of Regulations

The Company maintains strict measures to enforce safety rules and regulations. According to accident reports from past to the present, most accidents are caused by human negligence to wear personal protective equipment before working or removing protective equipment when no one sees. This is because employees are unaware of hazards that may occur at any time. Executives and supervisors have the duty to create understanding and warn employees according to the system and apply strict disciplinary actions. Statistics of accidents in 2017 showed more incidents and higher severity than in 2016. The executive team has given importance and monitors corrective measures closely in every accident while also intensifying measures by specifying the incidence of accidents as a personal indicator for annual performance assessments and end-of-year bonus payment considerations. This measure will become effective from the assessment period of 2018 onward. In 2017, the Company issued warning letters to six employees because of negligent operations resulting in accidents.

Concerning outside persons working in the Company, one accident occurred in 2017, causing damage to awnings at Factory 1. This was a case where a cargo truck from the port did not follow employees' advice. The Company reprimanded the person and demanded compensation for damage.

## Creating Participation

Annual work area and work position risk review and assessment continue to be a measure for creating employee participation in thinking of, searching for and creating preventive measures together. According to reviews in 2017, the system development team mentored operations in each section to intensify risk searches in line with TOSH standards.

Moreover, the Company organized the 5S Safety & Happy Workplace weekly activity to combine 5S and happy workplace work with safety work. The Company believes all three topics complement one another by creating a 5S system to reduce accidents and create happiness in working.



5S Safety & Happy Workplace Week



Risk Assessment Activity



## Measuring Safety, Occupational Health and Work Environment

The company assesses work environment to monitor risk factors concerning employee health comprehensively and regularly. The assessment results in 2017 are as follows:

**Table Showing Sound Measurements in Work Areas**

Area	Test Point	Annual Test Results					Standard	Unit
		2013	2014	2015	2016	2017		
Factory 1	Steel Core	85	74.1	-	-	78.7	90	dB(A)
Factory 1	Human Resources Department					62.1	90	dB(A)
Factory 3	Unicore Metal Cutting Machine	91	79.0	76.8	78.3		90	dB(A)
Oil Baking & Filling	Tanking	81	88.8	75.8	79.1	77.1	90	dB(A)
Assembly	Wood Cutting Room	81	77.4	77.3	81.5	93.7	90	dB(A)
Steel Core	Work Shop	83	77.3	79.9	81.2	86.5	90	dB(A)
Factory 4	Steel Pellet Shooting Area		85.9	84.7	89.6	88.6	90	dB(A)
Assembly	Work Shop			69.6			90	dB(A)
Assembly	Copper Core Welding					82.7	90	dB(A)
Coiling 1	Coiling			70.6			90	dB(A)
Coiling 2	Coiling			82.2			90	dB(A)
Coiling 3	Coiling					71.3	90	dB(A)
Coiling 4	Coiling			75.3		70.9	90	dB(A)
New Coiling Building	Coiling Machine				74.1	74.1	90	dB(A)
Paper Cutting Room	Paper Cutting			74.4			90	dB(A)
Factory 4	Chassis Assembly and Welding		85.9	84.7	91.3	90.3	90	dB(A)

According to results from sound measurements in work areas in 2017, sound levels in Factory 4 work areas were found to be slightly lower than 2016 but still higher than standard specifications. The Safety Committee team specified the area as a hearing protection area. Operators are required to wear ear plugs or ear muffs at all times while working in the area. The wood cutting room had higher sound levels from 2016 until sound levels exceeded standards due to installation of more machines. The aforementioned machines function automatically with no need for a controller. Thus, the machine noise levels have no impact on workers. Nevertheless, the Safety Committee team specified the area to be a hearing protection area. Any person entering the aforementioned area while machines are working is required to wear ear plugs or ear muffs at all times when in the area.

### Results from Measuring Noise Disturbance outside Factories (Community)

Parameter	Area	Annual Test Results				Standard	Unit
		2014	2015	2016	2017		
General Volume Level ( $L_{eq}$ 24hr)	Factory Garden	56.3	65.2	65.8	62.4	70	dB(A)
General Volume Level ( $L_{max}$ )	Factory Garden	51.6-78.3	36.5-91.4	96.3	87.3	115	dB(A)

## Test Results on Environment for Working with Chemicals

Area	Parameter	Annual Test Results							Standard	Unit
		1/2014 2/4/2015	2/2014 16/9/2014	1/2015 28/5/2015	2/2015 23/11/2015	1/2016 1/6/2016	2/2016 10/12/2016	1/2017* 16/06/2017		
Steel Core: Factory 3	Iron Dust					<0.007	<0.007	0.015	10	mg/m <sup>3</sup>
	Total Dust							<0.25	15	mg/m <sup>3</sup>
Steel Core: Factory 1 Steel Arrangement	Xylene	0.71	2.17	0.25	0.6				435	mg/m <sup>3</sup>
	Xylene					<0.25	Not Detected	<0.25	100	ppm
	Toluene				4.36				435	mg/m <sup>3</sup>
	Toluene					0.33	Not Detected	1.81	200	ppm
	Acetone				0.26	<0.30	Not Detected	Not Detected	250	ppm
	Total Dust							Not Detected	15	mg/m <sup>3</sup>
Steel Core: Steel Clamp Paint	Xylene	0.01	2.17	0.25	0.25				435	mg/m <sup>3</sup>
	Xylene					<0.25	Not Detected	Not Detected	100	ppm
	Toluene	2.86	2.72	4.82	0.3				752	mg/m <sup>3</sup>
	Toluene					<0.25	2.41	Not Detected	200	ppm
	Acetone				0.53	<0.30	<0.30	Not Detected	250	ppm
Steel Core: Plasma Cutting	Total Dust				<0.25	<0.25	0.43	<0.25	15	mg/m <sup>3</sup>
	Carbon Monoxide				<1	<1	1	1	50	ppm
	Copper Fume					<0.007	Not Detected		0.1	mg/m <sup>3</sup>
	Xylene							Not Detected	100	Ppm
	Toluene							Not Detected	200	Ppm
	Iron Fume							0.01	10	mg/m <sup>3</sup>
	Acetone							Not Detected	250	ppm
	Total Dust							0.84	15	mg/m <sup>3</sup>
Coiling: Coiling 3	Total Dust				<0.25	<0.25	Not Detected	Not Detected	15	mg/m <sup>3</sup>
Coiling: Coiling 4	Copper Fume					<0.007	Not Detected	Not Detected	15	mg/m <sup>3</sup>
Coiling: New Coiling Building	Total Dust					0.34	Not Detected	Not Detected	15	mg/m <sup>3</sup>
	Copper Fume					<0.007	Not Detected	Not Detected	0.1	mg/m <sup>3</sup>
Coiling: Paper Cutting Room	Total Dust		ND	0.26	0.25	<0.25	<0.25	0.43	15	mg/m <sup>3</sup>
	Respirable Dust							0.1	5	mg/m <sup>3</sup>
Assembly: Transformer Assembly	Copper Fume	0.01	0.01	0.007		0.008	Not Detected	Not Detected	0.1	mg/m <sup>3</sup>
	Iron Fume					<0.007	<0.007	Not Detected	10	mg/m <sup>3</sup>
Assembly: Workshop	Lead	0.001	0.01	0.015					0.2	mg/m <sup>3</sup>
	Copper Fume	0.009	0.01		0.007	<0.007	<0.007	Not Detected	0.1	mg/m <sup>3</sup>
	Iron Fume					<0.007	<0.007	Not Detected	10	mg/m <sup>3</sup>
Assembly: Wood Cutting Room	Total Dust		ND	9.13	0.25	0.42	0.34	Not Detected	15	mg/m <sup>3</sup>
	Respirable Dust				0.1	0.4	Not Detected	Not Detected	5	mg/m <sup>3</sup>
Equipment Installation: Spray Booth	Total Dust		ND	1.36	0.25	0.68	Not Detected	Not Detected	15	mg/m <sup>3</sup>
	Xylene	0.25	2.17	0.25	<0.25	<0.25	<0.25	Not Detected	100	ppm
	Toluene	0.01	1.88	0.25	<0.25	<0.25	1.57	Not Detected	200	ppm
Transformer Repair	Total Dust		ND	0.25	0.25	<0.25	Not Detected	< 0.25	15	mg/m <sup>3</sup>
	Oil Mist				0.056		0.08		5	mg/m <sup>3</sup>
Chassis: Chassis Assembly Welding	Total Dust		ND	0.25	0.34	0.34	Not Detected	< 0.25	15	mg/m <sup>3</sup>
	Carbon Monoxide					<1	3	1	50	ppm
	Iron Fume					0.206	0.018	0.046	10	mg/m <sup>3</sup>
Chassis: Plasma Cutter	Carbon Monoxide					<1	5	< 0.25	50	ppm
	Iron Fume				0.015	0.153	0.018	0.038	10	ppm
	Iron Fume				0.232	0.182	0.090	0.046	10	mg/m <sup>3</sup>
Steel Pellet Firing Room (inside)	Iron Fume				0.011	0.016	0.042		10	mg/m <sup>3</sup>
	Respirable Dust							0.100	5	mg/m <sup>3</sup>
	Oxygen							21.000	19.5 - 25	%
Steel Pellet Firing Room (outside)	Iron Fume							0.011	10	ppm
Spray Booth, Factory 4	Carbon Monoxide				-	<1	2	Not Detected	50	ppm
	Iron Fume				0.020	0.017	0.012	Not Detected	10	ppm
	Respirable Dust					0.05	<0.10	0.2	5	mg/m <sup>3</sup>

\*Remarks: Environmental tests are reduced to once a year pursuant to the Department of Labor Protection and Welfare Notification on Criteria, Test Methods and Analysis of Hazardous Chemical Concentration Test Results of B.E. 2559 (A.D. 2016)

## KAIZEN Modification in Safety: Alarm Systems...Warning of Dangers in Advance

According to risk assessments from working in the steel pellet firing room, the operator wears a protective suit with oxygen respirators and works alone in a sealed room. If an accident occurs to the operator inside the room, people outside the room will not know and will be unable to provide assistance. This is a concern for the Safety Committee team and executives. Thus, maintenance teams and workers in the area were assigned to think of methods for preventing potential hazards.

Mr. Jedsada Prateep, a maintenance technician, proposed making KAIZEN modifications by designing alarm system circuits himself. This was done by installing control systems to detect if the employee inside the room can work normally. Light and sound signals were installed with a timer and a switch for controlling steel pellet firing. According to this work principle, when the employee enters the room and closes the door, the limit switch installed at the door will connect the circuit, starting 5-minute timer countdown. If the employee does not press the switch for controlling steel pellet firing, the timer will send light and sound signals, giving employees outside awareness and ability to provide support or inspect the situation. In addition, an emergency switch is attached to the employee. In case of emergency, the employee can press the switch to ask for help immediately. Modifications used a total budget of 15,000 baht. This achievement added significant value for the organization, thereby improving moral for workers inside and significantly reducing chances of an accident.

Before Modification



No Alarm System

After Modification



Alarm System and Ability to Ask for Help



"My basic knowledge, helpful advice from supervisors and the Company's equipment support helped me achieve this success. I have to thank the Company's executives for giving me the opportunity to develop my abilities in this area. And I feel very happy seeking my friends working in the steel pellet shooting room with comfort. The commendation I received from executives and my friends' thanks made my heart swell with pride."

**Mr. Jedsada Prateep**

**Maintenance Staff**

## Accident Statistics (G4-LA6)

In 2017, the number of accidents is higher than in 2016, mostly because of non-compliance with proper work methods and negligence in wearing personal protective equipment. This caused property damage at a value of 190,518.00 baht. Two accidents interrupted work with a total interruption period of four days. Loss from interruptions is valued at 1,300 baht.

Table Comparing Work Accident Statistics (2013-2017)


Severity/Damage	No. of Times/Year				
	2013	2014	2015	2016	2017
Property Damage	8	6	10	10	12
Minor Injury (No Interruption)	8	7	21	7	9
Severe Injury Causing Interruption	1	0	0	0	2
Total (Times)	17	13	31	17	23
Total Length of Interruption Caused by Work Accident (Days)	2	0	0	0	4
Sickness from Working (Sick Leaves)	0	0	3	0	0

## Safety Indicators

Objective: To promote work safety and reduce work accidents.


Goal 1 : To reduce work accidents with severity causing work interruptions

Indicator : Zero accidents.

Result :  Failed to achieve the goal (two work accidents caused four days of work interruption).

Goal 2 : Reduce work accidents in every case.

Indicator : No more than 15 accidents.

Result :  Failed to achieve the goal (a total of 23 cases of accidents occurred).

Goal 3 : Every employee received training according to necessary safety courses.

Indicator : 100%

Result :  Goal achieved.



## Employee Health (G4-LA7)

Employees' good health is an important factor enabling employees to perform duties and responsibilities effectively. The Company has announced policies to promote health and organization happiness in addition to organizing work areas to have an attractive and clean environment covering issues in the areas of lights, sounds, heat, chemicals, consumption and quitting alcohol, smoking and substance abuse, etc. Furthermore, the Company organizes annual health examinations and continually monitors results.

### Annual Health Examinations

The Company arranges for employees to receive health examinations once a year at the Bangkok office and the factory in Rayong using two medical facilities, namely, BMC Plus Hospital with Phayathai Sriracha Hospital and Samitivej Srinagarindra Hospital. The Company controls legal health examinations and arranges additional examinations for employees according to age and gender of risk. In 2017, the Company spent a budget of 544,850.00 baht for annual health examinations.

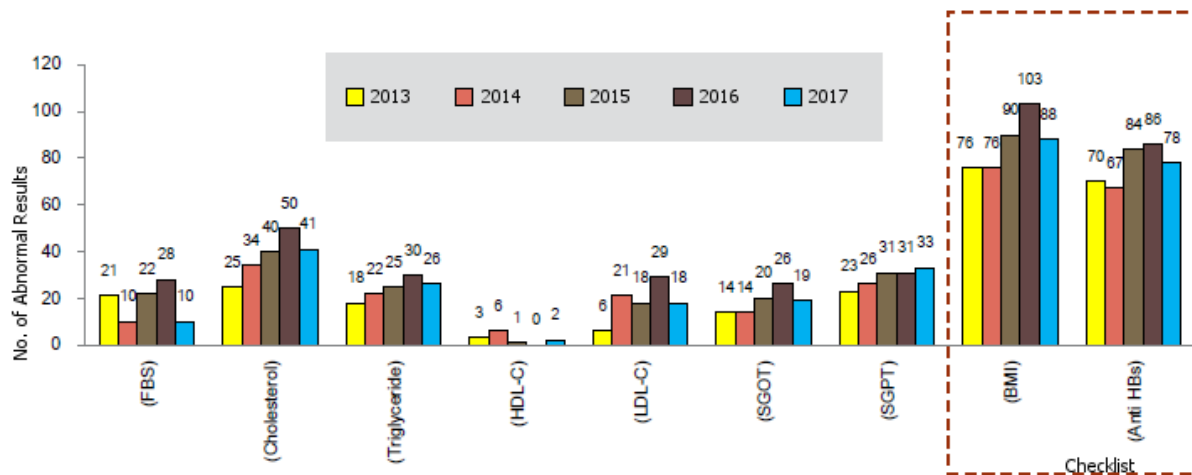


Chart Showing General Health Examination Results of Employees with Abnormal Results/Health Risks



Annual Health Examinations of 2017



Health examinations according to occupational risk factors in 2017 found lower trends of employees at risk due to the Company's efforts to continually modify work environments and control risk factors along with inviting experts and doctors to educate and advise employees on proper healthcare methods (G4-LA7).

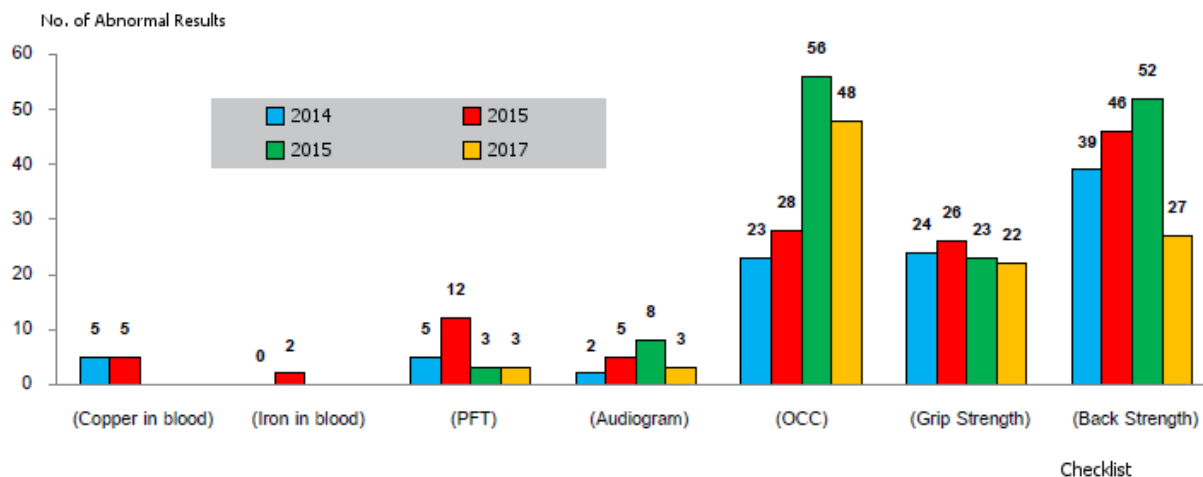


Chart Showing Test Results According to Occupational Risk Factors (Only Abnormal Test Results)

## Hepatitis B Vaccination Project

According to health examination results in 2017, trends of employees with abnormal test results were found to be lower than 2016 because of the Company's supportive measures. In 2017, the Company considered health risks related to employees' immunity to hepatitis B because many migrant workers are now working in Thailand, especially at restaurants and department stores including colleagues in the Company. Migrant workers may be carriers of hepatitis B. Therefore, the Company allocated 72,000 baht to provide hepatitis B vaccinations for employees who have no immunity including migrant workers by using services at Mabyangporn Tambon Health Promotion Hospital. Each employee at the factory and the Bangkok Office was given three vaccinations. Vaccinations were completed in March 2018 (45,250 baht was spent in 2017).



## Health Promotion Project

“When should I exercise? **Now** or when I’m **sick**”



This is an ongoing project from 2015 aimed at supporting employees to exercise and make appropriate food choices. The Company’s support is open to every employee at all levels because the Company understands that health is a personal right to be performed effectively by each person. The Company provides budgets to support activities according to employees’ preferences and ability such as soccer club, badminton club and aerobic-yoga club activities, etc.



QTC League Cup 2017 Soccer Competition Activities (Soccer Club)



Badminton Club Activities

Furthermore, the Company requires food vendors in the Company to provide healthy and nutritious menus in line with nutritional principles along with displaying the amount of sugar and calories in beverages and meals in order to provide healthy food choices for employees while also using the Clean Food Good Taste standard as criteria.



Cafeteria

## White Factory Project

The Company continues to place importance on aggressively preventing and suppressing substance abuse due to awareness that threats from substance abuse will have effects on employees' health, relationship with coworkers, families, communities and the Company. The Company continually organizes random tests for narcotic substances without giving notifications in advance in line with policies and strictly enforces rules and regulations.

In 2017, the Company intensified efforts by inviting police officers (Pluak Daeng Police Station) to perform 100 percent inspections on at least a quarterly basis without notifying schedules in advance. This is to cause fear among those who think of experimenting with narcotic substances or help employees with substance abuse to finally stop using narcotic substances. Test results in 2017 found seven employees with narcotic substances, most of whom were new employees who went to entertainment venues. The Company followed terms by dismissing three employees and sending four employees to enter therapy projects with close monitoring.



Images of Urine Tests by Police Officers (Pluak Daeng Police Station)

## Employee Health Indicators

Objective: To help employees have good health and reduce illnesses from health risks

Goal 1 : Employees have immunity to hepatitis B.

Indicator : 90% of all employees (risks from inconsistency with indicators or lack of immunity in some employees).

Result : **✗** Failed to achieve the goal. In 2017, 43.5 percent of employees were found to be immune. Employees without immunity are receiving vaccinations. The final vaccination will be completed in March 2018.

Goal 2 : Reduced risk of occupational sickness for employees.

Indicator : A 15-percent reduction in the number of employees with occupational illnesses from 2016.

Result : **✓** Goal achieved (52 employees in 2016 and 27 employees in 2017 or %51.92).

Goal 3 : 100% White Factory.

Indicator : No employees who use methamphetamine or ecstasy (zero).

Result : **✗** Failed to achieve the goal. In 2017, seven employees were found to have used methamphetamine or ecstasy.

# Employment and Human Rights

## **Employment** (G4-10, G4-EC5, G4-EC6, G4-LA12, G4-LA13, G4-HR6)

The company gives importance to employment and fair management of remuneration and is conscience about individual human rights. Hence, a policy was set as practice guidelines for operators and was communicated to all employees for understanding and dissemination on the company's website.

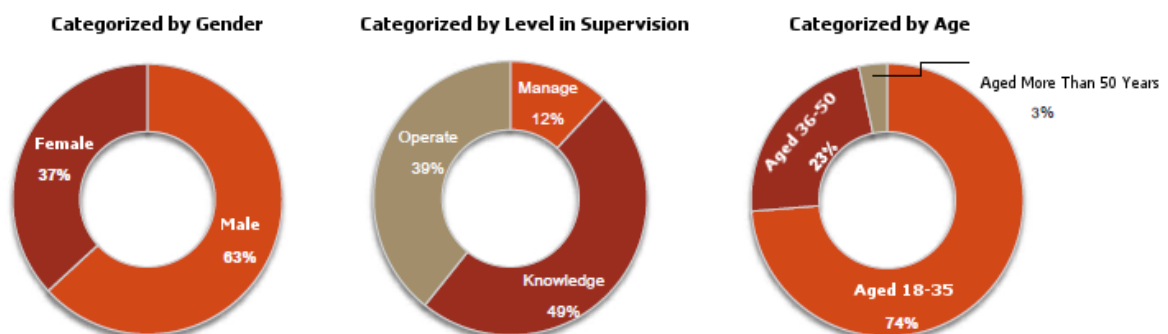


Human Resource Management Policy <http://qtc-energy.com/index.php/human-resource-management-policy/>

**Table Showing Employment Ratios (Only QTC Energy PCL)**

Employment Status	2014		2015		2016		2017	
	No. (Employee)	Percent	No. (Employee)	Percent	No. (Employee)	Percent	No. (Employee)	Percent
<b>By Gender</b>								
Male	137	83.43	145	64.44	131	62.98	132	63.16
Female	79	36.57	80	35.56	77	37.02	77	36.84
<b>By Level</b>								
Manage	12	5.56	12	5.33	13	6.25	25	11.96
Male	6	-	6	-	6	-	14	-
Female	6	-	6	-	7	-	11	-
Knowledge	118	54.63	121	53.78	110	52.88	102	48.81
Operate	86	39.81	92	40.89	85	40.87	82	39.23
<b>By Age</b>								
Aged 18 – 35 Years	153	70.83	159	70.67	145	69.71	154	73.68
Aged 36 – 50 Years	55	25.46	57	25.33	55	26.44	48	22.97
Aged More Than 50 Years	8	3.70	9	4.00	8	3.85	7	3.35
<b>By Area</b>								
Bangkok Main Office								
Male	20	9.26	22	9.78	22	10.58	23	11.00
Female	29	13.43	25	11.11	23	11.06	23	11.00
Rayong Factories								
Male	117	54.17	123	54.67	109	52.40	109	52.16
Female	50	23.15	55	24.44	54	25.96	54	25.84
<b>Total No. of Employees At End of Year (Employees)</b>	<b>216</b>		<b>255</b>		<b>208</b>		<b>209</b>	

**Chart Showing Categorization by Employment Status at the End of 2017**



In 2017, the Company used contracted labor from M & M Contract Co., Ltd. to perform insignificant work requiring manual labor in order to reduce labor shortage problems. The Company granted this group of employee rights pursuant to the law and provided care for welfare and living conditions equal to the Company's employees. Most of the contracted labor are Cambodians with legal work permits.

**Table Showing Contracted Labor Employment Ratios (Workers)**

List	2017	
	No. of Employees	Percent
<b>Gender</b>		
Male	24	80
Female	6	20
<b>Ethnicity</b>		
Thai	1	3.33
Cambodian	29	96.67
Myanmar	-	-
<b>Total No. at End of Year (Employees)</b>		

**Table Showing Wages and Remuneration Ratios (Amount)**

Employment Status	2014	2015	2016		2017	
			Amount (Baht)	Percent	Amount (Baht)	Percent
<b>Gender</b>						
Male	-	-	59,480,140.42	7.11	62,103,865.00	62.89
Female	-	-	29,144,864.14	2.89	36,648,700.00	37.11
<b>Level</b>						
Manage	-	-	-	-	36,141,644.00	36.60
Knowledge	-	-	-	-	40,638,699.00	41.15
Operate	-	-	-	-	21,972,222.00	22.25
<b>Executives</b>						
Executives (Board of Executives)	-	-	-	-	13,982,440.00	14.16
Employees	-	-	-	-	84,770,125.00	85.84
<b>Total Wages and Remuneration for Only QTC (Baht)</b>	-	-	-	-	98,752,565.00	
<b>Division between Regular and Contracted Employees</b>	-	-	-	-		
Regular QTC Employees	-	-	-	-	98,752,565.00	92.65
Contracted Labor with Wages Paid to Agent Company	-	-	-	-	7,834,478.95	7.35
<b>Total Wages and Remuneration (Baht)</b>					109,587,043.95	-

Chart Comparing Employment Ratios between Regular Employees and Contracted Labor





**Table Showing New Employees and Retired Employees**

Items	2014		2015		2016		2017	
	No. (Employees)	Percent	No. (Employees)	Percent	No. (Employees)	Percent	No. (Employees)	Percent
<b>New Employees</b>								
Male	64	77.10	47	77.04	24	63.16	36	65.45
Female	19	22.90	14	22.96	14	36.84	19	34.55
<b>New Employees</b>								
Aged 18 – 35 Years	76	91.57	59	96.72	38	100.00	46	83.64
Aged 36 – 50 Years	7	8.43	2	3.28	0	0.00	9	16.36
Aged More Than 50 Years	0	0	0	0	0	0.00	-	-
<b>Retired Employees by Gender</b>								
Male	39	72.22	28	75.67	37	67.27	33	61.11
Female	15	27.78	9	24.33	18	32.73	21	38.89
<b>Retired Employees by Age</b>								
Aged 18-35 Years	48	88.89	31	83.78	53	96.36	43	79.63
Aged 36-50 Years	6	11.11	6	16.22	1	1.82	10	18.52
Aged More Than 50 Years	0	0.00	0	0.0	1	1.82	1	1.85

**Remarks:** Minimum wage in 2017 in Bangkok is 310 baht and 308 baht in Rayong.

**Table Showing No. of Female Employees who returned from Maternity Leave (G4-LA3)**

Year	2014	2015	2016	2017
No. of Employees Who Took Maternity Leaves (Employees)	4	6	5	7
No. of Employees Who Returned to Work (Employees)	4	6	4	6

**Table Showing Resignation Rates**

Year	2014	2015	2016	2017
% Rate	1.73	1.37	2.13	2.10

**New Employment Wage Rates and Welfare (G4-EC5), (G4-LA2)**

Items	Operate Level	Knowledge Level	Management	
			Section	Department
Starting Wages (Not Including Experience): Baht	1.73	1.37	2.13	2.10
Traveling Costs	⊙	⊙	⊙	-
Cost of Living	⊙	⊙	-	-
Controlled Engineering Profession Certificate Cost	-	Only Engineers	-	-
Risk Cost	Only High Risk Positions		-	-
Diligence Allowance	⊙	⊙	-	-
Accident Insurance	Only Employees Working Offsite		-	-
Telephone Fee	-	Some Positions	⊙	⊙
Office Car	-	-	-	⊙
Children's Scholarship (If Any) According to Terms	⊙	⊙	-	-
Provident Fund (15% from employees at most. The Company contributes 3-6% according to terms)	⊙	⊙	⊙	⊙
Funeral Assistance for Employees' Relatives	⊙	⊙	⊙	⊙
Wedding Assistance (One-Time Payment)	⊙	⊙	⊙	⊙
Assistance for Childbirth Expenses	⊙	⊙	⊙	⊙
Medical Expenses at No More Than One Times Salary/Person/Year	⊙	⊙	⊙	⊙
Dental Procedure Cost (1,000 Baht/Year)	⊙	⊙	⊙	⊙

**Remarks:** Minimum wage in 2017 in Bangkok is 310 baht and 308 baht in Rayong.



## Performance Management System (PMS) Development Project

According to plans for reducing risk of outpouring from the engineering profession and major work positions, the Company carried out the project to restructure wages and modify wage and remuneration management systems again in 2016. The Company clearly specified wage levels and completed personnel transfers into the new wage structure. In addition, to continue the risk reduction plan in 2017, the Company began the Performance Management System (PMS) Development Project by using the current PMS system to prepare the organization's KPIs and indicators at the work unit level in line with the organization's strategy and goals. Furthermore, the Company prepared clear criteria and forms for personal performance assessment by hiring consultants from Human Intellectual Management Co., Ltd. with a budget of 600,000 baht.

Results from modifying performance assessment systems caused indicators for each work position to be connected to indicators at the agency and organization levels. This creates fair performance assessment, reflecting ability at the individual level, and creates opportunities for improving personnel in each position, giving supervisors the ability to manage wages and remuneration appropriately and fairly.

Further modifications in 2018 include succession planning, beginning with major work positions.



Image of Discussions in the Project's Modification and Guideline Presentation Process

## **Human Rights** (G4-HR4, G4-HR5)

In 2017, the Company implemented guidelines for modifying internal management processes from participation in the Children-friendly Business Promotion Project organized by the Thaipat Institute in cooperation with UNICEF in 2016 to improve employee welfare to connect with employees' children in order to help employees' children receive good care and educational opportunities such as:

### **Mothers' Corner Project**

The Company renovated the welfare building's area by adding "mothers' corners" to allow mothers to use breast pump services and refrigerate breast milk for infants (mothers can ask supervisors to use services at any time to pump breast milk). Services are provided from 8:30 a.m. – 4:30 p.m. of every business day. In addition, the Company provided key information regarding lactogenesis and childcare.



### **Scholarship Project for Employees' Children**

In 2017, the Welfare Committee considered presenting 40 scholarship requests for employees' children to the Board of Executives according to specified conditions. Scholarships are divided into three levels consisting of:

- |                              |                              |
|------------------------------|------------------------------|
| Preschool Scholarships:      | 8 Scholarships @ 1,000 Baht  |
| Primary Edu. Scholarships:   | 24 Scholarships @ 1,500 Baht |
| Secondary Edu. Scholarships: | 8 Scholarships @ 2,000 Baht  |

A total of 60,000 baht.



Human Rights Policy : <http://qtc-energy.com/index.php/humans-right-policy/>




# Employee Care (G4-HR4)

The Company continues to apply a strategy of building work-life balance for the goal of creating sustainable happiness for employees under the happy workplace policy and the human rights policy along with promoting knowledge and understanding through activities.

 Happy Workplace Policy: <http://qtc-energy.com/index.php/happy-workplace-policy/>

The Company measures employee happiness after 2016 by using the Happinometer. In 2017, happiness survey data were sent to the Thailand Centre for Happy Workplace Studies, Institute for Population and Social Research, Mahidol University, in order to analyze happiness in different dimensions including employee satisfaction, attachment to the organization and balance in life. The Company also prepared detailed summary reports to use as guidelines for improving and raising employee happiness levels.

Report Showing Mean Happiness Scores in Separate Dimensions (Organization Overview) of 2017:  
(Surveyed in November 2017)

Mean Happiness Score	 Happy Body	 Happy Relax	 Happy Heart	 Happy Soul	 Happy Family	 Happy Society	 Happy Brain	 Happy Money	 Happy Work	Overall Happiness
Overall (200 Employees)	55.0 Happy 	55.6 Happy 	67.5 Happy 	69.8 Happy 	62.8 Happy 	60.5 Happy 	63.5 Happy 	52.1 Happy 	66.0 Happy 	61.4 Happy 

According to overall happiness assessments in 200 employee representatives out of 239 employees (including contracted workers), mean happiness was found to be at 61.4 percent, a “Happy” level. The Company’s goal is “Very Happy” > 75%.



Image of Employee Happiness Surveys to Send Data to the Institute for Population and Social Research, Mahidol University

## Support for Building a Happy Workplace

The Company continues to support activities aimed at helping employees have a positive attitude toward themselves, colleagues, the organization and society in general. Most of the activities are from ongoing projects in the previous year in order to create consistency and sustainability.

### “Happy Money, Good Living, No Debts, No Poverty”

This project supports employees to save by focusing on providing knowledge and understanding through experienced persons in the organizations, who shared experiences regarding causes of debt and how to become free from debt in order to help employees learn.



In 2017, 90 Company employees applied to enter the project in order to receive financial support for relieving debts outside the system from G Capital Public Co., Ltd. (GCAP). All of the employees are currently repaying debts according to contracts. The aforementioned support is able to assist employees with debt and adjust spending behavior effectively.



Mr. Kriangkrai and Mrs. Nok are a couple who have worked as operating-level employees at QTC for more than six years. They have a daughter aged two years old. Both entered the Happy Money, Good Life, No Debt, Poverty Project. Previously, both of them have debts outside the system. They had to pay high interest rates and were not able to make ends meet. The couple are now able to manage their finances and have high financial discipline. Kriangkrai and Nok told the happiness team that “Since we entered this project, our lives improved just like the project’s name. Apart from bringing our debt outside the system into the system and make monthly deductions consistent with our financial capabilities at no more than 30 percent of income, we’ve learned how to manage our income. Allocating savings, expenditures and recording accounts helped us to be aware of ourselves all the time. Now, we are much more relaxed from stress. Happiness is really something we make for ourselves. I want QTC to always have good projects like this.”

**Mr. Kriangkrai Siripai (Kriangkrai)**

**Miss Sureerat Jaikamhang (Nok)**

**Saving**  
is to keep part of current income for future  
expenditures.  
“Happy Money”





## Morals & Ethics Promotion Activities in 2017

The Company continues to place importance on and promote moral and ethical actions among employees in order for employees to be good, responsible to themselves and surrounding persons via the following activities:

**“Be good, think well, do well. Concentrate at work and manage the problems that come your way.” Happy Soul**



Merit Making  
At QTC's  
21st Anniversary  
19 August 2017



Sermon by Phra Ajarn Suntaro on 11 April 2017



Dry Food Offerings for the Passing of the Year and New Year's Day on 27 December 2017



## Photograph Competition to Support the Family Institution of 2017

**“Don’t care for others more than family. Don’t indulge yourself until you’ve forgotten that family is important”**

**“Happy Family”**



**“Happy Family”**  
Ms. Sawitree Nakjan



**“I love my father the most”**  
Ms. Sawitree Nakjan



**“I love my mother the most”**  
Mr. Ekkachai Seepenwan

## Employee Value Promotion 2017

Praising good people who returned items to coworkers.



Mr. Apiwat Maneenop



Ms. Jarunee Bootdee

Outstanding Employee



Mr. Somchai Muagpimai

10 Year QTC Award



20 Year QTC Award



Zero Accident Area Award



## Recreational Activities 2016

**“Happiness” is not measured by the “good things” we receive  
but by our “view” toward “those things”  
“Happy Relax”**



### Annual Tours and Vacations

In 2017, the Company prepared a suitable annual tour and vacation budget for the needs of each employee group in addition to training group leaders to manage everything by themselves. The Company focused on tourism sites to promote income for local communities by organizing minor activities on five trips consisting of: Chomchan Around the World in Khlung, Chanthaburi, Puley Homestay in Laem Singh, Chanthaburi, Mina Villa, Nakorn Nayok, and Praying at 9 Temples in Ayudhaya. The Company spent a budget of 341,650 baht with 144 activity participants or 67.92 percent of all employees.



Annual Tour and Vacation Activity Images

### New Year's Day Activities

In 2017, the Company organized New Year's Day activities again after cancelling activities in 2016. Activities were organized internally using the Company's own activity leaders and teams in order to cut expenses from hiring outside agencies to organize activities. In 2017, activities were organized with a “Four Regions' Culture” theme on 27 December 2017. The Company spent 531,691.69 baht in activities with 231 participants (including contract workers).



Atmosphere at New Year's Day Activities, “Continuing Cultures from Four Regions”



# Employee Development (G4-LA9, G4-LA10, G4-LA11)

Clinging to ideas without adjusting how you thing or practicing new necessary skills is a barrier for self-improvement.

## “Happy Brain”

The Company is determined to develop employee skills, knowledge and capabilities to create good and talented employees according to the Q+R=S sustainability equation using key strategies to develop employees all-round to create good and talented employees. In 2017, the Company had the following results:



Training Hour Statistics (Only QTC Energy PCL)

Employees	No. of Hours/Employee/Year					
	2014	2015	2016		2017	
By Level	-	-	Total Training Hours	Mean/ Employee/ Year	Total Training Hours	Mean/ Employee/ Year
Manage	66.50	82.78	1,290.50	99.27	1,671.50	64.29
Knowledge	66.50	82.78	7,300.00	64.60	2,709.50	26.05
Operate	66.50	82.78	2,621.00	29.12	4,468.00	52.59
By Gender	-	-				
Male	-	-	7,670.50	55.99	5,880	43.64
Female	-	-	3,541.00	44.82	2,969	37.31
By Department	-	-				
Executive	-	-	249.00		140.00	
Foreign Sales	-	-	227.00		90.50	
Domestic Sales	-	-	747.00		189.50	
Business Development	-	-	55.00		36.00	
Supply Chain	-	-	1,132.00		753.00	
Accounting & Finance	-	-	470.00		89.00	
Management	-	-	686.00	51.91	379.50	41.29
Production	-	-	4,254.50		4,220.50	
Corporate Sustainability Development	-	-	126.00		1,295.50	
Engineering	-	-	2,045.50		430.00	
Special Project Sales	-	-	493.50		91.00	
Research & Development	-	-	263.00		831.50	
Marketing	-	-	65.00		282.00	
Safety	-	-	398.00		21.00	
Total No. of Training Hours for the Year (Hours)	-	-	11,211.50		8,849	
Mean Employees for the Year (Employees)	-	-	216		214	

## Training Hour Statistics (Only Contracted Labor)

Employees	No. of Hours/Employee/Year				
	2014	2015	2016	2017	
By Gender	-	-	-	Total Training Hours	Mean/Employee/Year
Male	-	-	-	733	27.15
Female	-	-	-	160	22.86
					26.26
Total Training Hours for the Year (Hours)	-	-	-	893	
Mean Employees for the Year (Employees)	-	-	-	34	

In 2017, the Company focused on improving employee skills at the Operation level to be higher than in 2016. Employees at the Knowledge and Manage levels had lower training ratios in order to improve work skills at the Operate level. This is to reduce work errors and obtain quality work. Moreover, the Company added courses to adequately and appropriately improve employee quality of life (life skill) so as to create balance. The Company spent a budget of 1,238,654.00 baht on training and development.

### Work Skill Courses



Professional Excel Skills



Welding Skills



Testing Skills



Quality Assurance Skills

### Life Skill Courses



Experience Sharing  
with Accident Victims



Developing Teamwork



Compliance with Rules & Regulations  
for a Happy Society



Knowing Personal Mental Health and  
Consultation Guidelines



Sharing "Debt Relief, No Poverty" Experience

## Employee Indicators

**Objective:** To help employees in the organization be good with morals, respect for rules to live together happily and develop employees to be talented with many abilities, attached to the organization and capable of living with work life balance.

**Goal 1:** Lower resignation rates.

**Indicator:** A 5-percent lower rate than in 2016.

**Result:** ❌ Failed to achieve the goal. In 2017, the resignation rate was 2.09 percent, a reduction from in 2016 by 1.88 percent. (In 2016, the resignation rate was 2.13 percent).

**Goal 2:** Every employee in the organization is united and respect the rights of others (G4-HR12).

**Indicator:** No internal complaints (zero) regarding violations of rights and liberty or disputes.

**Result:** ✅ Goal achieved.

**Goal 3:** Mean happiness in the organization is “very happy and enviable”.

**Indicator:** > 75%.

**Result:** ❌ Failed to achieve the goal. In 2017, mean happiness in the organization was 61.4 percent at a “Happy” level. Results were analyzed by the Institute for Population and Social Research, Mahidol University.

**Goal 4:** Lower numbers of employees with gaps in work capabilities according to work positions.

**Indicator:** A 50-percent drop in the number of employees with gaps.

**Result:** ✅ Goal achieved. In 2017, assessments found 80 employees with gaps and 49 employees developed skills to close gaps (61.25%).

**Goal 5:** Satisfaction, attachment to the organization and life balance.

**Indicator:** 80%.

**Result:** ❌ Failed to achieve the goal. In 2017, assessment methods were changed and the original analyzer was changed from HR Teamwork Co., Ltd. to the Institute for Population and Social Research, Mahidol University. Surveys were conducted among 200 employees out of 242 employees (including contracted labor). Results in 2017 were as follows:



Chart showing analysis of employee satisfaction, attachment and life balance in the organization's overview.



## Product and Service Responsibilities

The Company continues to place importance on product and service responsibilities with a determination to respond to customer needs in order to solve problems caused by the Company's products and services via customer complaint channels and customer satisfaction survey channels in order to continually modify and develop issues in customer interest. In 2017, the Company focused on communication and providing information regarding the Company's products to target group customers directly by hosting seminars and academic education from qualified experts including product exhibition booths such as:

The academic seminar on "Maximizing and Sustaining Tomorrow Energy with QTC Energy" was an activity organized to provide knowledge and understanding for target group customers and ordinary individuals regarding amorphous transformers. Amorphous transformers are a new product jointly developed by QTC and Hitachi Metal., Ltd. until the product was successful and ready to be presented to customers. The seminar was honored by Dr. Kamon Tankaboot, Chairman of the Council of Engineers, who lectured on the World's Current Energy Situation, and Dr. Daichi Azuma from Hitachi Metal Co., Ltd., who lectured on Energy Saving Potential by Using AMDT. This seminar was hosted on 2 March 2017 at the Swissotel le Concorde (Ratchada) Hotel, Bangkok.



Images of the "Maximizing and Sustaining Tomorrow Energy with QTC ENERGY" Academic Seminar

The Company has a policy to open factories to allow customers, educational institutes and government agencies, etc., to view production processes closely. Furthermore, factories are open to customers who are able to inspect products during production and closely observe transformer testing processes for items being procured to create confidence in QTC transformer quality (Only customers on purchasing orders may inspect products during production and participate in the testing process. Only items on purchasing orders may be viewed and customers may not view other items of other customers). In 2017, 18 customers asked to inspect products during production and 66 customers participated in the testing process. Furthermore, the Company had 89 groups of customers, educational institutes and government agencies, etc., who requested to view the production process.



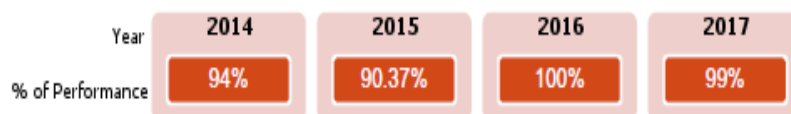
## Customer Indicators

Objective: To help the Company's operations be consistent with the quality policy **"We are determined to develop quality goods and services continually for customer satisfaction"**, the Company specified goals and indicators in the area of customers to monitor assessments and make corrections and preventions effectively.

Goal 1: Ability to provide transformer services during the guarantee period for customers.

Indicator: > 90% per year.

Result:  Goal achieved.



Goal 2: Ability to manage customer complaints in the area of goods and services.

Indicator: 100%.

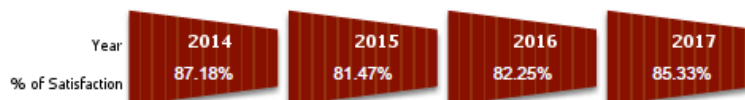
Result:  Goal achieved.



Goal 3: Customers satisfied with goods and services (G4-PR5).


Indicator: 70 percent of survey results must pass a criteria of more than 80 percent.

Result:  Goal achieved.



Goal 4: Prioritization on maintaining customers' personal secrets.

Indicator: No complaints from customers regarding customer information leaks (zero).

Result:  Goal achieved. No complaints in 2014 – 2017.



# Corporate Social Responsibility

(G4-SO1, G4-SO2, G4-SO11)

Unity, compliance with rules and generosity to colleagues,  
community and society starts with ourselves.

“Happy Society



In 2017, the Company sent Mrs. Tipwimon Tawornchat and Miss Suttirak Suttisatit, who are normally responsible for in process and after process corporate social responsibility, to be trained in the personnel course on general corporate social responsibility management and registered as specialist personnel pursuant to the Ministry of Industry Notification on Registration of Factory Personnel in the Area of Corporate Social Responsibility of B.E. 2559 (A.D. 2016). This course was organized by United Analyst & Engineering Consultant Co., Ltd. (UAE), a training agency approved by the Department of Industrial Works to provide training in the aforementioned course.



Mrs. Thipwimon Thawornchat  
Manager, Corporate Social  
Responsibility Section



Miss Suttirak Suttisatit  
Manager, System Development Section

The Company continues to place importance on corporate social responsibility and has set a budget of 1.5 percent of net profit for use in the aforementioned activities in order to ensure liquidity in work and consistency with the company's economic situation. Projects and activities are approved through annual business plans and are examined for transparency by the internal auditor. The budget set in 2017 is set based on the net accrued profit (because the Company performed at a loss in 2016). Corporate social responsibility related to QTC's context is divided into three issues as follows:

## Participation in Community Development

“Building trust among stakeholders” remains the Company's major strategy in activities with external stakeholders in the community area to create confidence among community members that the Company will not cause difficulties and is ready to develop the area for public benefit. The Company organizes “community discussion activities: QTC meets communities” once annually to open the factory and allow community leaders, the general public and other stakeholders in the area to hear the Company's performance in the past year, performance on issues recommended by the community in the previous year and hear new recommendations from the community on issues in which QTC can support.

## Community Discussion: QTC Meets Communities 2017

In 2017, the Company organized the “Community Discussion: QTC Meets Communities” on 19 September 2017. The same activity model was maintained by inviting stakeholders in the community to hear descriptions of the Company’s performance during the year and reports of projects being carried out with the community. The Company added the special “massage and posture” activities for community members as in the past. In 2017, the Company spent a budget of 46,838.00 baht to organize the discussion.



Images of the Atmosphere at “Community Discussion: QTC Meets Communities” in 2017

## Wheelchair Home (A Disabled Person’s Business)

In 2017, representatives and stakeholders from disabled persons in the community attended discussions and petitioned for the Company and community leaders to support disabled persons’ occupations by organizing vocational groups and inviting disabled persons in the community who lack the courage to confront the outside world to join groups and build value for self and others. On this issue, the Company affirmed the Company’s support for the Wheelchair Home, a disabled person’s business, by purchasing products from the group such as souvenirs fashioned from wire, cleaning fabrics (by canceling purchases from the original seller). In 2017, from August – December, the Company purchased goods from the group at a value of 19,850 baht. In 2018, the Company will consider purchasing other goods and services to generate more income for the group.

1. Souvenirs	Value (Baht)
2. Fabric scraps	5,000
Total	14,850
<b>รวม</b>	<b>19,850</b>





## “Ban Saphan Si Massage and Posture Adjustment” Job Creation Project

The discussions featured key content on the issue of the “Ban Saphan Si Massage and Posture Adjustment” Job Creation Project. This operation is in conflict with laws on the issue of age of youths’ participating in the project to provide massage and posture adjustment services. This is a concern for the Company and the Social Health Enterprise (SHE) including community leaders. Thus, this issue was discussed to seek an appropriate solution. A conclusion was jointly reached to close the aforementioned project in order to comply with the law and prevent potential inappropriate incidents from occurring to youths. The Company paid the Company’s contribution in the coupon system and collected 44,329 baht of income to contribute on this amount to students who participated in this project on 7 March 2017 through the Principal, Mabyangporn Wittayakom School. The Social Health Enterprise (SHE) remains happy to provide training support for students if students wish to develop an occupation in the future.



## 5S...to School

This is another activity arising from discussions in 2016. School leaders wanted QTC personnel to provide knowledge on the 5S system for students in the community. Therefore, in 2017, QTC’s 5S work group created a special “5S to School” course for students to easily understand, follow and create concrete results. The Company coordinated with 2 schools to organize class periods for extracurricular subjects for 300 Grade 4-6 students at Ban Huay Prab School and 60 Grade 4-6 students at Ban Mab Toei School. The Company spent a budget of 4,784.82 baht in operations in 2017 (only equipment preparation and educational media preparation).



5S...to Ban Huay Prab School on 21 June 2017



5S...to Ban Mab Toei School on 24 July 2017



According to the discussion in 2017, school representatives proposed for the Company to organize a 5S School Award in the community to motivate teachers and students to apply 5S knowledge with clear results. The Company accepted this proposal for consideration to be carried out in 2018 after providing “5S to School” courses for every school in the community.

## Science Camp

In 2017, Mabyangporn Wittayakom, a school providing education for Grade 7-9 students located in Mabyangporn, asked the Company to organize scientific learning for students to create learning and experience building opportunities. Thus, the Company cooperated with the Department of Electrical and Computer Engineering, King Mongkut's University of Technology North Bangkok (KMUTNB), to arrange for 16 faculty students, 2 professors and 2 members of QTC's CSR team to organize a science camp with six bases consisting of: 1. Plasma Ball, 2. Van der Graf, 3. Induction Heat, 4. Jumping Ring, 5. Tesla Coil and 6. Beam and Pulley at Mabyangporn Wittayakom on 18 August 2017. The Company spent 21,777.00 baht in these operations.



Atmosphere at the Science Camp, Mabyangporn Wittayakom School

## Social Investment

Regarding social investment, QTC assessed and found QTC is not ready to invest for society directly as business for the Company. Therefore, the Company has guidelines to invest for society by purchasing products and using services from social businesses. In 2017, the Company maintained connections with the Social Health Enterprise (SHE), a social business, to provide massage and posture adjustment services for customers and other stakeholders rather than distributing souvenirs at the Company's product exhibitions. In 2017, the Company spent a total of 113,558.00 baht to support activities for society through the Company's activities such as:

### The "Massage and Posture Adjustment" Support Project



SETA 2017 @ BITEC, Bang Na, on 9-11 march 2017



MAI Forum 2017 @ Central World on 1 July 2017



TEMCA Forum & Exhibition 2017 @ Peach Conference Center, Royal Cliff Beach Resort, Pattaya  
On 18-19 August 2017



## “Unite...to Turn the Lives of 13,000 Cancer Patients Around” Project

The Company donated 20,000 baht to the MAI Listed Companies Association for use in the “Unite...to Turn the Lives of 13,000 Cancer Patients Around” Project by preparing survivor planners along with providing accurate cancer management knowledge, understanding and information for 13,000 cancer patients nationwide in order to increase patient survival rates. Project activities and monitoring are under the responsibility of the MAI Listed Companies Association in cooperation with the Art for Cancer Project. The project was opened in a press conference for this cooperation on 14 December 2017.



## “New Dimension: Create Work and Jobs for the Disabled”

In 2017, the Company participated in the “Promote and Develop Quality of Life among Thai Disabled Persons” Project by providing vocational training in the Animal Husbandry (Egg Chickens) Course for two disabled persons. The Company supported vocational training with 219,000 baht through the project under the responsibility of the Thai Chamber of Commerce. The Company complied with the project’s work plans from 1 April – 30 September 2017 for a total of 600 hours. The two disabled persons under the Company’s responsibility were:

1. Mr. Wichian Pupiluek, aged 54, Disability Type 5: Intellectual, lives at 103, Moo. 2, Thap Sadet, Ta Phraya, Sakaeo.
2. Miss Mayura Kaewlert, aged 38 years, Disability Type 4: Psychological or Behavioral, lives at 12, Thap Sadet, Ta Phraya, Sakaeo.



The aforementioned actions supplemented contributions to the Fund for Promoting and Developing Quality of Life among Disabled Persons in 2017 pursuant to the Empowerment of Persons with Disabilities Act.

## Social Activities

For activities or donations, the Company considers prioritization, necessity analysis, reasons for activity or donation requests including the Company's ability to carry out that activity or donation under designated budgets. Significant activities and donations in 2017 consisted of:

### **QTC Loves Children 2017**

This activity is an annual activity organized by the Company on a rotation of community schools specified by Mabyangporn TAO. In 2017, this activity was hosted on Saturday, 14 January 2017, at Ban Huay Prab School, Mabyangporn, Pluak Daeng, Rayong. The Company spent 32,627.06 baht in activities with 10 QTC Loves Children volunteer employees.



### **250 kVA Transformer Donation: Pluak Daeng Tambon Municipality School**

In 2017, the Company donated a 250kVA 22KV 3pH electrical transformer valued at 160,000 baht to Pluak Daeng Tambon Municipality School. This school is administrated by the Ban Pluak Daeng Tambon Municipality, Pluak Daeng, Rayong. Most of the students moved with parents who came to work in the industrial estate and were impoverished. School administrators had an idea to provide an opportunity for this group of children to study happily and live well. Thus, school administrators expanded school buildings, increased computer equipment and installed classroom air conditioners for students, causing the original transformer to be inadequate for use. The Company saw the aforementioned need and, therefore, gifted the 250kVA electrical transformer to the school as a special case on 17 August 2017.





## Activities in the Unite Local People Project: “Make Sound, Add Color, Fill Smiles”

This is another activity to which the Company has always given support. The aforementioned activity originated from a group of employees who came from areas close to one another who created activities to develop their homes by requesting support from the Company and friends in the Company to successfully carry out activities according to goals. This activity helped employees to practice project management skills while also creating participation, unity, generosity and awareness of responsibility to society.

In 2017, Mr. Pongkawe Naopotong, a transformer repair technician, and Mr. Kanoksak Naopotong, an assembly worker, from the northeastern region and team members created the “Make Sound, Add Color, Fill Smiles” Project for students at Ban Nong Kung Kam Hai School in Non Sang, Nong Bua Lamphu. The aforementioned school had a fire at the administration’s room and the computer room in the school building, causing the entire building to be destroyed in mid-2017. Therefore, the team requested a budget to create public announcement systems and paint the cafeteria building to be colorful along with donating other items to students on 9-11 December 2017. The project had 18 volunteers in the team and spent 42,183.02 baht in operations.



“Make Sound, Add Color, Fill Smiles” Activities at Ban Nong Kung Kam Hai School, Nong Bua Lamphu

## QTC Unites...to Help Flood Victims in the Southern Region

Due to heavy flooding in Thailand’s southern provinces in late 2016 and early 2017, the CSR team and the Music Lover’s Club organized the Unite...to Help Flood Victims in the Southern Region mini-concert on 18 January 2017 to collect donations from employees to purchase mineral powder, Tonav and other pharmaceutical supplies valued at a total of 22,810 baht in addition to 12,000 bottles of drinking water valued at 42,000 baht from the Company for delivery to the Royal Thai Navy Headquarters, Bangkok, on 22 January 2017. This activity demonstrates QTC employees’ generosity because QTC employees shared to give courage to people in the southern region.



Mini-concert Activities and Donations



## Social Activities

**Objective:** To help the Company's business operations be carried out alongside compliance with corporate social responsibility by emphasizing benefits to community and society under QTC's context until trust in one another is created.

**Goal 1:** Students in the community receive opportunities and benefits from the Company's social activities.

**Indicator:** At least 2 activities with educational benefits/year.

**Result:** ✓ Goal achieved. (In 2017, the Company had five activities with educational benefits in the community by using a total budget of 219,188.88 baht).

**Goal 2:** Participate in supporting social businesses to have sustainable business operations.

**Indicator:** At least 50,000 baht of the Company's budget spent to support businesses for society through the Company's activities.

**Result:** ✓ Goal achieved. In 2017, the Company spent a budget of 113,558.00 baht to support (Social Health Enterprise: SHE, "Unite...to Turn the Lives of Cancer Patients Around" Project by Art for Cancer).

**Goal 3:** Production factories are able to operate smoothly with the community (G4-SO11).

**Indicator:** No complaints related to social impacts (zero).

**Result:** ✓ Goal achieved.





“ QTC ”

**THE FIRST AND ONLY ENERGY-SAVING  
TRANSFORMER PRODUCER IN THAILAND**



[www.qtc-energy.com](http://www.qtc-energy.com)

Tel : 0-2379-3092 , 090-678-6850

# ENVIRONMENT

The Company places importance on environmental impacts directly and indirectly caused by the Company's business operations. The Company applies a "Build Green Culture" strategy in the organization by applying ISO 14001 environmental management standards. In 2017, the Company renewed the certificate to the 2015 version. Furthermore, the Company manages energy with the ISO50001 energy management standard system along with managing greenhouse gases with ISO14064-3 standards and Thailand Greenhouse Gas Management Organization (Public Organization) standards (TGO). The Company also supports modifying work processes to reduce environmental impacts and creating QTC's green culture.

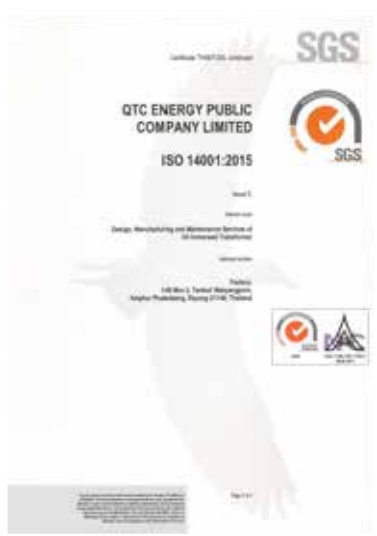


Corporate Environment, Energy and Carbon Footprint Policy: <http://qtc-energy.com/index.php/energy-policy/>



Accepting the Green Industry Award, Level 4 (Green Culture), Certificate No. 4-116/2559

On 11 September 2017 at the Royal Thai Army Club



ISO14001:2105 (UKAS & NAC) and ISO 1501:2011 (SGS) Standard System Certification Documents

# Waste and Scrap Material Management: Waste

(G4-EN23, G4-EN25, G4-EN29)

The company gives importance to managing wastes created by employee consumption and contract construction work or equipment installation, including the company's production and service processes. Hence, the company has clearly set methods for sorting waste and has a waste-sorting facility that meets safety standards along with emergency preparations procedures specifically for waste management. Furthermore, the company pays attention to its selection of waste disposers and chooses only those licensed by the Department of Industrial Works. Additionally, the company monitors and conducts inspection on the work of waste disposers on a regular basis, since waste and scrap management is considered to be an issue of interest of stakeholders and a risk to the organization's reputation that requires management that comply with legal specifications and thoroughness in activities.

## List of Waste and Scrap Collection, Transportation, Treatment and Disposal Operators of QTC in 2016

Thai Hsing Hydrocarbon Co., Ltd.

Disposes: Used transformer oil containing no PCB components.

Disposal Method: 049, Recycle for other uses.

Akkhie Prakarn PCL.

Disposes: Industrial factory wastes and scrap materials.

Disposal Method: 075, Incineration in special incinerators for hazardous wastes.

Professional West Technology (1999) PCL.

Disposes: Industrial factory wastes and scrap materials.

Disposal Method: 071, Land-filling pursuant to sanitation principles, for non-hazardous wastes only.

Disposal Method: 073, Safe land-filling after stabilization or compacted into solids.

Chok Sahaphat & Supply Co., Ltd.

Collects and Disposes: Wood, cooper, steel, paper, lathe and plastic scraps.

Disposal Method: 011, Sort for redistribution.

Krai Burapa Co., Ltd.

Collects and Disposes: Wood, cooper, steel, paper, lathe and plastic scraps.

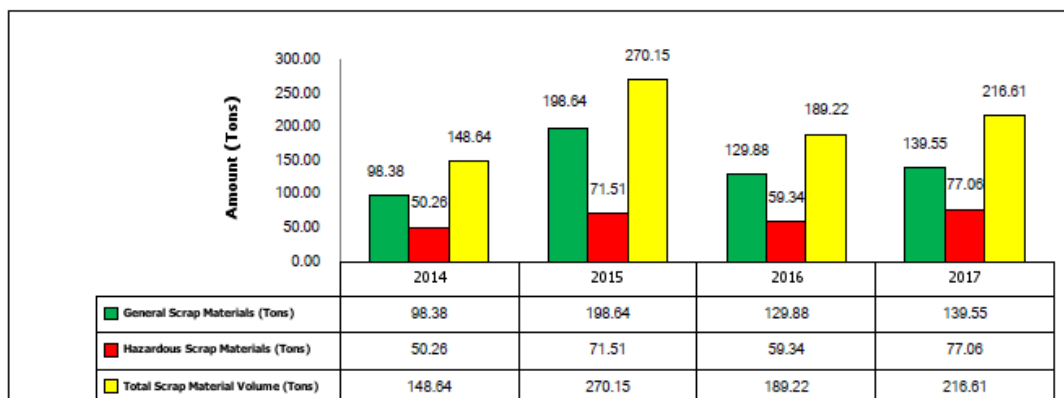
Disposal Method: 011, Sort for redistribution.

*"Waste (waste) transportation and disposal is performed in Thailand and not transported overseas for disposal".*

*"Operations of the Company and disposal service providers in 2017 are in line with legal specifications and incurred no fines".*



Because the report showing comparison of waste and material scrap volume in 2014 – 2016 on Page 82 of the Sustainability Report 2016 contained data errors, the Company revised data to be accurate according to the truth and retrospectively shows the following comparison of waste and material scrap volume (G4-EN25), (G4-EN27)



Comparison of Waste and Scrap Material Volume (Waste) Four Years in Retrospect (2014 – 2016: Revised)

In 2017, the Company sorted disposal categories and disposal methods to control and management waste in addition to testing disposal service providers more effectively. This year will be the first year when the report displays the following list of disposal types and methods (G4-EN23):

Table Showing Volume of Scrap Materials (Waste) Sorted by Disposal Category and Method (Only 2017)

Waste Type	Disposal Method Code	Disposal Method	Waste Volume (Tons)	Total Disposal Expense (Baht)
* Ordinary Non-hazardous Waste	011	Sort for redistribution.	96.81	379,741.66
	073	Safe land-filling after stabilization or compacted into solids.	2.10	
	075	Incineration in special incinerators for hazardous wastes.	40.65	
**Hazardous Scrap Materials (Waste)	049	Recycle for other uses.	35.60	
	073	Safe land-filling after stabilization or compacted into solids.	5.61	
	075	Incineration in special incinerators for hazardous wastes.	35.85	
Total Waste Volume for the Year			216.61	

**\*Ordinary Waste:** These are scrap materials from manufacturing that are non-hazardous and can be sold to individual licensed operators, e.g., copper scrap, steel scrap, etc. In 2017, sales of ordinary wastes amounted to 5,533,628.04 baht (not including transformer oil).

**\*\*Hazardous Waste:** These are contaminated wastes. Some have to be transported for disposal outside such as oil-contaminated cloths, paint containers, various chemicals, etc., while others can be sold such as transformer oil and transformer oil containers. In 2017, expenses for disposal amounted to 379,741.66 baht, while income from sales of old transformer oil amounted to 388,570.00 baht.



# Environmentally-friendly Production Processes and Products

## Environmentally-friendly Production Processes (G4-EN1, G4-EN2)

In 2017, the Company considered replacing machines used to cut insulation wood, a component in electrical transformers, because the old machine was a machine with the sawing blade on a board requiring one employee to hold the piece on the cutting board during cutting. This caused the Company to need to leave an area for insulation wood for employee safety, causing the wood to become unusable scraps. One insulation wood board would leave scraps at 20 percent of weight per board.

Therefore, the production process development team considered replacing machines by installing a CNC Router (for wood work) in place of the old machine. The supervisor will draw work piece models according to engineering orders. One employee would lift the wood board and send an order to the CNC Router without need to monitor or hold the work piece, allowing the machine to complete the order. Wood and saw dust will be vacuumed through ducts in a closed system for storage to control dust particles in the air. The result is quality work pieces, lower manpower requirements and, most importantly, the Company would be able to use wood insulation for the full area, leaving scraps at only 6 percent of weight per board.

Insulation wood is an imported raw material with main components made from wood with insulation properties, high density, low humidity with high durability and an expensive price. In addition to increasing work efficiency, the Company's investment in machinery replacement will allow the Company to benefit from raw materials with natural resource (wood) main components cost-effectively with effective air pollution control.

Table Showing Amount of Insulation Wood Used in Production

Year	Amount Drawn (kg)	Amount Scrapped (kg)	% of Waste
2016			
The original wood cutting machine was used.	20,587.73	3,705.79	18%
2017			
The CNC Router wood cutting machine was used	40,360.68	2,421.64	6%

CNC Router (For Wood)



Table Showing Efficiency Calculation When Comparing New & Old Machines

Items	Amount Used in 2017 (kg)	% of Waste	Amount of Waste (kg)	Value of Waste (Baht)
(If Used) Old Machine	40,360.68	18%	7,264.92	871,790.69
New CNC Machine	40,360.68	6%	2,421.64	290,596.90

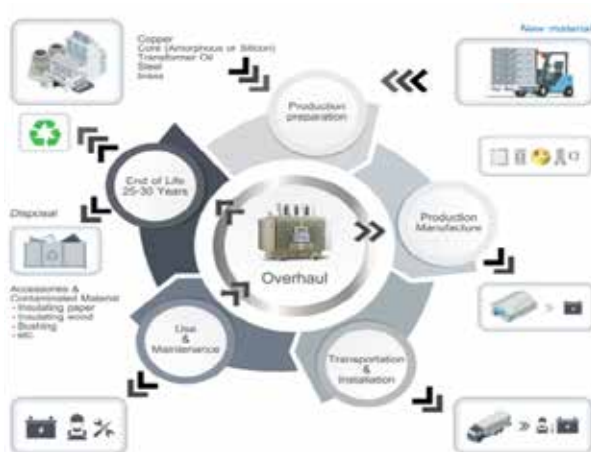


According to the amount of insulation wood used in 2017, if the Company used the old machine, the Company would have to dispose of 7,264.92 kg of insulation wood scraps. Thus, the Company concluded the aforementioned operation returned raw material scraps from using the old machine to be used in the new machine by 66 percent of waste disposed from the old machine or a conservation value of 581,193.79 baht.

## **Environmentally-friendly Products** (G4-EN27)

Electrical transformers in an ordinary distribution system have a mean useful life of 25-30 years. QTC transformers are the same because we produce products under international standards and specifications. Transformers' useful life is dependent on characteristics of use and regular maintenance. The Company is aware of responsibility to the Company's products throughout the product's life. Hence, the Company designated the following return policy for product remains:

QTC Transformer Product Life Cycle



Return Policy for Product Remains

*“When QTC transformers are expired, customers can return transformer remains to QTC’s production factories to enter the separation process and product remains will be sent for proper disposal at no expense to customers. However, the Company requires written consent from customers because QTC transformers are considered the legal property of customers and customers must deliver QTC transformers to the QTC production factories in Rayong in person.”*

### • **Amorphous Distribution Transformer Development Project**

In 2017, the Company achieved the highest success in the project to develop amorphous distribution transformers. With design and production developed over an extended period, the Company’s 300kVA amorphous transformers by Metropolitan Electricity Authority specifications and 315kVA amorphous transformers by Provincial Electricity Authority specifications passed the Short Circuit Performance Test conducted by CESI, Italy.

Furthermore, in 2017, the Company received partial funding from the National Innovation Agency to install machinery and produce 1000 kVA amorphous distribution transformers and send transformers to receive the Short Circuit Performance Test at CESI, Italy. If successful, this transformer will become the country’s largest amorphous distribution transformer to have passed this test. The Company plans to send transformers to be tested in April 2018.

The Company modified the amorphous core production line and installed machines with an investment of 5,340,000 baht (including contributions from NIA). The Company is ready to produce amorphous transformer cores in early 2018. QTC is the one and only factory in Thailand capable of producing amorphous cores, causing amorphous distribution transformer prices to drop. In 2018, the Company will use sales promotions to bring amorphous products into the market with a goal to sell 50 million baht of amorphous transformers in 2018



## Wastewater Quality

QTC's manufacturing factory is located in a place without public water resources, whether natural or via plumbing. Hence, water usage is only possible through extraction of ground water. Nevertheless, no water is used in the manufacturing process of electrical transformers. Water is used only for the cooling circulation of the vacuum oven system and reducing temperature of weld works. In these usages, water is stored for repeated usage throughout the entire year and then transported for proper disposal. As for the rinsing of contaminated equipment of the company, the company provides water containers for storing contaminated water and transports them for disposal outside according to schedule. Hence, discarded water is water resulting from washing in bathrooms and kitchens and car washing only. Additionally, the company tests the quality of the wastewater of factory on a regularly on a biannual basis.

**Table Showing Factory Wastewater Quality Test Results at the Final Point (2014-2017)**

Tested Parameters	Test Results							Standard	Unit
	1/2014	1/2015	2/2015	1/2016	2/2016	1/2017	2/2017		
	24/3	17/7	23/11	08/6	24/11	16/6	20/12		
BOD5	2.7	11	5	7	16	4	7	20	mg/l
Oil and Grease	0	2.2	2.2	<1.5	2.1	4.6	<1.5	5	mg/l
PH	5.8	6.97	7.36	7.76	8.82	7.26	6.61	5.5-9.0	-
Sulfides	0.2	1.4	1	<0.5	<0.5	<0.5	<0.5	1	mg/l as H <sub>2</sub> S
Suspended Solids	15	65	26	20	21	10	10	50	mg/l
Temperature	30	31	30	38	32	31	23	40	°C
Total Dissolved Solids	66	620	608	87	Not Detected		59	3000	mg/l
Total Kjeldahl Nitrogen	<5	29.8	34.8	<1.0	1.3	<1.0	1.6	100	mg/l as H <sub>2</sub> S

**Table Showing Cafeteria Wastewater Quality Test Results at the Final Point (2014-2017)**

Tested Parameters	Test Results									Standards	Unit
	1/57	2/57	1/58	2/58	1/59	2/59	1/60	2/60	2/60		
	24/3	10/9	9/3	23/11	9/3	8/6	12/1	16/6	21/12		
BOD5	233	153	134	253	120	228	145	78	376	≤ 20	mg/l
Oil and Grease	10.4	10	4.2	21.9	22.9	27.1	23.4	28.7	18.7	≤ 5	mg/l
PH	5.3	6.2	7.06	6.63	7.52	7.53	7.27	7.38	4.94	5.5-9.0	-
Sulfides	1.05	1.73	1.21	2.2	3.3	0.9	0.6	<0.5	1.3	≤ 1	mg/l as H <sub>2</sub> S
Suspended Solids	94	61	55	232	44	17	75	77	74	≤ 50	mg/l
Temperature	30	30	27.8	40	27	30	29	34	22	≤ 40	°C
Total Dissolved Solids	451	712	123	398	440	444	284	520	452	≤ 3000	mg/l
Total Kjeldahl Nitrogen	17	18	13	16.5	12	7.3	19.4	9	15	≤ 100	mg/l as H <sub>2</sub> S

Wastewater quality inspection results at the cafeteria failed to meet standards and, since the final storage pit is a closed system, the company employed a licensed company to transport the water for disposal, namely, Kritsada Service Co., Ltd. In 2017, the company had an operating expense of 6,200 baht.



## Air Quality

QTC's electrical transformer production processes involve stages that have to release air outside. Hence, the company has installed a modern preliminary prevention system in related production processes to minimize the release of pollution to outside atmosphere and conducts regular air quality inspection twice per year. The processes related to air pollution emission are as follows:

1. In the transformer baking process, vacuum and hot air ovens are used. During this stage, hot air is released outside and might contain transformer oil vapors.
2. In preparing insulation plywood, the air that is released outside might contain paint dust.
3. In dry spraying, air is vented outside and paint particles may be mixed in air.
4. In cutting with the plasma cutting machine, the air released outside might contain dust that might undergo chemical reactions with the atmosphere and become toxic pollutants.ได้

Area	Parameters	Test Results								Standar	Unit
		2014		2015		2016		2017			
		1	2	1	2	1	2	1	2		
		24/3	19/9	26/5	23/11	1/6	23/11	15/6	20/12		
Wood Cutting Room Sawdust Vacuuming Duct	Particulate	1.9	0.5	2.15	10.4	<0.1	2.82	1.2		400	mg/m3
Chassis Spray Booth Stacks	Particulate		5.6	0.7	1.66	4.49	2.59	4.11	1.97	400	mg/m3
	Xylene		3.31	0.25	0.25	<0.25	0.73			200	ppm
	Total VOCs		27.85	29.4	1.05	32.2	28.2	1.77	6.97	-	ppm
Spray Booth Stacks (Installation)	Particulate		2.1	1.2	8.42	4.73	0.38	2.1		400	mg/m3
	Xylene				<0.25	1.06	0.38			200	ppm
	Volatile Organic Compounds		17.5	5.35	40.2	28.7	4.54	3.69	0.21	-	ppm
Plasma Cutting Machine Stacks, Factory 4	Particulate				87.6	2.05	42.5	22.7	54.1	400	mg/m3
	Oxide of Nitrogen as Nitrogen Dioxide				30	<1	Not Detected	12	3		ppm
	Carbon Monoxide				<1	4	<1	3		870	ppm
	Oil mist								433	-	mg/m3
Oven Stacks (Vacuum)	Particulate								23.2	400	mg/m3
	Oil mist	3.68	0.3	0.031	0.617	0.391	355	278	7.52	-	mg/m3
	Carbon Monoxide				8	2	19			690	ppm
	Oxide of Nitrogen as Nitrogen Dioxide				<1	<1	Not Detected	<1		200	ppm
Oven Stacks (Transformer Repair)	Oil mist	0.48	0.42	0.03	0.447	0.513	306	12.2	2.08	-	mg/m3
	Xylene				<0.25	<0.25	Not Detected		-	200	ppm
	Oxide of Nitrogen as Nitrogen Dioxide				<0.25	<0.25	Not Detected		<1	200	ppm

The company that conducted inspection and certified water and air quality results was Chemlab Services (Thailand) Co., Ltd., which is certified by ISO/IEC17025 Accreditation Number Testing-0064.

# Climate Change



The Company began preparing the organization's greenhouse gas emissions report in 2015. The Company received support in the area of knowledge and skills for calculating and preparing reports from the Project to Support Organization Carbon Footprint Preparation in the Industrial Sector, Phase 5, by the Federation of Thai Industries. The Company continually prepared reports and registered the organization's carbon footprint to request certification from the Thailand Greenhouse Gas Management Organization (Public Organization) (TGO) with SGS (Thailand) Co., Ltd. reviewing and certifying results.

In 2017, the Company received a certificate for being a model pilot organization with organization carbon footprint registration, Certificate No. TGO CFO FY17-2-029 (Verification Period: 01/01/2016 – 31/12/2016), from Dr. Kurujit Nakornatp, Chairman of the Thailand Greenhouse Gas Management Organization (Public Organization) at the "Hundred Hearts Cooling Global Warming" event of 2017 hosted at Centara Grand Hotel at Central Plaza Ladprao on 19 September 2017.



The organization carbon footprint registration, Certificate No. TGO CFO FY17-2-029, reports the volume of greenhouse gases emitted by the organization in the area of the factories in Rayong from 1 January 2016 – 31 December 2016. The Company must register in 2017.

Table Showing the Organization's Greenhouse Gas Emissions

Type	Greenhouse Gas Emission		
	2015 (Base Year) tonCO <sub>2</sub> eq.	2016 ton CO <sub>2</sub> eq.	2017 ton CO <sub>2</sub> eq.
Scope 1 (Direct GHG Emissions)	426	401	391
Scope 2 (Indirect GHG Emissions: Electricity)	899	672	907
Scope 3 Other Emissions (Paper & Cloth Usage)	63	68	57
Total Emissions	1,388	1,141	1,355
Types of GHGs included: CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFCs, PFCs, SF <sub>6</sub> , NF <sub>3</sub>			

Table Showing Comparison of the Organization's Greenhouse Gas Emission Per Production Unit

Year	Greenhouse Gas Emission Volume (ton CO <sub>2</sub> eq.)	Production Volume (Unit)	Greenhouse Gas Emission Per Unit (ton CO <sub>2</sub> eq/Unit)	Production Volume Counted as Megavolt Ampere (MVA)	Greenhouse Gas Emission Per Unit (ton CO <sub>2</sub> eq/MVA)
Base Year: 2015	1,387.17	3,728	0.3721	1,791.85	0.7742
2016	1,139.53	2,341	0.4868	1,148.60	0.9921
2017	1,352.83	4,162	0.3250	1,659.53	0.8152

In 2017, overall greenhouse gas emissions were lower than the base year of 2015 by 2.48 percent while higher than 2016 by 18.72 percent due to a higher production capacity in 2017 than in the base year by 434 units. When counted in megavolts ampere, greenhouse gas emissions were lower than the base year by 132.32 MVA and production capacity was higher than 2016 at 1,821 units. When counted in megavolts ampere, greenhouse gas emissions were higher than 2016 at 51093 MVA. In the meantime, the Company constructed two 914-square meter factory buildings. Contractors who used the Company's electricity performed construction. Furthermore, the Company added three air conditioners using HFC134a working fluids for use with machinery and three office air conditioners using R410 A working fluids.

When analyzed by type of greenhouse gas, the Company was found to have modified internal work processes by promoting employees' KAIZEN activities, causing Type 1 greenhouse gas emissions to drop by 8.87 percent when compared to the base year and by 3.14 percent when compared to 2016. Moreover, KAIZEN activities influenced behaviors in using cloth scraps to clean work pieces, enabling the Company to reduce Type 3 greenhouse gas emissions by 10.52 percent when compared to the base year in 2015 and by 17.19 percent when compared to 2016. Reductions in Type 1 and Type 3 greenhouse gas emissions in 2017 were contrary to increased production volume. However, Type 2 greenhouse gas emissions fluctuated according to increased production capacity.

The organization's greenhouse gas emission certificate of 2017 from 1 January 2017 to 31 December 2017, Certificate No. TH-ENV-2018-00061-001, was reviewed and affirmed by SGS (Thailand) Co., Ltd. on 9 February 2017. In 2017, the Company improved certification levels from "Limited" to "Reasonable".



The full Greenhouse Gas Verification Statement is downloadable from



<http://qtc-energy.com/index.php/category/qtc-activity/>



## Carbon Footprint Organization (G4-EN19)

The Company supports employees to improve work with KAIZEN by considering modifications covering every issue including quality, safety, energy and environment. In 2017, the Company had a total of 250 KAIZEN articles with 36 KAIZEN articles capable of reducing energy and environmental impacts (14.4% of all KAIZEN articles). These 36 articles were proven to be applicable by the Promotion Committee and were used in practice. Examples of KAIZEN for reducing energy consumption and greenhouse gas emissions include:

- **“Use Gasket and Cork Scraps Instead of Cloth Scraps”** – This method changed from using cloth scraps to support the cable box trigger point prepared for delivery to customers. Four cloth scraps are needed for each cable box and 50 cable boxes would need 200 cloth scraps or an approximate weight of 25 kilograms. Attending employees had the idea to use wooden gasket and cork scraps from production, which was to be sent for disposal outside, in place of cloth scraps at 100 percent. Employees reused materials by cutting gaskets to have a fitting size for supporting the trigger point in place of cloth fabrics. This is one of the many KAIZEN articles reducing Type 3 greenhouse gas emissions in 2017 to be lower than in 2016 by 11 tonCO<sub>2</sub>eq. (reducing use of cloth scraps by 25 kilograms equals reducing Type 3 greenhouse gas emissions by 0.4546 tonCO<sub>2</sub>eq.).



Mr. Bantiu Nakiaongam  
Transport Employee

“We just learned that it’s very simple.  
Changing how we think and do can  
reduce greenhouse gas emissions. I  
see the numbers. I don’t know what  
they’d be but I feel that it’s great.  
It’s true, right?”



Mr. Anansitti Poodhom  
Transport Employee

- **“Automatic Welding Machines”** – Welder employees who open welding machines have to wait to use welding machines all the time, causing loss of energy with no benefit. The maintenance team saw this waste and, therefore, invented a base to place welders by attaching limit switches to the base. After completing work and putting the welder down, the magnetic breaker will cut electricity, causing the circuit distributing electricity for electrical welding machines to be automatically cut. The Company invested 7,000 baht on improvements. Results from modifications from April – December 2017 according to comparison meters attached to log the number of hours and the amount of electricity used to compare between modified and unmodified welding machines at the same production volume were as follows (G4-EN7, G4-EN19):



Hours of Use	Kilowatt – Hour	Electricity Cost
1899	569.7 kwh	2,279 บาท
2219	665.7 kwh	2,663 บาท



Mr. Witoon Lakawan  
Head of Maintenance  
Product Consultant



Mr. Jedsada Prateeb  
Maintenance Staff  
Operator

“It was just an idea to help  
my friends work more  
conveniently and reduce  
electricity use according to the  
Company’s policy but it can  
help reduce global warming.  
We are proud and we want to  
thank the Company for  
supporting all of our ideas.”

Test results from both welding machines revealed the automatic welding machine to be able to reduce electricity consumption by 96 kWh in 9 months when compared to the original welding machine, enabling the Company to reduce Type 2 greenhouse gas emissions by 0.0559 tonCO<sub>2</sub>eq. The Company approved to modify the three remaining electrical welding machines.

# Resource Utilization

## Energy (G4-EN3, G4-EN4, G4-EN6)

The Company uses non-renewable energy in its production process and services as well as its office work, primarily comprised of two forms of energy as follows:

### 1. Electricity Consumption

Electricity is purchased from the Metropolitan Electricity Authority for the main office in Bangkok and from the Provincial Electricity Authority for the factories in Rayong.

Table Showing Electricity Consumption Efficiency

Item	Year		
	2015	2016	2017
Bangkok Main Office			
Metropolitan Electricity Authority (kWh)	141,000.00	153,000.00	139,000.00
Rayong Factories			
Provincial Electricity Authority (kWh)	1,545,688.00	1,153,576.00	1,556,768.00
Production Volume (MVA)	1,791.85	1,148.60	1,659.53
Production Volume (Unit)	3,728.00	2,341.00	4,162.00
kWh/MVA	862.62	1,004.33	938.08
kWh/Unit	414.62	492.77	374.04

In 2017, the Company installed a 300kVA 12/24 kV amorphous transformer at the Bangkok office to conserve electricity consumption, causing electricity consumption in 2017 to drop from 2016 by 14,000 kWh, enabling the Company to save energy at a value of 56,000 baht (if electricity cost is 4 baht/1 kWh).

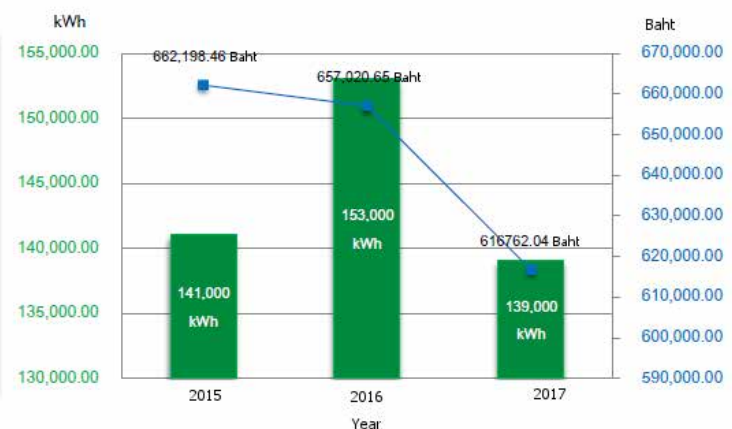


Chart Showing Electricity Efficiency at the Bangkok Office

In 2017, the factories in Rayong used more electricity than in 2016 by 403,162 kWh due to production of more than 1,821 units. When counted in MVA, the factories used more than 510.93 MVA. Furthermore, in 2017, the Company constructed two 914-square meter factory buildings and the contractor used the Company's electricity in operations. Thus, factory electricity consumption efficiency can be seen to have improved from 2016 as shown on the chart.

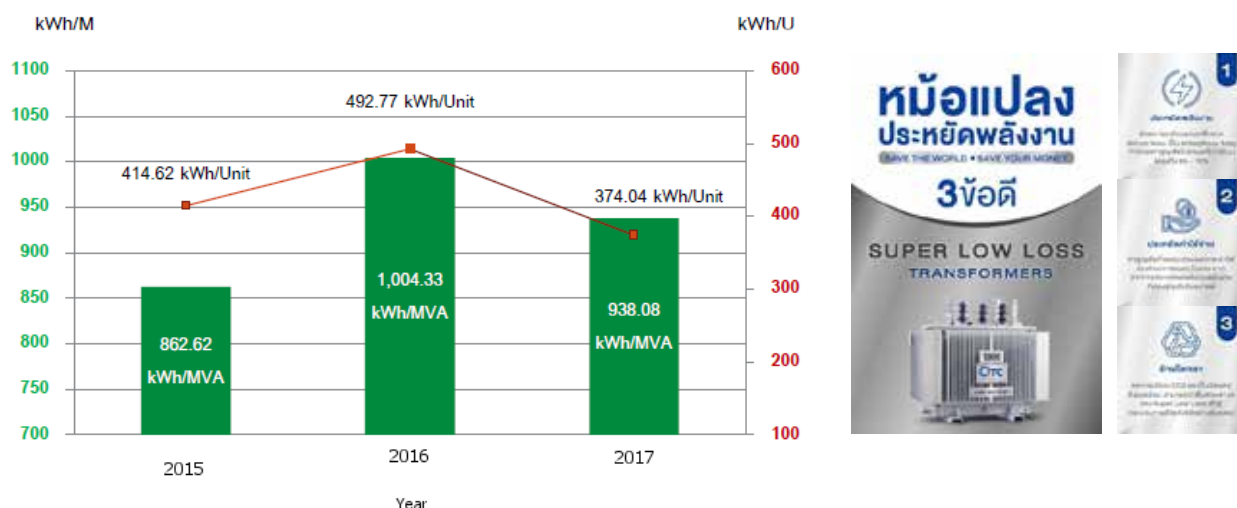


Chart Showing Electricity Efficiency at Factories in Rayong

## 2. Heating Consumption

Diesel and benzene were used for transportation work outside the Company, service work, transportation inside the Company, employee transports and office cars.

Table Showing the Amount of Fuel Purchased

Item	2015	2016	2017
Diesel (Liter)	118,873.10	110,765.37	107,331.63
Benzene (Liter)	29,908.38	29,275.52	27,583.98
Total (Liter)	148,781.48	140,040.89	134,915.61

The amount of heat, diesel and benzene consumed dropped from 2016 by 5,125.28 liters in 2017 because the old forklift was replaced. Furthermore, most product deliveries in 2017 were large lot deliveries. This helped the Company to manage transportation better.

## **Water** (G4-EN8)

QTC's factories are located in an area that does not have public water sources, whether natural or from plumbing. Ground water is extracted for usage only. No water is used in the electrical transformer production process. Water is used to cool the vacuum oven, reduce the temperature of weld works and for washing bathrooms, kitchens and vehicles. Water is supplied to the Bangkok main office by the Metropolitan Waterworks Authority.

Table Showing the Amount of Fuel Purchased

Items	2014	2015	2016	2017
Metropolitan Waterworks Authority (Cubic Meters)	2,992.00	1,527.00	803.00	1,264.00
Ground Water (Cubic Meters)	7,534.80	5,551.40	4,504.30	5,173.80

The amount of water from the Metropolitan Waterworks Authority used by the Bangkok office in 2017 increased from 2016 by 461 cubic meters due to water pipe breaks in April.

The amount of surface water used by factories in Rayong in 2017 increased by 669.50 cubic meters from 2016 from higher production capacity and a higher number of employees, resulting in increased water consumption activities. Furthermore, in 2017, the Company constructed two factory buildings with workers camping onsite for five months.

The Company has to water treatment system to reuse water. However, the Company monitors and measures wastewater values at the final well to meet legal specifications in order to prevent environmental impacts.





# Biodiversity

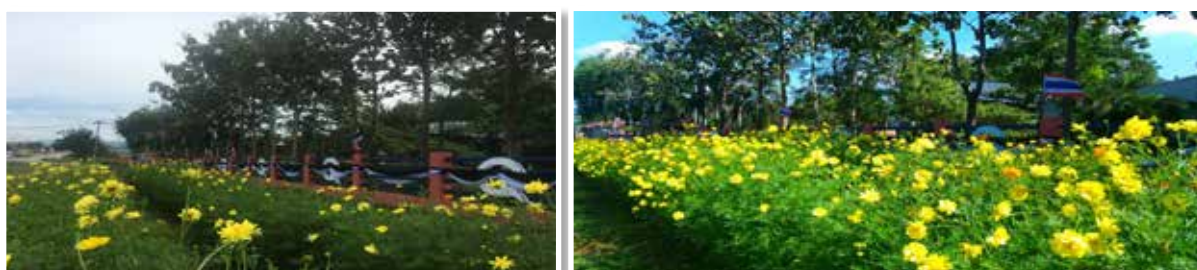
## Tree-planting in the Factory (G4-EN12)

Since the factory is located on land that does not have water sources or forest and is required to drill a well to extract ground water for use, which can decrease ground water quantities, in order to maintain natural balance, the Company has launched a project to plant trees in the factory grounds to restore the environment surrounding the factory and increase moisture to the soil and underground water sources in 2013. At present, there are over 751 trees planted by employees, and they continue to grow according to expectations. In addition, the natural water collection pond that was dug at the center of the planting area continues to hold a significant amount of water employees can use to raise fish, grow aquatic plants and prepare food. At present, the area cannot yet be opened to the surrounding communities for utilization, since the forest that was planted is still not fully mature.



Images of Wooded Areas in QTC Factories, Taken in December 2017

In 2017, the Company participated with private organizations and woodland communities in Rayong to propose guidelines for creating the “Rayong Model: Green Space Roles in Reducing Global Warming”. These guidelines were prepared by the Thailand Greenhouse Gas Management (Public Organization) in cooperation with the Royal Forestry Department, Faculty of Forestry, Kasetsart University, and the Province of Rayong. In this project, the Company is still considering to select community woods to support. The Company will begin to have roles in 2018.



## Environmental Indicators

**Objective:** To create a green culture in the organization and good environmental governance.

**Goal 1:** Control the organization's greenhouse gas emissions per production unit.

**Indicator:** Greenhouse gas emissions of the organization per production unit and MVA no more than 5 percent from base year data.

**Result:**

- Base Year 2015 Greenhouse Gas Emissions = 0.3721 ton CO<sub>2</sub> eq./Unit and 0.7742 ton CO<sub>2</sub> eq./MVA

- Greenhouse Gas Emissions in 2017= 0.3250 ton CO<sub>2</sub> eq./Unit and 0.8152 ton CO<sub>2</sub> eq./MVA

✓ Unit = Greenhouse Gas Emission Reduction Per Unit at 12.65% of Base Year

✗ MVA = Greenhouse Gas Emission Per MVA Increased by 5.30% of Base Year (Exceeded the goal of 0.30%)

**Goal 2:** Compliance with environmental criteria of the law or regulations.

**Indicator:** Zero value of fines and number of times when the Company did not comply (Zero).

**Result:** ✓ Goal achieved. In 2017m, the Company operated in compliance with environmental laws and incurred no fines.

**Goal 3:** Processes for the management, correction and prevention of environmental impacts from the Company's activities.

**Indicator:** No complaints related to environmental issues (Zero).

**Result:** ✓ Goal achieved.

The Company received documented verification from the Mabyangporn Tambon Administrative Organization confirming no environmental complaints from surrounding communities in 2017.



# GRI Content Index

Standard Disclosure	Disclosure Requirements	Page		Note	SDG Mapping
		SR	AR		
GENERAL STANDARD DISCLOSURES					
STRATEGY AND ANALYSIS					
G4-1	Provide a statement from the most senior decision-maker of the organization (such as CEO, chair, or equivalent senior position) about the relevance of sustainability to the organization and the organization's strategy for addressing sustainability.	2-3			
G4-2	Provide a description of key impacts, risks, and opportunities.	21, 39-44			
ORGANIZATIONAL PROFILE					
G4-3	Report the name of the organization.	5			
G4-4	Report the primary brands, products, and services.	5			
G4-5	Report the location of the organization's headquarters.	5			
G4-6	Report the number of countries where the organization operates, and names of countries where either the organization has significant operations or that are specifically relevant to the sustainability topics covered in the report.	10			
G4-7	Report the nature of ownership and legal form.	9			
G4-8	Report the markets served (including geographic breakdown, sectors served, and types of customers and beneficiaries).	5			
G4-9	Report the scale of the organization.	12, 46-47			
G4-10	a. Report the total number of employees by employment contract and gender. b. Report the total number of permanent employees by employment type and gender. c. Report the total workforce by employees and supervised workers and by gender. d. Report the total workforce by region and gender. e. Report whether a substantial portion of the organization's work is performed by workers who are legally recognized as self-employed, or by individuals other than employees or supervised workers, including employees and supervised employees of contractors. f. Report any significant variations in employment numbers (such as seasonal variations in employment in the tourism or agricultural industries).	71-75			Goal 8 : Employment
G4-11	Report the percentage of total employees covered by collective bargaining agreements.	-	-	-	
G4-12	Describe the organization's supply chain.	21-22			
G4-13	Report any significant changes during the reporting period regarding the organization's size, structure, ownership, or its supply chain.	9			
G4-14	Report whether and how the precautionary approach or principle is addressed by the organization.				
G4-15	List externally developed economic, environmental and social charters, principles, or other initiatives to which the organization subscribes or which it endorses.	-	-		
G4-16	List memberships of associations (such as industry associations) and national or international advocacy organizations.		-		
IDENTIFIED MATERIAL ASPECTS AND BOUNDARIES					
G4-17	a. List all entities included in the organization's consolidated financial statements or equivalent documents. b. Report whether any entity included in the organization's consolidated financial statements or equivalent documents is not covered by the report.	5-8			
G4-18	a. Explain the process for defining the report content and the Aspect Boundaries. b. Explain how the organization has implemented the Reporting Principles for Defining Report Content.	26-28			
G4-19	List all the material Aspects identified in the process for defining report content.	26-27			
G4-20	For each material Aspect, report the Aspect Boundary within the organization.	29			
G4-21	For each material Aspect, report the Aspect Boundary outside the organization.	29			
G4-22	Report the effect of any restatements of information provided in previous reports, and the reasons for such restatements.	-	-		
G4-23	Report significant changes from previous reporting periods in the Scope and Aspect Boundaries.	-	-		
STAKEHOLDER ENGAGEMENT					
G4-24	Provide a list of stakeholder groups engaged by the organization.	23-25			
G4-25	Report the basis for identification and selection of stakeholders with whom to engage.	21			
G4-26	Report the organization's approach to stakeholder engagement, including frequency of engagement by type and by stakeholder group, and an indication of whether any of the engagement was undertaken specifically as part of the report preparation process.	23-25			
G4-27	Report key topics and concerns that have been raised through stakeholder engagement, and how the organization has responded to those key topics and concerns, including through its reporting. Report the stakeholder groups that raised each of the key topics and concerns.	23-25			
REPORT PROFILE					
G4-28	Reporting period (such as fiscal or calendar year) for information provided.	26			
G4-29	Date of most recent previous report (if any).	26			
G4-30	Reporting cycle (such as annual, biennial).	26			
G4-31	Provide the contact point for questions regarding the report or its contents.	28			

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G4-32	a. Report the 'in accordance' option the organization has chosen. b. Report the GRI Content Index for the chosen option. c. Report the reference to the External Assurance Report, if the report has been externally assured. GRI recommends the use of external assurance but it is not a requirement to be 'in accordance' with the Guidelines.	26			
G4-33	a. Report the organization's policy and current practice with regard to seeking external assurance for the report. b. If not included in the assurance report accompanying the sustainability report, report the scope and basis of any external assurance provided. c. Report the relationship between the organization and the assurance providers. d. Report whether the highest governance body or senior executives are involved in seeking assurance for the organization's sustainability report.	28			
GOVERNANCE					
G4-34	Report the governance structure of the organization, including committees of the highest governance body. Identify any committees responsible for decision-making on economic, environmental and social impacts.	11-12			
G4-35	Report the process for delegating authority for economic, environmental and social topics from the highest governance body to senior executives and other employees.	11-12, 15			
G4-36	Report whether the organization has appointed an executive-level position or positions with responsibility for economic, environmental and social topics, and whether post holders report directly to the highest governance body.	11-12, 15			
G4-37	Report processes for consultation between stakeholders and the highest governance body on economic, environmental and social topics. If consultation is delegated, describe to whom and any feedback processes to the highest governance body.	11-12, 15	-		Goal 16 : Inclusive decision making
G4-38	Report the composition of the highest governance body and its committees.	11-12, 15	43-56		Goal 5 : Women in leadership Goal 16 : Inclusive decision making
G4-39	Report whether the Chair of the highest governance body is also an executive officer (and, if so, his or her function within the organization's management and the reasons for this arrangement).	11	12, 17		Goal 16 : Effective, accountable and transparent governance
G4-40	Report the nomination and selection processes for the highest governance body and its committees, and the criteria used for nominating and selecting highest governance body members.	30	40		Goal 5 : Women in leadership Goal 16 : Inclusive decision making
G4-41	Report processes for the highest governance body to ensure conflicts of interest are avoided and managed. Report whether conflicts of interest are disclosed to stakeholders.	-	73-74		Goal 16 : Effective, accountable and transparent governance
G4-42	Report the highest governance body's and senior executives' roles in the development, approval, and updating of the organization's purpose, value or mission statements, strategies, policies, and goals related to economic, environmental and social impacts.	-	4-11		
G4-43	Report the measures taken to develop and enhance the highest governance body's collective knowledge of economic, environmental and social topics.	32-33			Goal 4 : Education for sustainable development
G4-44	a. Report the processes for evaluation of the highest governance body's performance with respect to governance of economic, environmental and social topics. Report whether such evaluation is independent or not, and its frequency. Report whether such evaluation is a self-assessment. b. Report actions taken in response to evaluation of the highest governance body's performance with respect to governance of economic, environmental and social topics, including, as a minimum, changes in membership and organizational practice.	32-33			
G4-45	a. Report the highest governance body's role in the identification and management of economic, environmental and social impacts, risks, and opportunities. Include the highest governance body's role in the implementation of due diligence processes. b. Report whether stakeholder consultation is used to support the highest governance body's identification and management of economic, environmental and social impacts, risks, and opportunities.	39			Goal 16 : Inclusive decision making
G4-46	Report the highest governance body's role in reviewing the effectiveness of the organization's risk management processes for economic, environmental and social topics.	39			
G4-47	Report the frequency of the highest governance body's review of economic, environmental and social impacts, risks, and opportunities.	39			
G4-48	Report the highest committee or position that formally reviews and approves the organization's sustainability report and ensures that all material Aspects are covered.	39			
G4-49	Report the process for communicating critical concerns to the highest governance body.	39			
G4-50	Report the nature and total number of critical concerns that were communicated to the highest governance body and the mechanism(s) used to address and resolve them.	43			
G4-51	a. Report the remuneration policies for the highest governance body and senior executives. b. Report how performance criteria in the remuneration policy relate to the highest governance body's and senior executives' economic, environmental and social objectives.	31	57-60		
G4-52	Report the process for determining remuneration. Report whether remuneration consultants are involved in determining remuneration and whether they are independent of management. Report any other relationships which the remuneration consultants have with the organization.	31	57-60		
G4-53	Report how stakeholders' views are sought and taken into account regarding remuneration, including the results of votes on remuneration policies and proposals, if applicable.	31	57-60		Goal 16 : Inclusive decision making

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G4-54	Report the ratio of the annual total compensation for the organization's highest-paid individual in each country of significant operations to the median annual total compensation for all employees (excluding the highest-paid individual) in the same country.	-	-		
G4-55	Report the ratio of percentage increase in annual total compensation for the organization's highest-paid individual in each country of significant operations to the median percentage increase in annual total compensation for all employees (excluding the highest-paid individual) in the same country.	-	-		
ETHICS AND INTEGRITY					
G4-56	Describe the organization's values, principles, standards and norms of behavior such as codes of conduct and codes of ethics.	13, 31-38			Goal 16 : Effective, accountable and transparent governance
G4-57	Report the internal and external mechanisms for seeking advice on ethical and lawful behavior, and matters related to organizational integrity, such as helplines or advice lines.	35-38			Goal 16 : Effective, accountable and transparent governance
G4-58	Report the internal and external mechanisms for reporting concerns about unethical or unlawful behavior, and matters related to organizational integrity, such as escalation through line management, whistleblowing mechanisms or hotlines.	13			Goal 16 : Effective, accountable and transparent governance
SPECIFIC STANDARD DISCLOSURES					
CATEGORY: ECONOMIC					
ASPECT: ECONOMIC PERFORMANCE					
G4-DMA	Generic Disclosures on Management Approach				
G4-EC1	Direct economic value generated and distributed	46-49	85-161		Goal 5 : Infrastructure investments Goal 8 : Economic performance Goal 9 : Research and development
G4-EC2	Financial implications and other risks and opportunities for the organization's activities due to climate change	-	-		
G4-EC3	Coverage of the organization's defined benefit plan obligations	-	-		
G4-EC4	Financial assistance received from government	-	-		
ASPECT: MARKET PRESENCE					
G4-DMA	Generic Disclosures on Management Approach				
G4-EC5	Ratios of standard entry level wage by gender compared to local minimum wage at significant locations of operation	73	-		Goal 1 : Earnings, wages and benefits Goal 5: Equal remuneration for women and men Goal 8 : Employment
G4-EC6	Proportion of senior management hired from the local community at significant locations of operation	71-72			Goal 8 : Employment
ASPECT: INDIRECT ECONOMIC IMPACTS					
G4-DMA	Generic Disclosures on Management Approach				
G4-EC7	Development and impact of infrastructure investments and services supported	-	-		
G4-EC8	Significant indirect economic impacts, including the extent of impacts	-	-		
ASPECT: PROCUREMENT PRACTICES					
G4-DMA	Generic Disclosures on Management Approach				
G4-EC9	Proportion of spending on local suppliers at significant locations of operation	49			
CATEGORY: ENVIRONMENTAL					
ASPECT: MATERIALS					
G4-DMA	Generic Disclosures on Management Approach				
G4-EN1	Materials used by weight or volume	99			Goal 8 : Materials efficiency
G4-EN2	Percentage of materials used that are recycled input materials	99			
ASPECT: ENERGY					
G4-DMA	Generic Disclosures on Management Approach				
G4-EN3	Energy consumption within the organization	107-108	-		Goal 13 : Climate Action
G4-EN4	Energy consumption outside of the organization	107-108	-		
G4-EN5	Energy intensity	-	-		
G4-EN6	Reduction of energy consumption	107-108	-		
G4-EN7	Reductions in energy requirements of products and services				
ASPECT: WATER					
G4-DMA	Generic Disclosures on Management Approach				
G4-EN8	Total water withdrawal by source	109	-		Goal 6 : Sustainable water withdrawals
G4-EN9	Water sources significantly affected by withdrawal of water	-	-		
G4-EN10	Percentage and total volume of water recycled and reused	-	-		



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ASPECT: BIODIVERSITY					
G4-DMA	Generic Disclosures on Management Approach				
G4-EN11	Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	-			
G4-EN12	Description of significant impacts of activities, products, and services on biodiversity in protected areas and areas of high biodiversity value outside protected areas	110			Goal 6 : water-related ecosystems and biodiversity
G4-EN13	Habitats protected or restored	-			
G4-EN14	Total number of IUCN Red List species and national conservation list species with habitats in areas affected by operations, by level of extinction risk	-	-		
ASPECT: EMISSIONS					
G4-DMA	Generic Disclosures on Management Approach				
G4-EN15	Direct greenhouse gas (GHG) emissions (Scope 1)	104-105	-		Goal 3 : Air quality Goal 13 : GHG emissions
G4-EN16	Energy indirect greenhouse gas (GHG) emissions (Scope 2)	104-105	-		Goal 3 : Air quality Goal 13 : GHG emissions
G4-EN17	Other indirect greenhouse gas (GHG) emissions (Scope 3)	104-105	-		Goal 3 : Air quality Goal 13 : GHG emissions
G4-EN18	Greenhouse gas (GHG) emissions intensity	-	-		
G4-EN19	Reduction of greenhouse gas (GHG) emissions	106	-		Goal 13 : GHG emissions
G4-EN20	Emissions of ozone-depleting substances (ODS)	104	-		
G4-EN21	NO <sub>x</sub> , SO <sub>x</sub> , and other significant air emissions	-	-		
ASPECT: EFFLUENTS AND WASTE					
G4-DMA	Generic Disclosures on Management Approach				
G4-EN22	Total water discharge by quality and destination	-	-		
G4-EN23	Total weight of waste by type and disposal method	97-98	-		Goal 3 : Waste
G4-EN24	Total number and volume of significant spills	-	-	No significant leaks.	Goal 3 : Spills
G4-EN25	Weight of transported, imported, exported, or treated waste deemed hazardous under the terms of the Basel Convention Annex I, II, III, and VIII, and percentage of transported waste shipped internationally	98	-		Goal 3 : Waste
G4-EN26	Identity, size, protected status, and biodiversity value of water bodies and related habitats significantly affected by the organization's discharges of water and runoff	-	-		
ASPECT: PRODUCTS AND SERVICES					
G4-DMA	Generic Disclosures on Management Approach				
G4-EN27	Extent of impact mitigation of environmental impacts of products and services	98	-		
G4-EN28	Percentage of products sold and their packaging materials that are reclaimed by category	-	-		
ASPECT: COMPLIANCE					
G4-DMA	Generic Disclosures on Management Approach				
G4-EN29	Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with environmental laws and regulations	111	-	No case	Goal 16 : Compliance with laws and regulations
ASPECT: TRANSPORT					
G4-DMA	Generic Disclosures on Management Approach				
G4-EN30	Significant environmental impacts of transporting products and other goods and materials for the organization's operations, and transporting members of the workforce	-	-		
ASPECT: OVERALL					
G4-DMA	Generic Disclosures on Management Approach				
G4-EN31	Total environmental protection expenditures and investments by type	49	-		Goal 9 : -Environmental investments -Research and development
ASPECT: SUPPLIER ENVIRONMENTAL ASSESSMENT					
G4-DMA	Generic Disclosures on Management Approach				
G4-EN32	Percentage of new suppliers that were screened using environmental criteria	57	-		
G4-EN33	Significant actual and potential negative environmental impacts in the supply chain and actions taken	-	-		
ASPECT: ENVIRONMENTAL GRIEVANCE MECHANISMS					
G4-DMA	Generic Disclosures on Management Approach				
G4-EN34	Number of grievances about environmental impacts filed, addressed, and resolved through formal grievance mechanisms	111	-	No case	

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CATEGORY: SOCIAL					
SUB-CATEGORY: LABOR PRACTICES AND DECENT WORK					
ASPECT: EMPLOYMENT					
G4-DMA	Generic Disclosures on Management Approach				
G4-LA1	Total number and rates of new employee hires and employee turnover by age group, gender and region	73	-		Goal 5 : Gender equality Goal 8 : Employment Goal 8 : Parental leave
G4-LA2	Benefits provided to full-time employees that are not provided to temporary or part-time employees, by significant locations of operation	73			Goal 8 : Earnings, wages and benefits
G4-LA3	Return to work and retention rates after parental leave, by gender	73			Goal 5 : Parental leave
ASPECT: LABOR/MANAGEMENT RELATIONS					
G4-DMA	Generic Disclosures on Management Approach				
G4-LA4	Minimum notice periods regarding operational changes, including whether these are specified in collective agreements	-			
ASPECT: OCCUPATIONAL HEALTH AND SAFETY					
G4-DMA	Generic Disclosures on Management Approach				
G4-LA5	Percentage of total workforce represented in formal joint management-worker health and safety committees that help monitor and advise on occupational health and safety programs	59	-		Goal 8 : Occupational health and safety
G4-LA6	Type of injury and rates of injury, occupational diseases, lost days, and absenteeism, and total number of work-related fatalities, by region and by gender	66	-		Goal 3 : Occupational health and safety Goal 8 : Occupational health and safety
G4-LA7	Workers with high incidence or high risk of diseases related to their occupation	67-68	-		Goal 3 : Occupational health and safety Goal 8 : Occupational health and safety
G4-LA8	Health and safety topics covered in formal agreements with trade unions	-	-		
ASPECT: TRAINING AND EDUCATION					
G4-DMA	Generic Disclosures on Management Approach				
G4-LA9	Average hours of training per year per employee by gender, and by employee category	81-82			Goal 4 : Employee training and education Goal 5 : Gender equality Goal 8 : Employee training and education
G4-LA10	Programs for skills management and lifelong learning that support the continued employability of employees and assist them in managing career endings	81-82			Goal 8 : - Employee training and education - Employment
G4-LA11	Percentage of employees receiving regular performance and career development reviews, by gender and by employee category	81-82			Goal 5 : Gender equality Goal 8 : Employee training and education
ASPECT: DIVERSITY AND EQUAL OPPORTUNITY					
G4-DMA	Generic Disclosures on Management Approach				
G4-LA12	Composition of governance bodies and breakdown of employees per employee category according to gender, age group, minority group membership, and other indicators of diversity	12	-		Goal 5 : Gender equality Goal 6 : Women in leadership Goal 8 : Diversity and equal opportunity
ASPECT: EQUAL REMUNERATION FOR WOMEN AND MEN					
G4-DMA	Generic Disclosures on Management Approach				
G4-LA13	Ratio of basic salary and remuneration of women to men by employee category, by significant locations of operation	72	-		Goal 5 : Equal remuneration for women and men Goal 8 : Equal remuneration for women and men
ASPECT: SUPPLIER ASSESSMENT FOR LABOR PRACTICES					
G4-DMA	Generic Disclosures on Management Approach				
G4-LA14	Percentage of new suppliers that were screened using labor practices criteria	-	-		
G4-LA15	Significant actual and potential negative impacts for labor practices in the supply chain and actions taken	-	-		
ASPECT: LABOR PRACTICES GRIEVANCE MECHANISMS					
G4-DMA	Generic Disclosures on Management Approach				

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G4-LA16	Number of grievances about labor practices filed, addressed, and resolved through formal grievance mechanisms	83	-	No case	
SUB-CATEGORY: HUMAN RIGHTS					
ASPECT: INVESTMENT					
G4-DMA	Generic Disclosures on Management Approach				
G4-HR1	Total number and percentage of significant investment agreements and contracts that include human rights clauses or that underwent human rights screening	-	-		
G4-HR2	Total hours of employee training on human rights policies or procedures concerning aspects of human rights that are relevant to operations, including the percentage of employees trained	81-82	-		
ASPECT: NON-DISCRIMINATION					
G4-DMA	Generic Disclosures on Management Approach				
G4-HR3	Total number of incidents of discrimination and corrective actions taken	-	-	No case	Goal 5 : Non-discrimination
ASPECT: FREEDOM OF ASSOCIATION AND COLLECTIVE BARGAINING					
G4-DMA	Generic Disclosures on Management Approach				
G4-HR4	Operations and suppliers identified in which the right to exercise freedom of association and collective bargaining may be violated or at significant risk, and measures taken to support these rights	-	-		
ASPECT: CHILD LABOR					
G4-DMA	Generic Disclosures on Management Approach				
G4-HR5	Operations and suppliers identified as having significant risk for incidents of child labor, and measures taken to contribute to the effective abolition of child labor	-	-		
ASPECT: FORCED OR COMPULSORY LABOR					
G4-DMA	Generic Disclosures on Management Approach				
G4-HR6	Operations and suppliers identified as having significant risk for incidents of forced or compulsory labor, and measures taken to contribute to the elimination of all forms of forced or compulsory labor	72			
ASPECT: SECURITY PRACTICES					
G4-DMA	Generic Disclosures on Management Approach				
G4-HR7	Percentage of security personnel trained in the organization's human rights policies or procedures that are relevant to operations	-	-		
ASPECT: INDIGENOUS RIGHTS					
G4-DMA	Generic Disclosures on Management Approach				
G4-HR8	Total number of incidents of violations involving rights of indigenous peoples and actions taken	-	-		
ASPECT: ASSESSMENT					
G4-DMA	Generic Disclosures on Management Approach				
G4-HR9	Total number and percentage of operations that have been subject to human rights reviews or impact assessments	21	-		
ASPECT: SUPPLIER HUMAN RIGHTS ASSESSMENT					
G4-DMA	Generic Disclosures on Management Approach				
G4-HR10	Percentage of new suppliers that were screened using human rights criteria	-	-		
G4-HR11	Significant actual and potential negative human rights impacts in the supply chain and actions taken	-	-		
ASPECT: HUMAN RIGHTS GRIEVANCE MECHANISMS					
G4-DMA	Generic Disclosures on Management Approach				
G4-HR12	Number of grievances about human rights impacts filed, addressed, and resolved through formal grievance mechanisms	83	-	No case	
SUB-CATEGORY: SOCIETY					
ASPECT: LOCAL COMMUNITIES					
G4-DMA	Generic Disclosures on Management Approach				
G4-SO1	Percentage of operations with implemented local community engagement, impact assessments, and development programs	86-94	-		
G4-SO2	Operations with significant actual and potential negative impacts on local communities	86-94	-		
ASPECT: ANTI-CORRUPTION					
G4-DMA	Generic Disclosures on Management Approach				
G4-SO3	Total number and percentage of operations assessed for risks related to corruption and the significant risks identified	-	-		
G4-SO4	Communication and training on anti-corruption policies and procedures	35-38	-		Goal 16 : Anti-corruption

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G4-SO5	Confirmed incidents of corruption and actions taken	-	-	No case	Goal 16 : Anti-corruption
ASPECT: PUBLIC POLICY					
G4-DMA	Generic Disclosures on Management Approach				
G4-SO6	Total value of political contributions by country and recipient/beneficiary	-	-		
ASPECT: ANTI-COMPETITIVE BEHAVIOR					
G4-DMA	Generic Disclosures on Management Approach				
G4-SO7	Total number of legal actions for anti-competitive behavior, anti-trust, and monopoly practices and their outcomes	-	-		
ASPECT: COMPLIANCE					
G4-DMA	Generic Disclosures on Management Approach				
G4-SO8	Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with laws and regulations	43	-		Goal 16 : Compliance with laws and regulations
ASPECT: SUPPLIER ASSESSMENT FOR IMPACTS ON SOCIETY					
G4-DMA	Generic Disclosures on Management Approach				
G4-SO9	Percentage of new suppliers that were screened using criteria for impacts on society	-	-		
G4-SO10	Significant actual and potential negative impacts on society in the supply chain and actions taken	-	-		
ASPECT: GRIEVANCE MECHANISMS FOR IMPACTS ON SOCIETY					
G4-DMA	Generic Disclosures on Management Approach				
G4-SO11	Number of grievances about impacts on society filed, addressed, and resolved through formal grievance mechanisms	94	-	No case	Goal 16 : Grievance mechanisms
SUB-CATEGORY: PRODUCT RESPONSIBILITY					
ASPECT: CUSTOMER HEALTH AND SAFETY					
G4-DMA	Generic Disclosures on Management Approach				
G4-PR1	Percentage of significant product and service categories for which health and safety impacts are assessed for improvement	-	-		
G4-PR2	Total number of incidents of non-compliance with regulations and voluntary codes concerning the health and safety impacts of products and services during their life cycle, by type of outcomes	-	-		
ASPECT: PRODUCT AND SERVICE LABELING					
G4-DMA	Generic Disclosures on Management Approach				
G4-PR3	Type of product and service information required by the organization's procedures for product and service information and labeling, and percentage of significant product and service categories subject to such information requirements	5-8			Goal 12 : Product and service information and labeling
G4-PR4	Total number of incidents of non-compliance with regulations and voluntary codes concerning product and service information and labeling, by type of outcomes	-	-		
G4-PR5	Results of surveys measuring customer satisfaction	85	-		
ASPECT: MARKETING COMMUNICATIONS					
G4-DMA	Generic Disclosures on Management Approach				
G4-PR6	Sale of banned or disputed products	-	-		
G4-PR7	Total number of incidents of non-compliance with regulations and voluntary codes concerning marketing communications, including advertising, promotion, and sponsorship, by type of outcomes	-	-		
ASPECT: CUSTOMER PRIVACY					
G4-DMA	Generic Disclosures on Management Approach				
G4-PR8	Total number of substantiated complaints regarding breaches of customer privacy and losses of customer data	85	-		
ASPECT: COMPLIANCE					
G4-DMA	Generic Disclosures on Management Approach	-	-		
G4-PR9	Monetary value of significant fines for non-compliance with laws and regulations concerning the provision and use of products and services	-	-		



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บริษัท คิวทีซี เอนเนอร์ยี จำกัด (มหาชน)

เลขที่ 2/2 ซ. กรุงเทพมหานคร 8 แยก 5

ถนนกรุงเทพกรีฑา แขวงห้วยหมาก เขตบางกะปิ กรุงเทพฯ 10240

โทรศัพท์ : 0-2379-3089-92 โทรสาร : 0-2379-3099



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