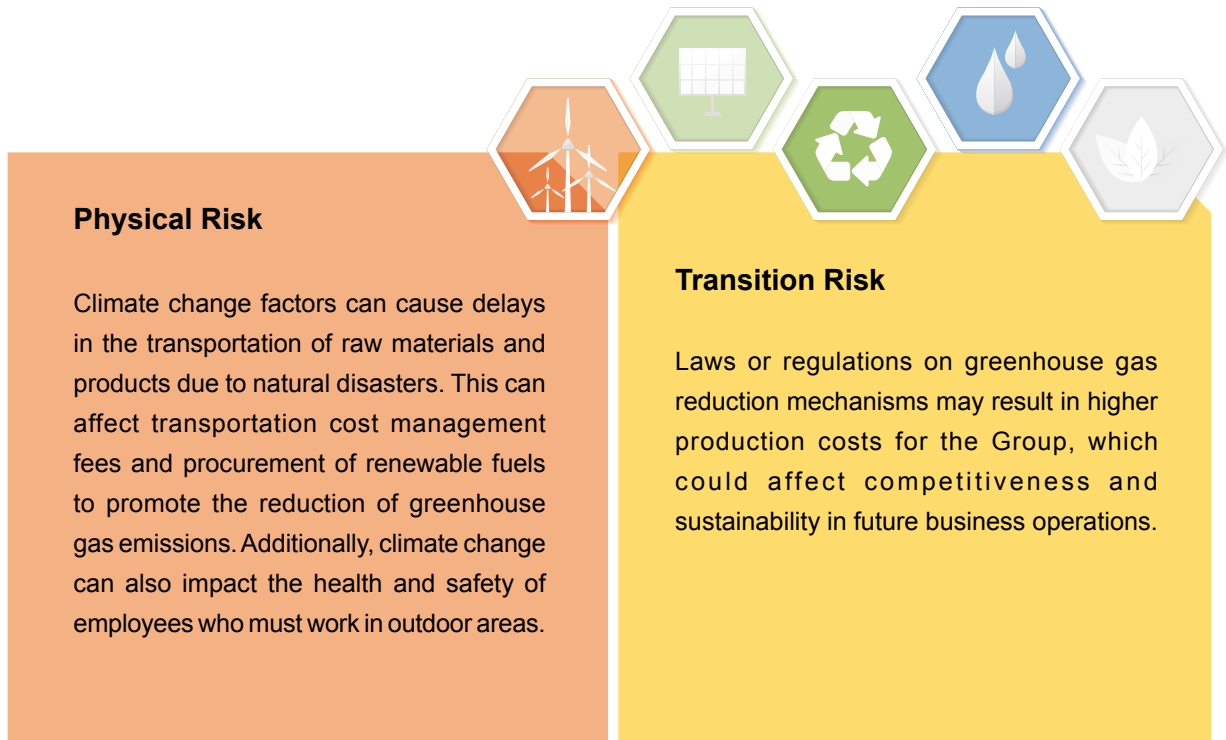


## Climate Change Risks and Opportunities

<p><b>Physical Risk</b></p>	<p><b>Factors from climate change might trigger natural disasters would</b></p> <ul style="list-style-type: none"> <li>• delay shipments</li> <li>• affect health and safety of construction workers outdoors on site</li> </ul>
<p><b>Transition Risk</b></p>	<p><b>Policy and Legal</b></p> <ul style="list-style-type: none"> <li>• Policy and Legal related to GHG reduction mechanism</li> </ul> <p><b>Technology</b></p> <ul style="list-style-type: none"> <li>• Higher production costs due to investments in new technologies to improve production processes to reduce greenhouse gas emissions</li> <li>• Increasing of transportation costs and management fees</li> </ul> <p><b>Market</b></p> <ul style="list-style-type: none"> <li>• Competitiveness and Sustainability in Business Operations in the Future</li> <li>• Procurement of renewable fuels to promote greenhouse gas emission reduction</li> <li>• Renewable fuels may rise unexpectedly in the future.</li> </ul> <p><b>Reputation</b></p> <ul style="list-style-type: none"> <li>• Pressure from customers and investors towards a low-carbon industry</li> </ul>
<p><b>Opportunity</b></p>	<p><b>Energy Efficiency</b></p> <p>Taking measures to comply with laws or regulations on greenhouse gas reduction mechanisms. Including achieving the goal of reducing greenhouse gas emissions is an opportunity to create sustainability in business operations of the Group.</p> <p><b>Energy Source</b></p> <ul style="list-style-type: none"> <li>• Switching to alternative energy production such as solar energy. It can help reduce greenhouse gas emissions and reduce annual energy costs.</li> </ul> <p><b>New Markets</b></p> <ul style="list-style-type: none"> <li>• Due to the long summer, it has a positive effect on the sales volume and income of the Group.</li> <li>• Demands of customers in providing road construction services of the Group</li> <li>• Natural disasters such as heavy rain, heavy floods cause roads to deteriorate faster. It may be an opportunity for the Group to increase revenue from sales of asphalt products for road repair.</li> </ul> <p><b>Product and Services</b></p> <p>It is a business opportunity that promotes reputation and image. As an expert who can provide solutions to problems in construction and maintenance including asphalt products that meet the needs of use.</p> <p><b>Sustainable Finance</b></p> <p>It is an opportunity for the Group of Companies. With the implementation of projects to reduce or absorb greenhouse gases, it can make it easier to access sustainable finance from various financial institutions, such as sustainability loan, sustainability bond issuance, and have lower financial costs.</p>

## Climate Change-Related Risk Management



### Physical Risk

Climate change factors can cause delays in the transportation of raw materials and products due to natural disasters. This can affect transportation cost management fees and procurement of renewable fuels to promote the reduction of greenhouse gas emissions. Additionally, climate change can also impact the health and safety of employees who must work in outdoor areas.

### Transition Risk






Laws or regulations on greenhouse gas reduction mechanisms may result in higher production costs for the Group, which could affect competitiveness and sustainability in future business operations.

## Measures Taken in 2022

- Improve the centralized logistics center at Phra Pradaeng plant. to manage the distribution of products from 5 plants to reduce fuel consumption and truck service
- Improvement of heat pipes in production and product preheating to improve heat transfer efficiency, reduce fuel consumption in production, and product heating.
- Product storage tank thermal insulation improvement project to reduce the rate of product heat energy loss into the atmosphere
- Set up a Total Productive Maintenance (TPM) multiplicative maintenance policy to reduce energy consumption, greenhouse gas emissions, and costs
- Set goals and promote short-term and long-term climate change management projects
- Increase efficiency in all processes by using the “3Rs: Reduce, Reuse, Recycle” principle to cope with climate change and reduce resource and energy consumption
- Hire external experts to conduct data reviews and audits as prescribed by international standards for continuous development of greenhouse gas reduction approaches

## Climate Change-Related Risks

Tipco Asphalt Group assesses the impact of potential climate change risks and opportunities on the continuity of the Group's business operations across the process of business value chain in 2022 as follows:

Business Value Chain	 <b>Marketing and Business Development</b>	 <b>Technology and Innovation</b>	 <b>Sourcing</b>	 <b>Refinery</b>	 <b>Production</b>
Physical Risk	Implemented by 2025	Implemented by 2025	<p><b>Heavy Rain</b> Delay in shipments of raw materials due to natural disasters such as unusually heavy rains, off-season rains</p> <p><b>Severe Flood</b> Land transport of raw materials was delayed due to severe flooding on the travel route.</p>	Implemented by 2025	<p><b>Heavy Rain</b> The use of heat energy in the production and heating products is increased due to heavy rain Damage to the production plant structure</p> <p><b>Drought</b> The use of groundwater for Asphalt Emulsion production could be affected if severe drought, rainfall decreases, and cause groundwater shortages in the future.</p>
Transition Risk	<p><b>Reputation</b> Pressure from customers and investors towards a low-carbon industry</p>	Implemented by 2025	<p><b>Market</b> In the future, there may be Fewer manufacturers who supply the main raw materials needed. As a result, the selling price or cost tends to rise as some manufacturers might be unable to adapt their products or production processes to be environmentally friendly. For example, asphalt chemical products produced by refineries.</p>	Implemented by 2025	<p><b>Legal &amp; Policy</b> New greenhouse gas emissions laws and regulations might affect production costs; such as investing in projects, new energy transformation, modifying workflows, and carbon tax increase financial costs</p> <p><b>Technology</b> Increased costs from investment in new technologies to improve production processes that reduce greenhouse gas emissions.</p>



**Sale**

**Heat wave**

Higher pavement temperatures result in the need to improve product properties to suit changing temperatures such as asphalt for airport applications

**Legal & Policy**

New laws or regulations may result in the need to adapt business models and strategies to national goals (Net Zero/ Carbon neutral), including workflow changes such as carbon credit



**Distribution**

**Severe Flood**

Flash floods in truck routes caused delays in deliveries to customers and delayed purchases of key products used in production.

Implemented by 2025



**Technical Service**

**Heat wave**

Extreme weather affects heat waves on the health and safety of outdoor workers on the job site.

**Severe Flood**

Flooding in the construction or maintenance area results in disruption of work and access to customer technical service personnel.

Implemented by 2025



**Construction**

**Heat wave**

- Heat waves spread in construction and maintenance areas, affecting the health and safety of workers outdoors on site.
- The long summer results in an extended period of time for construction works

**Market**

Long rainy season construction is a business opportunity that promotes reputation and image as an expert who provide solutions for customers