

AIS: Task Force on Climate-related Financial Disclosures (TCFD)

AIS is the largest telecommunication service provider in Thailand and aspires to be the Digital Life Service Provider leveraging upon our strength in telecommunication infrastructure and service expertise as well as nationwide customer base. We consider ourselves as part of the technological ecosystem to deliver digital technologies and services in order to drive growth in the low-carbon economy while enhancing social welfare and be a part in curtailing climate-related impact.

We are an early adopter of the Task-Forced on Climate-related Financial Disclosures (TCFD) by applying the framework to report on how we govern, plan, manage, and measure our business impact from and to the climate change. We apply the following four elements which are outlined in this document.

Part 1: Governance

Part 2: Risk Management

Part 3: Strategy

Part 4: Metric and Target

Part 1: Governance

Managing the climate-related impact to our business is a part of our enterprise risk management process as well as from the lens of sustainable business development. The Board of Directors has oversight on the risk management which includes climate-related risks and assigns the Audit & Risk Committee for an independent view and recommendation to ensure appropriate risk assessment, monitoring, reporting and control activities. The Board also assigns the Sustainable Development Committee to guide and has focus on the long term climate-related aspects with a clearly defined strategy and target. At the management level, the management committee is responsible for assessing and managing climate related risks and opportunities and guiding relevant business units and/or teams to execute proper mitigation and adaptation.

Board of Directors	Risk oversight & Governing climate-related strategic direction and target
Audit & Risk Committee	Ensure appropriate climate-related risk assessment and monitoring
Sustainable Development Committee	Guide on long term climate-related aspects with a clearly defined strategy and target
Management Committee	Assess and manage climate-related risks & opportunities

Part 2: Risk Management

Telecommunication and digital services have become the lifeline of every aspect of people's personal and professional lives, and are considered as significant infrastructures that facilitate economic growth and development. AIS realizes that climate-related risks are critical issues that could impact how we run our business and operation, both today and in the future. Therefore, we are working to incorporate climate-related issues into our overall risk management process and develop formal processes that engage our Board of Directors, management team, and relevant departments.

The integration of climate-related risks with overall risk management

AIS performs a materiality assessment every 3 years to evaluate sustainability-related issues and broader emerging challenges that are critical to the success of a business. The process guides companies to apply a sustainability perspective to business by engaging with key stakeholders, prioritizing the identified issues, mitigating risks or driving toward emerged business opportunities, allocating resource and setting goal. As climate change is considered as one of our 7 strategic focus, we establish multi-disciplinary process to conduct thorough assessment on the climate-related risks and opportunities, and its implications to our business.

We engaged relevant stakeholders to assess climate-related issues, both transition and physical risk aspects and performed a simplified scenario analysis to assess financial risks and opportunities that may have caused by climate change. The scope of our risks and opportunities assessment includes our operations as well as upstream and downstream activities such as the impacts on suppliers and customers, within different timeframes consistent with the expected lifetime of the assets or activities (Short term: 0-1 years, Medium term: 2-5 years, Long term: 6-30 years). For physical risks, location-specific information of the operations and assets was considered, while, for transitional risks, potential changes in legislation, technological development or market conditions are included. The process allows us to understand its potential impacts on our business strategy, operation, and financial implication in aspects such as increasing operational cost from an impact of physical risks, potential streams of income from new market opportunities enabled by the need to mitigate impacts from natural disaster, and increasing capital expenditures from transitioning to the lower-carbon business operation (Further details of these implications are illustrated in Part 3: strategy).

For the target setting, AIS planned the adaptation and mitigation actions by committing to reduce greenhouse gas, continually improving energy efficiency, supporting renewable energy, and encouraging our trade partners and equipment suppliers to play a part in the sustainable business goals.

We set short, medium, and long term goals to reduce greenhouse gas emission and have the Chief Technology Officer (CTO) tasked with carrying out the programs implementing environmental management across the organization, from its core business to its auxiliary endeavors. A team of environmental experts provides a quarterly report to the CTO to inform actions, as well as monitors regulations, measures and relevant technological trend to constantly improve the environmental management plan. A report on environmental efforts is presented to the Sustainability Development Committee and the Board of Directors on quarterly basis.

Climate-related risk identification and assessment process

Given that this is our initial steps in learning the evolving nature of this issue, our detailed processes to tackle with climate-related risks now focus on major flooding, which is identified as the most material risk event. The documented processes in Enterprise Business Continuity Plan (BCP) to tackle such events are outlined below;

1. AIS conducts climate-related risk identification and assessment toward AIS operations annually to inform climate risk at enterprise level.

2. The results from climate-related risk identification and assessment are used by risk management working group, then risk management committee to conduct enterprise risk management. Refer to process in Annual Report 2020 pages 51

3. AIS management approach and mitigation actions of climate risks and opportunities are addressed and communicated. Refer to Sustainability report 2020.

4. For the identified significant climate risk, i.e. major flooding, the Plan and Process to manage is addressed in BCP.

Part 3: Strategy

AIS acknowledges that climate-related issues create significant risks and opportunities for our businesses and strategy. In order to mitigate such risks and embrace business opportunities arising from the transition towards the low-carbon economy, the climate-related issues are incorporated into our strategic planning, business operations, and risk management process by aligning to the Taskforce of Climate-related Financial Disclosures (TCFD) recommendations. Since we are at early stages of integrating the TCFD framework in our risk management, we have conducted a simplified qualitative scenario analysis by using historical climate and environmental data to project possible implications of the climate-related risks and opportunities to our businesses and the financial impacts. This exercise is an initial step on our journey towards achieving the low-carbon economy and sustainable growth, and it will continue to evolve in the future. The table below illustrates an overview of the preliminary implications of climate-related issues on our strategy, operations, and financial planning.

Table 1: An overview of the implications of climate-related issues on our strategy, operations, and financial planning.

Issues	Time horizon ¹	Description		Affected financial items
Transition risks				
		Risks	Opportunities	
Policy and regulatory change	Medium-long term	<p>1. Changes in carbon emission regulation may lead to the following implications;</p> <ul style="list-style-type: none"> - increased costs of carbon emission if cap-and-trade policy or carbon tax is imposed - increased capital expenditure and/or operating cost to upgrade the energy efficiency of the equipment and new technology that helps offset the carbon emission. - compliance cost to new regulation and emission reporting obligations. 	<p>2. The government's policy incentives to support renewable and energy-efficient projects will help lower the cost and improve the risk/ return profile of our investment in solar panels and energy-saving technology.</p> <p>3. The government's policy to enforce lower emission will create opportunity to AIS in providing 5G/IoT solutions that help businesses to monitor and manage their energy usage more efficiently</p>	<p>Capital expenditure</p> <p>Operating costs</p> <p>Value of assets</p> <p>Revenue</p>
Technology	Medium-Long term	<p>4. The replacement of existing technology and equipment such as upgrading rectifiers and the installation of solar panels at the data centers, base stations, and switching centers, requires high upfront costs to transition to lower emission and energy-efficient technologies in the medium term.</p>	<p>5. New innovation and more cost-efficient renewable technologies could help decrease the investment cost in the long run.</p> <p>6. Development on digital technologies that supports lower operating cost enlarges the market demand for telecommunication connectivity</p>	<p>Capital expenditure</p> <p>Operating costs</p> <p>Value of assets</p> <p>Revenue</p>

¹ Short term: 0-1 years, Medium term: 2-5 years, Long term: 6-30 years

Issues	Time horizon ¹	Description		Affected financial items
Market	Short-medium term		<p>7. New market for digital services enabled by the need to mitigate impacts from climate change and natural disaster.</p> <p>As corporate customers are increasingly aware of climate-related risks, services such as co-location of IT server and storage, Cloud and Data center have become increasingly important businesses due to the need to reduce risks from climate change and natural disaster.</p> <p>8. Market opportunity for low-carbon services</p> <p>- Increased demand for digital services will be boosted by our existing Telecom network stability and product/ service reliability.</p>	Revenue
Reputation	Short-medium term	<p>9. Investors and customers' expectations on the company's climate-related strategies and performances</p> <p>- If the company fails to demonstrate our efforts and progress on appropriate measures to minimize, our brand could be perceived negatively.</p>	<p>10. Increased demand for low-carbon and environmental-friendly products and services</p> <p>- The Full E concept through e-bills, e-receipts, and myAIS application, which allows customers to manage their accounts by themselves, helps improve the customer experience, as well as benefit the company's environmental reputation.</p>	Revenue
Physical risks				
Acute	Short-long term	<p>11. Extreme and severe weather such as flood and drought could disrupt our operation and supply chain.</p>		Capital expenditure

Issues	Time horizon ¹	Description		Affected financial items
		<p>- Since telecommunication and digital services have become the lifeline of every aspect of people's personal and professional lives, our customers expect our services to operate regardless of weather conditions. This could incur higher operating cost to properly respond to adverse weather situations.</p> <p>12. Stranded assets</p> <p>- Unpredictable and severe weather could pose a threat to our property and assets regardless of the mitigation plans.</p>		<p>Operating costs Value of assets Revenue</p>
Chronic	long term	<p>13. Change in weather pattern such as chronic higher temperature and change in rainfall pattern could affect our operations such as investment for higher resiliency of base station and telecommunication equipment and data center where the cooling system is the key.</p> <p>- Air-conditioning system and water cooling system might need a replacement to better heat resistant technology. This could also lead to the increased energy usage to power the cooling system.</p>		<p>Capital expenditure Operating costs Value of assets Revenue</p>

Part 3: Strategy (continued) – Scenario analysis

From the 13 implications of the climate-related issues listed in table 1, we have conducted further analysis on the following 3 implications to size potential risks and financial impacts, and formulate the adaptation and mitigation plans accordingly.

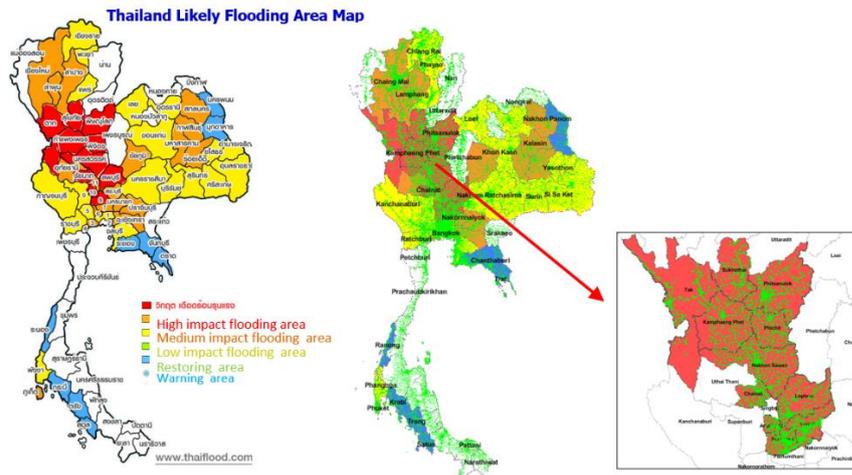
Physical Risks: the case of major flooding

AIS uses the risk matrix to define the level of climate-related risks by considering the category of probability or likelihood against the category of consequence severity. The risk level is categorized into 4 levels, consisting of Low, Medium, High, and Very High. Our annual update identified high temperature, major floods, windstorms, and water shortage as a medium level of climate-related risks to AIS operations, shown in the matrix below. In response to such weather events, we formulate Incident Response Plan and Business Continuity Plan to manage such risks for our main infrastructure, Base Station, and Principle Node. This risk management plan includes standard designs, operational routine, and crisis response process.

Impact	Severe					
	Major		Storm			
	Moderate		Flooding			
	Minor	Tsunami			High temperature/ Forest Fire	
	Insignificant				Drought	
		Rare	Unlikely	Possible	Likely	Almost certain
		Likelihood				

Low	Medium	High	Very High
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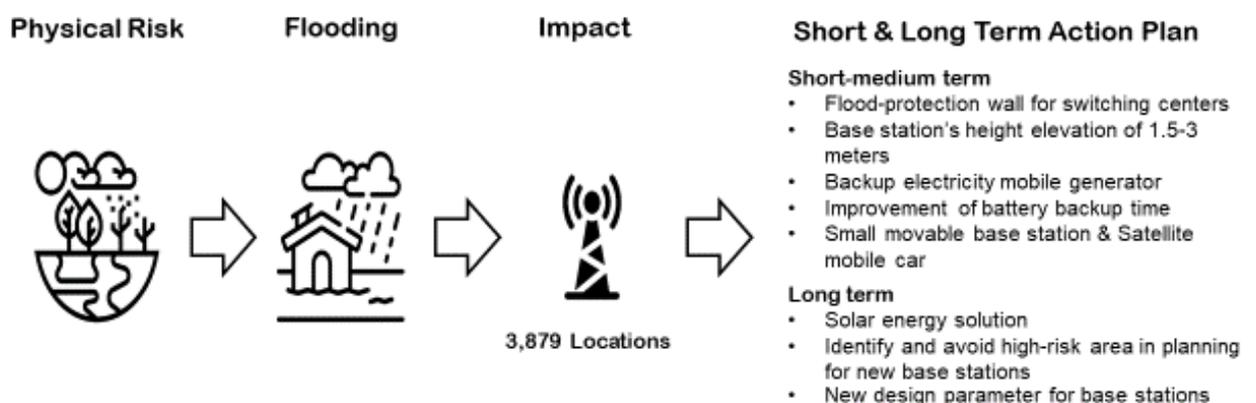
From the 4 medium-level risks identified in the matrix, we choose major floods to conduct simplified scenario analysis to evaluate the financial impacts and our company's resilience under the major flooding circumstances. The scope of analysis covers AIS operations as well as upstream and downstream activities. Geographical locations of 100% of our operations are taken into consideration over 10-year timeframe which corresponds with asset lifetime. Our analysis starts from identifying the potential flood-prone areas in Thailand and maps them out with our locations of network and operations, as shown in the map below.



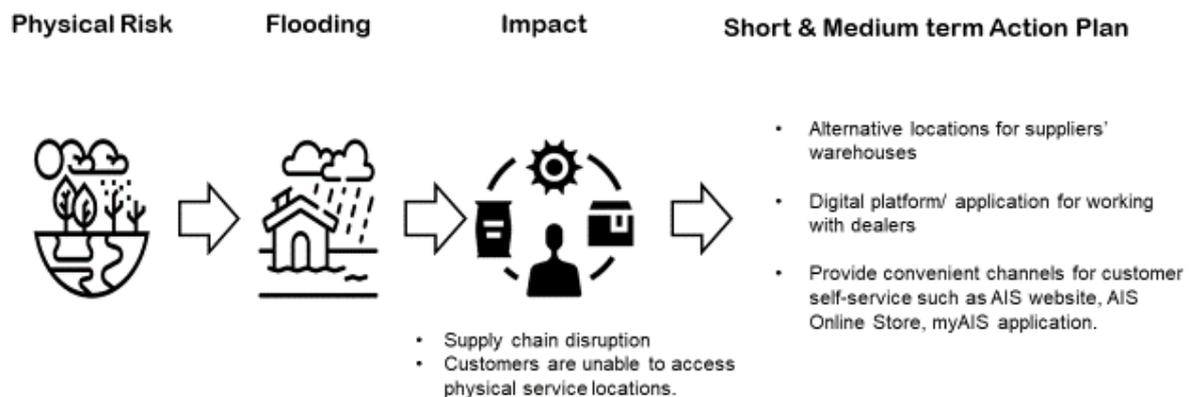
Then, estimated financial implication of the risk before taking action is calculated from the opportunities loss for revenue and the damage to invested facilities in the areas with high risk of flooding. Since telecommunication and digital services have become the lifeline of every aspect of people’s personal and professional lives, our customers expect our services to operate regardless of weather conditions. Besides, keeping a channel to work with our dealers is also important for our services to run smoothly despite the impact from flooding. Preventing major disruption of our services from the severe weather events could incur higher capital expenditure and/or operating cost to properly respond to adverse weather situations. We also consider financial cost for potential damage of 3,879 locations of our operation. Apart from our business operation, supply chain disruption caused by major floods is also taken into consideration. Major floods might damage telecommunication and network equipment for our network expansion or maintenance stored in suppliers’ warehouses.

To mitigate such risks, investment for preventive actions in short to long terms have been planned. Our risk management approach consists of the following actions;

AIS Business operation



Upstream and downstream operations/ activities

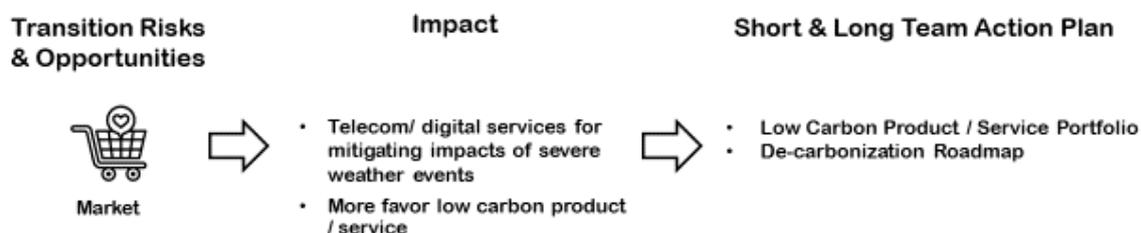


Short to medium term action plan (0-1 and 2-5 year, respectively)

- 1) elevating the Mobile Base Station (BTS) in flood-prone areas by 1.5-3.0 meters and building the flood-wall for the Mobile Switching Centers (MSC) where vulnerable to flooding.
- 2) preparing back-up electricity generators for BTS and small movable/mobile BTS to maintain services in critical areas in order to further reduce the impact from network interruption to customers and risk to potential revenue loss
- 3) increasing solar cell capacity which will serve as an alternative source of power at our operation locations and data center when the extreme weather events disrupt the main power source.
- 4) installing weather warning system to monitor flood.
- 5) For upstream activities, partnering with major suppliers to find alternative locations for evacuating the equipment when a high risk from flooding is identified.
- 6) For downstream activities, using online channels to work with our dealers in order to keep our operations to run smoothly
- 7) For customers, providing convenient channels for customer self- service. For example, myAIS mobile application serves as a one- stop service platform that allows customers to use our services and manage their accounts conveniently.

In the long run, we will take the result of this analysis into consideration in 100 % of new facility siting in order to avoid building new stations in the flood- prone areas and design improved parameters for the new stations. With all these preventive actions, impacts from flooding risk has decreased significantly to very low likelihood and impact over the next 7-8 years.

Transition Risks: new market opportunity arising from the need to manage impacts from natural disaster

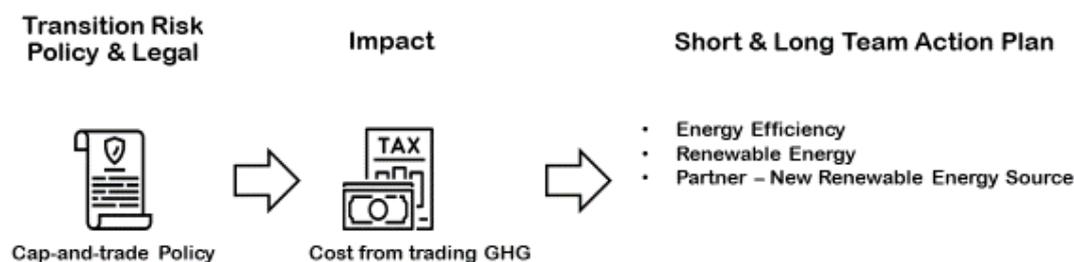


Following the climate change issues, the natural disaster has become more severe and more difficult to predict, particularly flooding that happens in several provinces in Thailand. Thus, more corporate customers have started to outsourcing their IT infrastructure and services e.g. co-location of IT server and storage, managed services such as Cloud and Data center to reduce risks from such incidents. AIS provides secured infrastructure (i.e. Tier-4 Data Centers) along with Business Solutions for enterprise customers ranging from cloud solutions, back-up services, disaster recovery site, co-location of server to software as a service. These implications represent some significant business opportunities in our 2 core areas (refer to Table 2) for the company to grow its new revenue streams by leveraging our data centers, skills and expertise, IT and our nationwide network infrastructure to provide end-to-end integrated services supporting the growing demand of the enterprise customers arising from climate change.

Table 2: Businesses that could be benefited from the increasing demand due to the need to mitigate risks from severe weather events.

Core business areas	Services that can be provided
Telecommunication connectivity service	<ul style="list-style-type: none"> • Enterprise data services i.e. Business Solution, broadband connectivity for small-medium size business • Machine-to-Machine communication • Call Center Outsourcing Service
New ICT/digital service	<ul style="list-style-type: none"> • IoT and ICT solution • Cloud & Data Center • Cybersecurity • Digital Marketing & Digital Content

Transition Risks (policy and regulatory change): the case of carbon tax



The Thai Government, acknowledging the country’s vulnerability to climate change and the urgent need to transition to a more sustainable economy, has embedded Thailand’s commitments to the achievement of its Nationally Determined Contributions (NDCs) in its National Strategy. In addition, the National Climate Change Master Plan (2015-2050) is designed to help Thailand achieve sustainable low carbon growth and climate change resilience by 2050, in which the NDCs to reduce the greenhouse gas emissions by 20 % from Business As Usual (BAU) level by 2030 is specified. The level of contribution could increase up to 25% subject to adequate and enhanced access to technology development and transfer, financial resources, and capacity building support through a balanced and ambitious global agreement under the UNFCCC.

In order to support the National commitment, AIS, a leading digital service providers, should play a significant role in achieving the transition to the lower- carbon economy by internalizing the negative impacts we have caused to the environment. Moreover, it is important to apply this responsible practice to our suppliers to reduce AIS’ indirect negative externalities caused by our suppliers. Due to growing demand for digital services and hence telecommunication connectivity, the electricity usage to power our networks and data centers, which is a major contribution to our GHG emission, shows an upward trend along with the rising demand. The incurred cost from internalizing negative externalities of our carbon emission could become another major transition risk that we need to properly manage.

Therefore, we study the trend of our GHG emissions by using linear regression to predict the trend and explore how it will affect our financial planning. Since Thailand does not have carbon tax or trading schemes, our scenario analysis is drawn from an assumption that the government could strongly encourage telecommunication industry to reduce the absolute amount of greenhouse gas emission by 20- 25% , aligning with the NDCs goal to be achieved by 2030. Under the cap- and- trade scheme, we formulate a projection of incurred cost from an assumption that the company have to trade the exceeding amount of GHG emission in the carbon market where the current global average price is approximately USD 27/tCO₂e. To reduce our negative externalities offsetting our GHG emission in the carbon market, there could be material implication on our operating cost.

We have reviewed our environmental target and have been deploying various initiatives such as enhancing network efficiency and investing in renewable energy, which will help reduce our emissions to mitigate future climate-related risk to AIS operations and also contribute to the transition to a lower-carbon economy. Besides, we also partner with our suppliers to reduce our environmental impact by assessing their energy consumption and encouraging them to increase proportion of renewable energy usage.

Part 4: Metrics and Target 2023

AIS believes our goals demonstrate to our stakeholders that we are committed to internalize our negative externalities, while also managing possible risks and opportunities arising from the climate change. Our commitment involves 2 key main approaches;

- Reduce GHG emissions intensity as calculated from the ratio of direct (GHG scope 1) and indirect (GHG scope 2) emissions to data traffic (tCO₂e/terabit or ton carbon dioxide equivalent per terabit) by 90% compared to the baseline in 2015.
- Increase renewable energy usage to 5% of total energy consumption

Implications and financial impacts from climate change are evolving issues that need to be further explored in order to develop finer methodologies to better quantify the degrees of climate-related risks and opportunities on our business and strategy. Our first TCFD report is only an initial step to demonstrate to our stakeholders that we are committed to reducing our environmental impact. And, we will continue to measure and disclose our performance against our targets.

Table 3: our metrics and performance

Subjects	Unit	2017	2018	2019	2020
GHG Emission^(GRI 305)					
Total GHG emissions (Scope 1 and 2)	tCO ₂ e	519,950	525,451	615,407	696,883
- Direct GHG emissions (Scope 1) ^{(GRI 305-1) 1}	tCO ₂ e	11,431	10,687	11,177	11,196
- Direct GHG emissions (Scope 2) ^{(GRI 305-2) 2}	tCO ₂ e	508,519	514,764	604,230	685,687
GHG Intensity ^{(GRI 305-4) 3}	tCO ₂ e per Terabit	0.041	0.025	0.020	0.015
Energy^(GRI 302)					
Total Energy Consumption	MWh	911,827	919,900	1,082,823	1,220,024
	Terajoule ⁴	3,283	3,311	3,898	4,392
Total non-renewable energy consumption	MWh	911,372	919,320	1,081,960	1,214,006
	Terajoule	3,281	3,309	3,895	4,371
- Direct energy consumption: Fuel and other ⁵	MWh	37,778	35,000	36,706	36,052
	Terajoule	136	126	132	130
- Indirect energy consumption: Electricity ⁶	MWh	873,594	884,320	1,045,254	1,177,954
	Terajoule	3,145	3,183	3,763	4,241
Energy from renewable sources ⁷	MWh	454.73	580.38	862.91	6,017.86
	Terajoule	1.637	2.0894	3.1068	21.6643
Water^(GRI 303)					
Total Water Use ^{(GRI 303-1) (2018 version)}	Cubic Meters	151,559	158,542	191,332	226,528
Municipal Water ⁸	Cubic Meters	148,377	154,933	187,900	222,821
- Water Stress Area ¹⁰	Cubic Meters	-	-	-	-
Ground Water ¹¹	Cubic Meters	3,182	3,609	3,432	3,707
- Water Stress Area ¹²	Cubic Meters	3,182	3,609	3,432	3,707

Details of note 1-12 are on page 88-89

<https://investor.ais.co.th/misc/sustainability/20210225-advanc-srd-2020-en.pdf> (page76-80)