



**Greenhouse Gases Analysis Report
And Reduction Targets 2020 -2030
(Issue: 3)**

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May 2021

Introduction

According to Climate Change impacts that are developing to Climate Crisis, resulting all countries entire the world are facing both direct and in-direct impacts that include impacts on economic and community. CP ALL Public Company Limited and subsidiary ("the Company") are realized meaningful of collaborating prevention and mitigation climate change impacts as severe flooding occurred during the 2011 that obviously impacted on people, industrial sector, logistic, and seven eleven stores. Furthermore, the Company is willing to contribute in climate change mitigation at global scale by set GHG emissions reduction target aligned with the national target as Thailand ratified the Paris Agreement on September. 21, 2016 during Conference of the Parties: COP21 and pledged 20-25% GHG emissions reduction by 2030¹

The Company has prepared this report, analyzing current GHG emissions situation and forecast potential GHG emissions scenarios (2020-2030), relevant financial impacts, sensitivity analysis, and cost of carbon offset as well as targets setting in according with expectations of the international and Charoen Pokphand Group, being carbon neutral or net zero carbon emissions and contribute to the national targets. Furthermore, the Company has expanded the scope of the assessment to cover emerging risk that associated with climate change i.e. sea level rise and its impact. With the awareness on the global issue, the Company has announced the Climate resilience target to be Net Zero Carbon within 2030 which aligned with the science based target at blow 2°C.

The report intention is forecasting potential GHG emissions scenarios by using input data that verified by external independence party or third party. GHG emissions assumptions are direct variation with business as usual case. Hence, periodically updating data that is reflecting the business is necessary for enhancing accuracy of projecting scenarios. Report preparing team is hopefully that the report will be benefit the entity screening GHG emissions reduction and offset initiatives properly and effectively.



Arkom Arjsang

General Manager

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¹ National GHG emissions reduction 2021 – 2030 roadmap has been prepared for achieving Nationally Determined Contribution: NDC that submitted to the UN secretary-general's Climate Action Summit on October 1, 2015. The national target pledged at 20-25% reduction from business as usual (BAU) in 2030. This climate commitment is a part of the Paris agreement that Thailand ratified on September 21, 2016 (Please see reference on page 10).

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1. GHG Emissions Circumstance (2015-2020)

CP ALL Public Company Limited and subsidiary ("the Company")² have collected GHG emissions related information in according with the international reporting standard, Global Reporting Initiative: GRI, calculated and converted into tonne carbon dioxide equivalent in according with Greenhouse Gas Protocol, and United Nations Framework Convention on Climate Change: UNFCCC. The GHG emissions scope 1 and 2 data have been consolidated since 2015-2020 (shown in **diagram 1**). The specific emission factor of the national electricity grid has been updated by the Energy Policy and Planning office (EPPO), Ministry of Energy which the Company has been re-calculated the GHG emission by referring to the numbers. The updated numbers and calculation methodology have been verified by an external 3rd verifier. The analyzed data indicate that during 2015-2020 GHG emissions is direct variation with growth as shown by GHG intensity (tCO₂e per million Baht) 2.43, 2.35, 2.18, 2.16, 2.15 2.17 respectively (shown in **diagram 2**). The number is indicating that the Company has achieved the sustainability target 2020 to reduce GHG intensity by 10% comparing with 2015 base year.

Since 2015, the volume of GHGs emissions were increased reflecting our business expansion and revenue growth. The Company is able to maintain the GHG intensity (tCO₂e per million Baht) by implementing several energy efficiency and renewable energy projects at more than 10,000 seven eleven stores such as 100% of stores changing conventional light bulb to LED, around 40% of stores upgrading air conditioner to inverter system, solar PV rooftop initiative generating renewable energy at pilot branches and deploying to potential branches entire the country. During 2019-2020, the GHG emissions were reduced and the intensity performance was improved due to external factors i.e. COVID-19 and expansion of our online store.

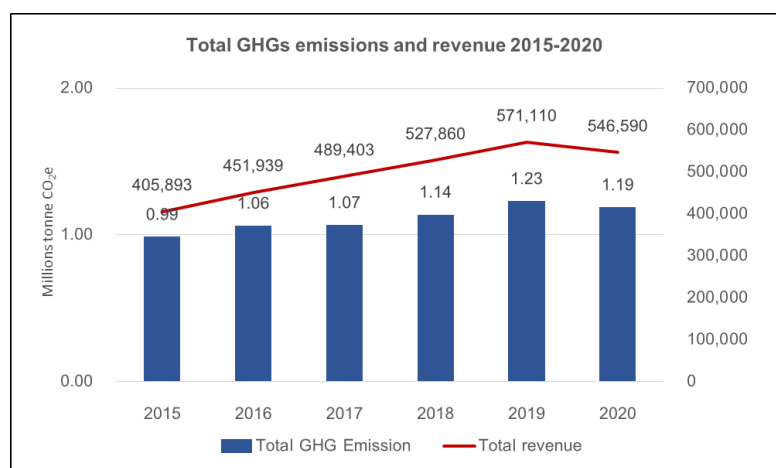


Diagram 1 GHG emissions and revenue 2015-2020

² The Company comprised of CP ALL Plc., Siam Makro PCL., and CPRAM Co., Ltd. which revenue composition 2020 are 55%, 37%, and 3.26%, respectively.

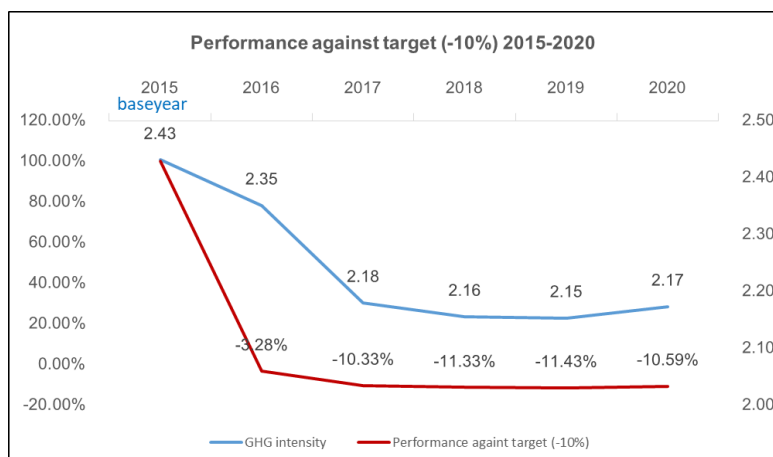


Diagram 2 GHG Performance against target 2015-2020

Analyzing 2020 data by comparing of average GHG proportions of 3 main business units found that CP ALL Plc. (CP ALL) has contributed 78.0% of total emissions, Siam Makro PCL. (Siam Makro) has contributed 16% of total emissions, and CP RAM Co. Ltd. (CPRAM) has contributed 6%.

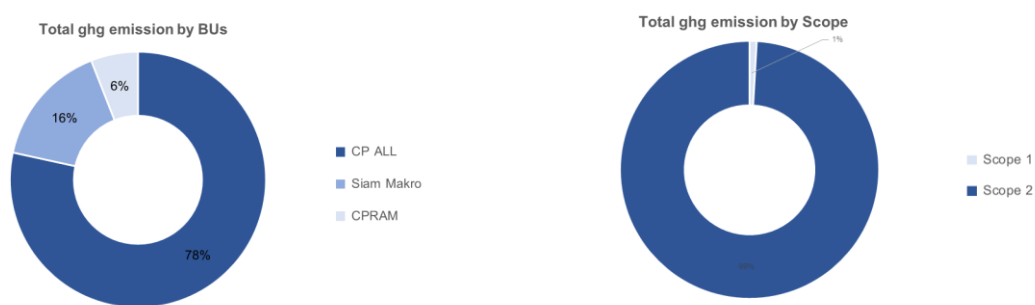


Diagram 3 GHG emissions by business units and scopes 2020

According to **diagram 3**, inferring that CP ALL has a major proportion of GHG emissions. In 2020, CP ALL has a direct (Scope 1) GHG emissions at 1% and energy indirect (Scope 2) GHG emissions has contributed 99%, that solely calculate from electricity

2. Climate change target phase 1: 2015-2020

As per completion of sustainability targets phase 1, the climate change target, reducing GHG intensity by 10% comparing with 2015 baseline, the Company has concluded the group-wide data as well as CP ALL Plc. performance. The progress against targets and results have been presented as **Table 1**. The group-wide performance is achieving the target at 10% GHG intensity reduction as actual reduction is at 2.17%. Focusing on CP ALL Plc., the Company has reduced the GHG intensity at 2.67% which required to reduce more 2,795 tCO₂e in order to achieve the target. The Company has expressed responsibility on this matter by offsetting the Thailand Voluntary Emission Reduction (T-VER) certified by the Thailand greenhouse gas management organization (public organization) (TGO).

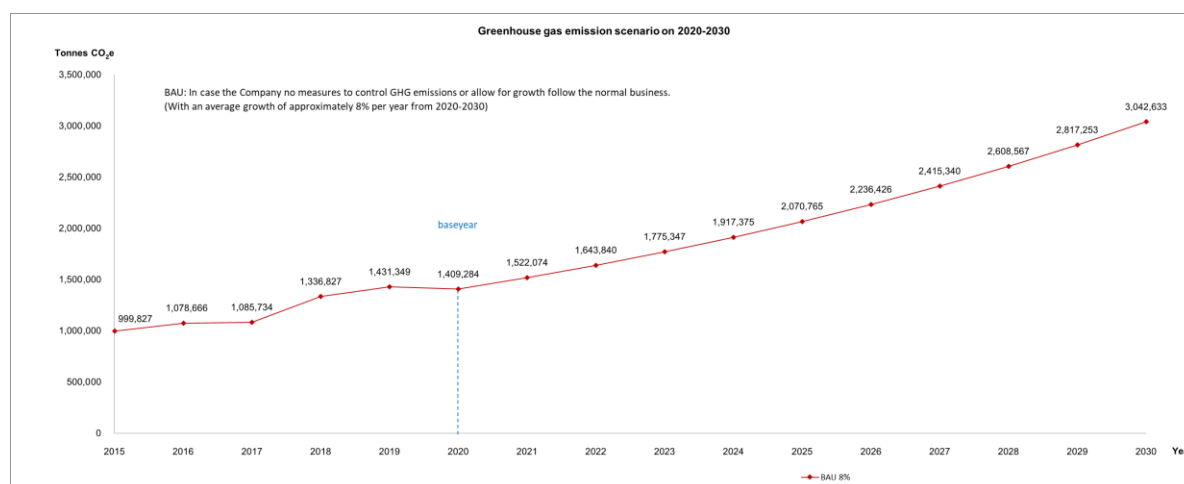
Table 1: results of climate change 2020 target

Scope	GHG intensity 2015 (tCO ₂ e/MTHB)	GHG intensity 2020 (tCO ₂ e/ MTHB)	Performance against target (%change)	Absolute number of tCO ₂ e required to achieve target	Remark
Group-wide performance	2.43	2.17	-10.59%	-	-
CP ALL Plc.	2.94	2.67	-9.12%	+2,795	The number of 2,795 has been offset by the Thailand voluntary emission reduction (T-VER).

3. Forecasting GHG Emissions Scenario (2020-2030)

Forecasting information for GHG emission 2030 by considering the Group-wide performance, the scope has covered fugitive emission, adding refrigerants consumption since, 2018 which reflect management control capping the emissions growth. For other sources of GHG emission, the Company is on track to measure, monitor, and manage which will include this scope in the corporate strategy soon.

3.1 Scenario 1: business yearly growth at 8% (Business as Usual: BAU) and projection GHG emissions growth at 8% with assumption that there is no GHGs mitigation in-place. The projecting results and trend are shown as **diagram 5**.

**Diagram 5** Forecasting GHG emissions BAU case

3.2 Scenario 2: reducing GHG emissions growth by 4%, due to the Company has limited energy consumption growth rate not over 6% which reflect the energy efficiency plan. This circumstance is focusing on the main GHG emission hot-spot at 86% of total GHG emission where fugitive emission is at 13% and others at 1%. Expecting result in 2030, the Company will reduce GHG emissions at 956,310 tCO₂e comparing with BAU are shown as **diagram 6**.

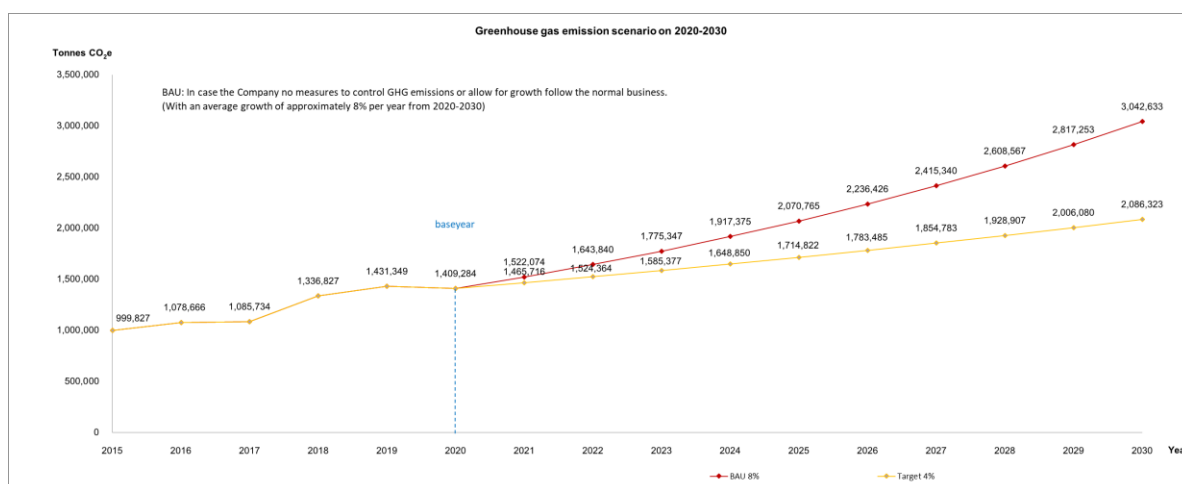


Diagram 6 Forecasting GHG emissions by capping GHG emissions at 4% (GHG reduction)

3.3 Scenario 3: business operates according to Business as Usual: BAU case, 8% growth, reduction of GHG emissions at 4.2% each year as implementing GHG emissions reduction, and implementing carbon offsetting, targeting to be carbon neutral or net zero carbon at 2030, this scenario is aligned with the science based target at below 2°C as implementing GHG emissions reduction. The result of GHG emissions is down-trend (shown in **diagram 7**).

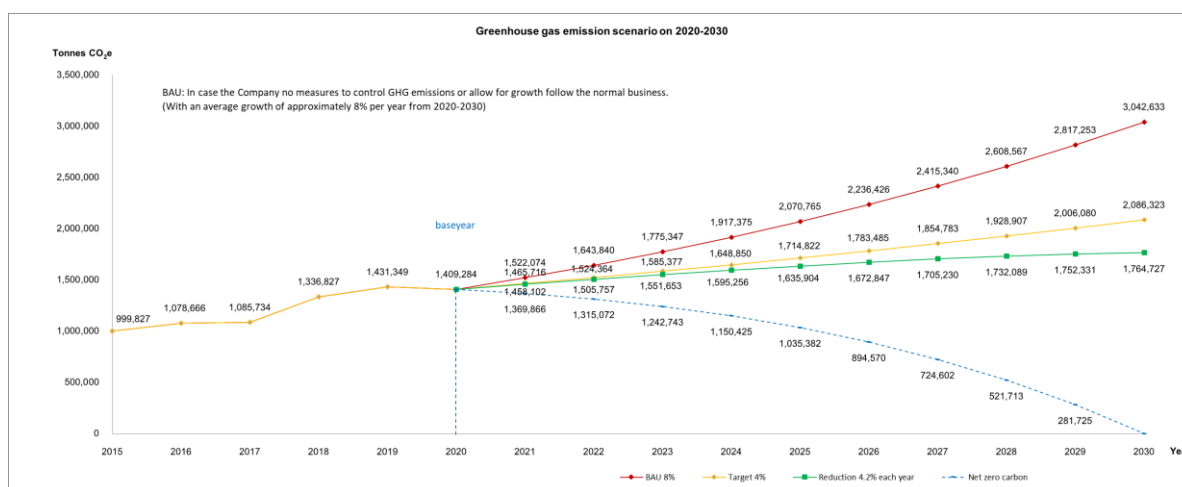


Diagram 7 Forecasting GHG emissions, targeting reduction GHG emission at 4.2% each year and net zero carbon

4. GHGs Analysis and Its Impacts

4.1 Carbon offsetting

According to business expansion continuously, the Company is aware of development of GHG emissions reduction initiatives for various operations, including research, pilot projects, and applied to the business as well as collaboration program with stakeholders thought value chain. Under continuously development principle, the Company has preliminary studied on advance sustainability targets, being a carbon neutral organization or net zero carbon 2030 afterward. The Company has simulated 3 GHG emissions reduction scenarios (shown in diagram 8) which all cases are linked with the business growth. Additionally scenario has been performed by limiting volume of carbon offsetting at 20% of projection BAU case in 2030. The offsetting cost of all remaining carbon emissions will be used for range determination.

Results are indicating cost that associated climate change mitigation and linkage with business case which reflect effort and preparations required for co-mitigating the global issue.

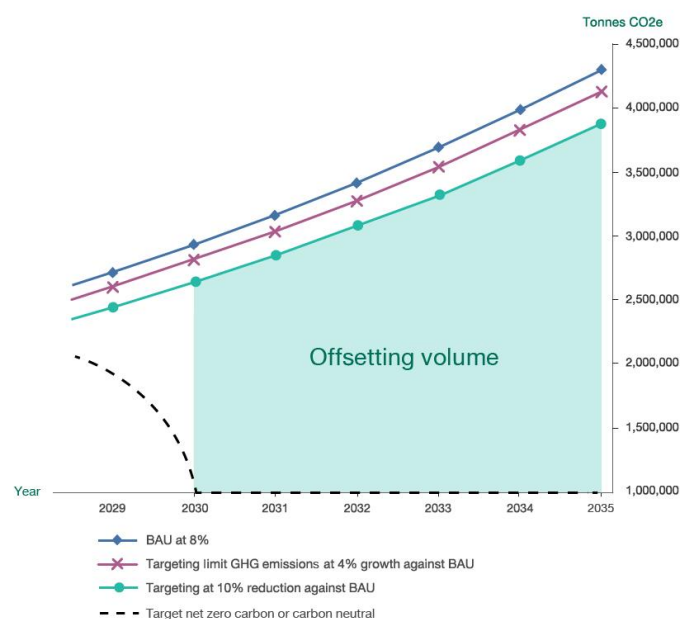


Diagram 8 GHG emissions and carbon offsetting

Data analysis (inputs and factors used for the analysis)	Unit	
Voluntary Emission Reduction	Euro / tonne	42.72
Exchange rate	Bath / Euro	38.37
Carbon emissions forecasting 2030 (CEF ₂₀₃₀)	tCO ₂ e	3,042,632.71
Target limited GHGs growth at 4%	tCO ₂ e	2,086,322.77
Target GHGs reduction at 4.2% each year	tCO ₂ e	1,764,726.97
1% of revenue 2020	MTBH	5,465.90

Table 2: Sensitivity analysis for carbon offsetting on target year 2030 scenario

(Unit Million TBH)

Sensitivity range	-10%	-5%	0%	+5%	+10%
Carbon emissions (CEF ₂₀₃₀)	4,488.64	4,738.01	4,987.38	5,236.75	5,486.12*
Target limited GHGs growth at 4%	3,077.85	3,248.84	3,419.83	3,590.82	3,761.81
Target GHGs reduction at 4.2% each year	2,603.41	2,748.05	2,892.68	3,037.32	3,181.95

* exceeded threshold at 1% of revenue

4.2 Sea level rise

The mean sea level is rising up due to the impact of climate change. Due to the NASA Global Climate Change, Vital Signs of the Planet reports the observing land ice is having rate of change decreasing 151 billion metric tons per year. The Antarctica mass variation since 2002 is decreasing trend which the present period (2019-2020) variation range is around -2,000 - -3,000 Gt. (**Diagram 9**)

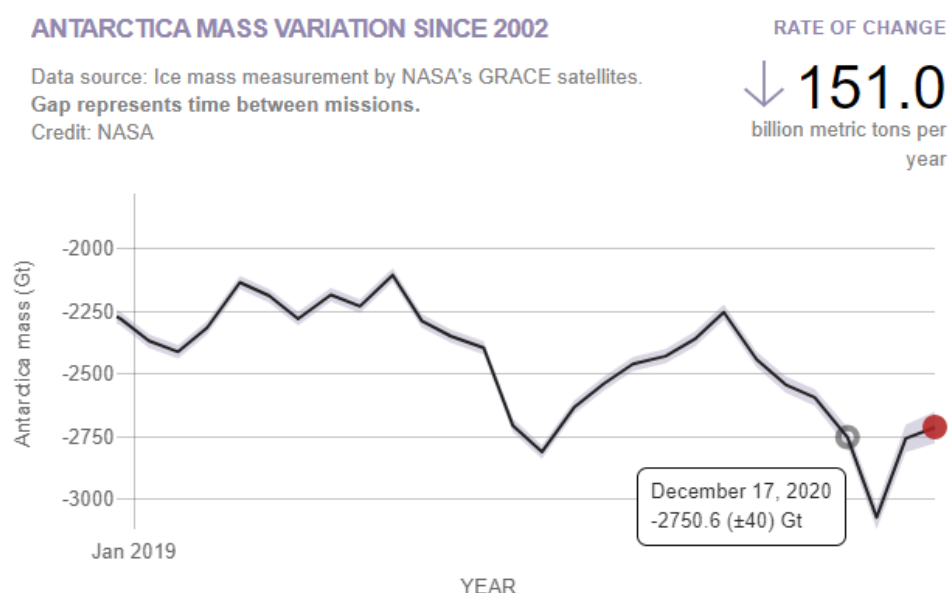


Diagram 9: Antarctica mass variation

Source: climate.nasa.gov

Apart from evidential impact aforementioned, there are various influential factors to nature, flora & fauna, and mankind. The sea level rising is a one of consequently effects which is caused³ primarily by two factors related to global warming: the added water from melting ice sheets and glaciers and the expansion of seawater as it warms⁴. The NASA has published the information reported that rate of change of sea level

³ <https://climate.nasa.gov/vital-signs/sea-level/>

⁴ The causes of sea-level rise since 1900 Frederikse et al., 2020

is increasing trend at plus 3.3 millimeter per year. Reflecting hot season period in our main operation as Thailand, the sea height variation is at 94.3 (± 4.00) mm (**Diagram 10**).

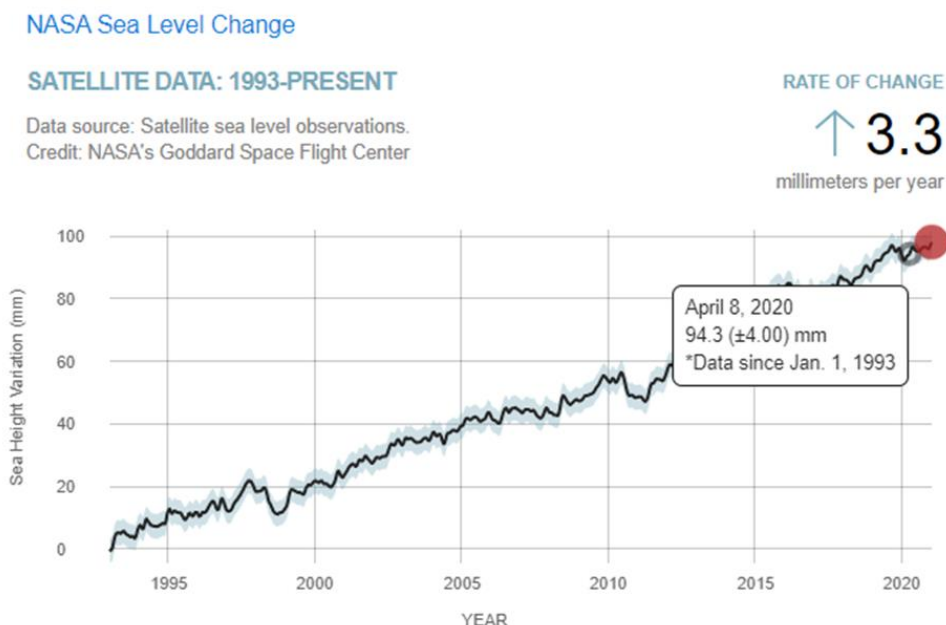


Diagram 10: Satellite data: sea level change

Data source: Satellite sea level observations, Credit: NASA's Goddard Space Flight Center

The Company is aware of the impacts and its consequences that inevitably has effects on the business and stakeholders. This matter was considered as one of emerging- climate related- risks of the Company. The impacts assessment is initially performed by considering effects on cost related with assets and opportunity to sale which are expecting or trending to amplify with this decades. Sensitivity analysis has been performed to determine corporate tolerance levels against the threshold or risk appetite.

Sensitivity analysis for sea level rise

Indicators and factors used for the assessment

- Areas: The central area of Thailand where focus on the provinces located near the gulf of Thailand and surrounding area reported impacts on the water quality. (Bangkok, Samutprakarn, Nonthaburi, Pathum thani, Saraburi, Nakhonpathom, Samutsakorn, Chachoengsao, and Prachinburi provinces)
- Cost associated with water filtration: the cost is determined by shorten life service time of membrane or filter.
- Cost associated with procuring fresh water: in order to maintain quality and service of the store, fresh water is required to procure from other sources. The volume is reflecting washing and cleaning activities (excluding drinking or production)
- Value of losing opportunity to sale specific products that got impacted from brackish water: in order to maintain quality of the products, drinkable products, and beverages that prepare or brew at store assumed / will be non-available on the specific period. The brackish water will have impacts on these products' quality.

Sensitivity testing factor is focusing exposure time of these impacts (default at 30 days) to the business which aims to identify maximum days that cause impacts on the business at the threshold (as 1% of sale).

Input	value	Unit
Estimated stores of each area		
Bangkok	2,506	stores
Samutprakarn	449	stores
Nonthaburi	410	stores
Pathum thani	373	stores
Saraburi	95	stores
Nakhonpathom	174	stores
Samutsakorn	168	stores
Chachoengsao	655	stores
Prachinburi	62	stores
Maintenance fee (equipment included)	1,350	THB / store
Fresh water (procure)	200	THB / m ³
Fresh water (consumption rate)	1.277	m ³ / store / day
Drinkable products, and beverages	29,864	THB / day / store
Duration (variable factor)	30	days

Table 3: Sensitivity analysis for sea level rise

(Unit: million Baht)

Sensitivity range	-10%	-5%	±0%	+5%	+10%	+15%	+20%	+25%
Sea level rise impacts	3,985	4,206	4,427	4,648	4,869	5,090	5,311	5,532*

* exceeded threshold at 1% of revenue

Protection and adaptation plans

The results have been reported to the corporate governance and sustainability development sub-committees in order to obtain directions and discussion the action needed to protect or mitigate the foreseeable impacts. The progress of the plans will be reports to the Sustainability and Corporate Governance Committee periodically.

- Upgrade water filtration machine to have higher capacity dealing with salinity;
- Update store selection criteria by considering the sea level rise impacts;
- Collaboration with water supply to ensure fresh water availability during the period;
- Support and engage with local community to make understanding and ensure water accessibility of locals and valuable groups;
- Support farmer by associated with the expert on the protection plan and good agricultural practices

5. Climate Change Target phase 2

5.1 Long term target (2030)

The business has received impacts associated with climate change i.e. severe flooding in 2011 that affected on industrial sector and people as well as physical damage on seven eleven branches. The Company has prioritized mitigation actions and contributing in combating with climate change by set GHG emissions reduction target aligned with the national target as Thailand ratified the Paris Agreement on September. 21, 2016 during Conference of the Parties: COP21 and pledged 20-25% GHG emissions reduction by 2030⁵. The Company has set 2 phases of GHG emissions reduction targets at 4.2% each year and net zero carbon as follows:

Table 4: GHG emissions reduction targets

Target	2025	2030
GHG reduction at 4.2% each year comparing with BAU case or absolute reduction at 1,036,382 tCO ₂ e (2025) and 1,764,727 tCO ₂ e (2030)	21%	42%
Net zero carbon emission or equivalent with 1,036,382 tCO ₂ e (2025) and 3,042,633 tCO ₂ e (2030)	50%	100%

The Company has prioritized energy security by reducing fossil fuel dependency (electricity, and fuel for logistics) and increasing renewable energy consumption such as installation solar PV rooftop at distribution center, factory, and 7-Eleven stores throughout the country. At this stage, relevant functions are drafting action plan for GHG emissions reduction achieving the goal.

5.2 Yearly targets (2021-2025)

According to various assumptions and scenario reflecting the long term target, the Company has analyzed and deployed yearly targets. For accuracy purpose and alignment with business context, updating information and target numbers may require:

Table 5: GHG emissions reduction yearly targets (2021-2025)

Target	2021	2022	2023	2024	2025
4.2% each year	1,458,102	1,505,757	1,551,653	1,595,256	1,635,904
Net zero carbon	1,369,866	1,315,072	1,242,743	1,150,425	1,035,382

⁵ National GHG emissions reduction 2021 – 2030 roadmap has been prepared for achieving Nationally Determined Contribution: NDC that submitted to the UN secretary-general's Climate Action Summit on October 1, 2015. The national target pledged at 20-25% reduction from business as usual (BAU) in 2030, this climate commitment is a part of the Paris agreement that Thailand ratified on September 21, 2016.

Reference

GHG Mitigation Action of Thailand

Pre-2020



❖ NAMA: COP20

“Thailand will endeavor, on a voluntary basis, to reduce its GHG emissions in the range of 7 to 20 percent below the Business as Usual (BAU) in energy and transportation sectors in 2020, subject to the level of international support provided [...]”

Coverage: Renewable Energy Energy Efficiency Bio-fuels Transport

Post-2020

❖ INDC: COP21

“Thailand intends to reduce its greenhouse gas emissions by 20 percent from the projected business-as-usual (BAU) level by 2030. The level of contribution could increase up to 25 percent, subject to adequate and enhanced [support] through a balanced and ambitious global agreement [...]”

Coverage: Economy-Wide Inclusion of LULUCF will be decided later

LULUCF: Land Use and Land Use Change and Forestry

Submission by Thailand

Intended Nationally Determined Contribution and Relevant Information

As a developing country highly vulnerable to the impacts of climate change, Thailand attaches great importance to the global efforts to address this common and pressing challenge. Pursuant to decisions 1/CP.19 and 1/CP.20, Thailand hereby communicates its intended nationally determined contribution (INDC) and the relevant information.

Thailand intends to reduce its greenhouse gas emissions by 20 percent from the projected business-as-usual (BAU) level by 2030. The level of contribution could increase up to 25 percent, 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 United Nations Framework Convention on Climate Change (UNFCCC).

Accompanying information

Baseline:	Business-as-usual projection from reference year 2005 in the absence of major climate change policies (BAU2030: approx. 555 MtCO₂e)
Time frame:	2021-2030
Coverage:	Economy-wide (Inclusion of land use, land-use change and forestry will be decided later)
Gases:	Carbon dioxide (CO ₂), Methane (CH ₄), Nitrous oxide (N ₂ O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur hexafluoride (SF ₆)

Source : Office of The Natural Resources and Environmental Policy and Planning (ONEP) Thailand Greenhouse Gas Management Organization (TGO), 14 November 2016