# 4.GREEN OPERATIONS

## 4.1 Climate action

### Climate change governance

In keeping with the global trend of mitigating and adapting to climate change, the TWSE has voluntarily adopted the TCFD guidelines and the IFRS S2 climate-related disclosures. On September 11, 2024, the TWSE established the Climate Change Management Policy and Procedures with the following four core elements: governance, strategy, risk management, plus metrics and targets. Based on these core elements, the TWSE formulated a comprehensive risk management framework, identifying significant risks and opportunities that climate change may pose to the company, proposing relevant response strategies, along with integrating existing risk management procedures.

In terms of governance, the Sustainable Development Committee of the TWSE is responsible for reviewing major policies and proposals related to climate change, as well as overseeing its management mechanisms. In addition, the Sustainable Development Committee regularly provides information on global climate change trends to all TWSE departments, enhancing employees' awareness. Each department implements relevant risk assessment and control measures in daily management operations, plus incorporates climate change-related risks into the existing risk management framework. This ensures that the company effectively develops resilience to climate risks and seizes opportunities for transformation.

### Management of climate-related risks and opportunities

#### 1.Identification process of climate risks and opportunities

The Sustainable Development Commission coordinates the review of major climate change policies and proposals, plus implements management at all levels through the division of responsibilities. Based on three climate change scenarios, the TWSE identifies the risks and opportunities brought about by extreme weather together with climate change. In regularly scheduled TCFD workshops or document review, department heads are invited to conduct research, discussion, information gathering, and analysis of climate change. They systematically identify significant risks and opportunities for the company, in addition to establishing risk prevention and response measures, thereby reducing risks as well as seizing opportunities. The process of identifying and formulating strategies for risks and opportunities related to climate change is as follows:

**1 Assess the impact on the operational environment**
Assess the impact of climate change on operational environment and stakeholders.

**2 Identify climate risks and opportunities**
Establish a risk and opportunity matrix, identify major risks and opportunities arising from climate change.

**3 Formulate response strategies**
Plan strategies to respond to the three major risks and three major opportunities identified.

**4 Develop climate change scenarios**
Develop three climate change scenarios[1]:
SSP 1-2.6 | SSP 3-7.0 | SSP 5-8.5

**5 Analyze financial impact/effects of climate risks & opportunities**
Collect and analyze financial impact/effects of various major risks and opportunities, as well as their corresponding costs.

**6 Establish climate change management indicators**
Based on various response strategies and financial analysis results, establish management indicators as well as goals for regular tracking and incorporate them into the management system.

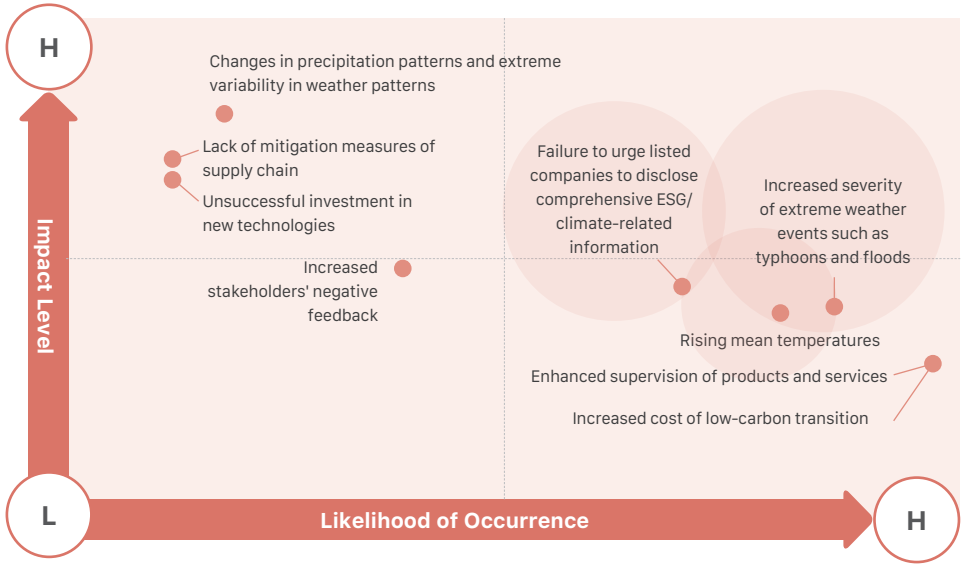
| Scenario | Estimated warming by[2] | |
|---|---|---|
| | mid-21st century | late-21st century |
| SSP 1-2.6 | 1.3° C | 1.4° C |
| SSP 3-7.0 | 1.5° C | 2.8° C |
| SSP 5-8.5 | 1.8° C | 3.4° C |

Note 1: The scenarios are based on those proposed in the Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC).
Note 2: According to the updated report on climate change in Taiwan, it is estimated that the temperatures in various regions of Taiwan will continue to rise by various levels in future scenarios as shown in the table above.
Note 3: The identification and evaluation process for this year remains consistent with that of the previous year, with no major changes.

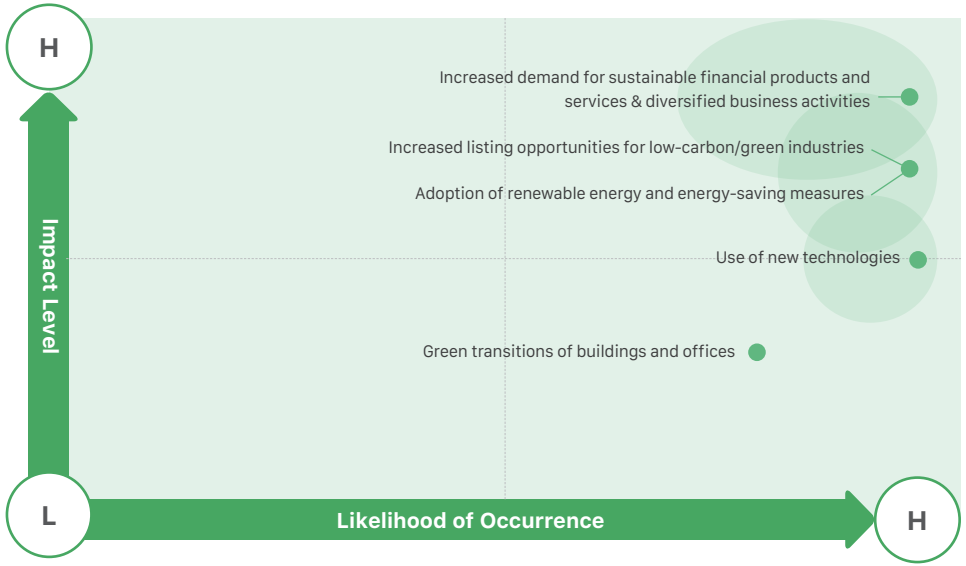
## 2. Identification results of climate risks and opportunities

After completing the identification of climate risks and opportunities, a risk and opportunity matrix was drawn up according to the likelihood of occurrence plus the degree of impact. Based on the top three climate risks and opportunities, the TWSE has developed respective strategies along with estimating the quantitative impact and financial costs. The climate risk and opportunity matrix of the TWSE are as shown as follows:

### • Climate risk matrix




### • Climate opportunity matrix




Based on the above matrix, the TWSE has identified the top three risks and opportunities, as well as their type alongside their time frame, as follows:

### Summary table of identified climate change risks

| Risk no. | Type of risk | Risk factors | Time frame |
|---|---|---|---|
| 1 | Physical risk – acute | Increased severity of extreme weather events such as typhoons and floods | Short-term |
| 2 | Physical risk – chronic | Rising mean temperatures | Long-term |
| 3 | Transition risk – reputation | Failure to drive listed companies to disclose comprehensive ESG/climate-related information | Medium-term |

### Summary table of identified climate change opportunities

| Opportunity no. | Type of opportunity | Opportunity factors | Time frame |
|---|---|---|---|
| 1 | Opportunity – products and services | Increased demand for sustainable financial products and services; diversified business activities | Short-term |
| 2 | Opportunity – markets | Increased listing opportunities for low-carbon and green industries | Medium-term |
| 3 | Opportunity – energy source | Adoption of renewable energy and energy-saving measures | Short-term |

Note: Definition of time frames: short-term refers to the year 2026; medium-term refers to 2027-2030; long-term refers to 2031-2050.

## Climate change risk and opportunity management strategies

### Risk 1 Increased severity of extreme weather events such as typhoons and floods

With the increasing frequency and intensity of extreme weather events, the occurrence of natural disasters such as strong typhoons with flooding will increase, leading to power outages, equipment failures, and office shutdowns, potentially causing stock market closures together with business interruptions. This ultimately affects the normal operation of the exchange, internal and external audit operations, directly resulting in reduced trading volume plus decreased revenue, contributing to increased operating costs in addition to capital expenditure due to repair and response measures.

**Risk impacts**

**Products and services**

Natural disasters can cause damage to equipment hardware, power outages, and network disruptions, resulting in interruptions of core business as well as information operations and services, **leading to an increased risk of stock market closure and business interruption.**

- Extreme weather may hinder on-site inspections of the TWSE's data centers and subsidiaries, as well as securities firms, leading to an inability to immediately discover significant internal control deficiencies that may affect operations. In addition, having to confirm internal controls and audit operations through written reviews may **increase audit risks and costs.**

**Supply chain and value chain**

- **Natural disasters may damage government infrastructure**, causing disruption of water, electricity, communication, and internet services to the data centers, leading to **operational interruptions and other negative impacts.**
- **Securities firms and IT companies may lack sufficient resilience in their information system equipment, and system instability resulting from extreme weather** conditions could cause individual companies or specific regions to experience trading interruptions. This could prevent investors from conducting transactions and impact investor rights alongside business stability.

**Response strategies**

**Products and services**

- **Adhere to the Taiwan Stock Exchange Corporation Measures for Responding to Natural Disasters.**
- **Maintain re-certification of ISO 22301.** Establish a complete, feasible, and effective business continuity management system, in tandem with conducting regular system backup drills every year to confirm that the system can resume operation within an acceptable downtime.
- Expand and optimize the **digital system for transmitting broker audit reports and online audit and approval processes.** Continue to improve audit operations in order to reduce the impact of climate disasters and minimize the risks and costs of audit operations.
- **Inspections of the TWSE's data centers and subsidiaries will be conducted via video or other means** if on-site inspections are hindered by extreme weather.

**Supply chain and value chain**

- Critical infrastructure supply chain of the TWSE is equipped with **backup mechanisms.**
- **Enhance the resilience of securities firms' information operations** according to the Financial Cybersecurity Action Plan. Formulate reference guidelines for information operations resilience, and regularly invite securities firms to participate in backup testing.

**Financial impacts**

**Decreased revenue**

- Stock market closures, system abnormalities, or interruptions can prevent investors from carrying out trades, resulting in decreased trading volume and consequently reduced revenue.

**Increased operating costs**

- If securities firm audits are changed to a written review, this will lead to increased audit costs and increased audit risks.

**Increased capital expenditure**

- Damage to infrastructure or failure of critical information equipment may lead to the premature scrapping of assets; repairing or rebuilding damaged infrastructure will result in increased related repair costs, including labor and material costs; purchasing new equipment will increase capital expenditure.

| SSP scenario: SSP 5-8.5 | | Short-term (2026) | Medium-term (2030) | Long-term (2050) |
|---|---|---|---|---|
| | Estimated costs (TWD1,000/year) | 237,156 | 291,847 | 403,165 |
| | % of revenue | 1.40% | 1.72% | 2.37% |

**Estimated costs**

**Increased operating costs**

- The increased frequency of system backup drills and climate disaster drills will result in increased costs related to personnel, equipment, and venues.

**Increased capital expenditure**

- The establishment of a digital audit report system will result in increased expenses related to system implementation.

**Estimated increased cost of TWD1.935 million per year, accounting for 0.04% of revenue.**

Note: The financial impact is calculated as a percentage of TWSE revenue for the year 2025. (This applies to all following financial impact calculations.)

## Risk2 Rising mean temperatures

Due to the long-term rise of average global temperatures, the TWSE will need additional cooling to maintain a stable temperature for the equipment in the data centers, leading to an increase in electricity costs. Furthermore, extreme heat may exacerbate overall electricity consumption, which may strain the power grid and increase the risk of outages. This in turn may cause market trading and business interruptions, affect the stability of the securities market, leading to a decrease in revenue.

### Risk impacts

**Products and services**

- **The risk of hardware and system failures increases**, as rising temperatures may lead to an increase in the temperature inside the server rooms. In addition to negatively impacting equipment performance, it may also lead to hardware damage or data loss.
- **Insufficient power supply may lead to power outages, which in turn cause operational interruptions; high temperatures lead to increased usage of air conditioning and cooling systems, thereby increasing the demand for electricity,** which may lead to insufficient power supply and even cause blackouts.

**Supply chain and value chain**

- **Declining performance of the cooling system** may lead to poor cooling effect and thus affect the performance of the infrastructure equipment. The entire value chain will be impacted, including data vendors, securities firms, peripheral units, including related financial industry participants.

### Response strategies

**Products and services**

- **Using energy-saving equipment and updating hardware technology, electromechanical equipment, and cooling systems** will reduce energy consumption and improve energy efficiency, while also reducing carbon emissions.
- Established data centers with international standard TIA942 Rated 4 certification, and equipped them with **fuel tanks and backup power supply equipment** for emergency electricity.

**Supply chain and value chain**

- To maintain operations, all real-time data vendors contracted with the TWSE have backup systems.

### Financial impacts

**Increased operating costs**

- Increased maintenance and inspection frequency of data center infrastructure will lead to higher facility maintenance costs.
- Additional operation time of the air conditioning system will lead to an increase in water and electricity expenses.

**Increased capital expenditure**

- Early replacement of existing data center system equipment and electromechanical equipment will lead to an increase in capital expenditure.

| | | Short-term (2026) | Medium-term (2030) | Long-term (2050) |
|---|---|---|---|---|
| SSP scenario: SSP 5-8.5 | Estimated costs (TWD1,000/year) | 8,423 | 8,607 | 9,065 |
| | % of revenue | 0.050% | 0.051% | 0.053% |

| | | Short-term (2026) | Medium-term (2030) | Long-term (2050) |
|---|---|---|---|---|
| SSP scenario: SSP 3-7.0 | Estimated costs (TWD1,000/year) | 8,423 | 8,576 | 8,958 |
| | % of revenue | 0.050% | 0.051% | 0.053% |

| | | Short-term (2026) | Medium-term (2030) | Long-term (2050) |
|---|---|---|---|---|
| SSP scenario: SSP SSP 1-2.6 | Estimated costs (TWD1,000/year) | 8,423 | 8,556 | 8,887 |
| | % of revenue | 0.050% | 0.050% | 0.052% |

### Estimated costs

**Increased operating costs**

- Increase in maintenance cost of backup power equipment.

**Increased capital expenditure**

- Adjusting and upgrading existing infrastructure will increase capital expenditures.

**Estimated increased cost of TWD26.974 million per year, accounting for 0.16% of revenue.**

## Risk 3 Failure to urge listed companies to disclose comprehensive ESG and climate-related information

The disclosure of sustainability-related information plays an ever more important role in investment decision-making. If the TWSE fails to encourage listed companies to fully disclose ESG and sustainability information, or if listed companies engage in greenwashing or provide false or misleading information, it will erode investors' trust in market transparency, not only tarnishing the TWSE's reputation, but possibly triggering capital outflows or other negative financial shocks.

### Risk impacts

**Products and services**

- Failure to properly monitor the accuracy and completeness of ESG disclosures by listed companies not only casts doubt on legal compliance as well as posing risks of greenwashing, but may also hinder investors from making a thorough assessment of company information, and **affect the trust of the public in the TWSE's regulation of listed companies.**

### Response strategies

**Products and services**

- **Hold briefings for listed companies and provide education and training**, offer more consultation services on sustainable information disclosure, thereby helping listed companies raise awareness of sustainability issues and enhance the quality and accuracy of their disclosures.
- **Assist listed companies in establishing sustainable information internal control mechanisms** to ensure that they can effectively manage, supervise, and disclose ESG information, enhance their sustainability and transparency, plus reduce legal and reputational risks.
- **Optimize ESG InfoHub and ESG Digital Platform** to assist small-and medium-sized listed companies in producing sustainable reports, as well as provide investors and enterprises with accessible means to search and compare sustainability information. In addition, **AI is utilized to assist in reviewing sustainability reports and inspecting ESG disclosure information** to enhance regulatory efficiency.
- **Organize internal education and training** to ensure that employees understand how to correctly disclose ESG information, thereby enhancing the quality of supervision and strengthening regulatory efforts and reducing the risk of misinformation.
- **Continue to review listed companies' sustainability reports and auditors' assurance working papers through the review mechanism,** to ensure that listed companies disclose ESG and climate-related information in accordance with relevant regulations, and that auditing institutions have conducted appropriate assurance procedures based on industry indicators and GHG inventory.

### Financial impacts

**Decreased revenue**

- If listed companies disclose inaccurate ESG and climate-related information or are suspected of greenwashing, it will reduce the attractiveness of Taiwan's capital market to domestic and foreign funds, thereby affecting revenue.

Note: If the ESG and climate information disclosed by listed companies is incomplete, it may impact investors' willingness to invest. However, as the securities market is influenced by multiple factors, it is difficult to precisely quantify the impact of individual factors on the securities market and the TWSE. Therefore, the financial impact of this section is presented qualitatively.

### Estimated costs

**Increased capital expenditure**

- Building digital platforms such as the ESG InfoHub and the ESG Digital Platform has led to an increase in capital expenditure.

**Increased operating costs**

- More human resources need to be invested to ensure the supervision and guidance of listed companies, resulting in increased personnel costs.
- Organizing internal employee education and training or recruiting professional talents in the field of ESG increases personnel costs.
- Additional expenses are required for conducting seminars and education training for listed companies.

**Estimated increased cost of TWD7.491 million per year, accounting for 0.04% of revenue.**

## Opportunity 1 Increased demand for sustainable financial products and services; diversified business activities

In response to the increasing demand for sustainable financial products and services, the TWSE and its subsidiaries are dedicated to developing sustainability indices, promoting domestic and international carbon trading, in tandem with encouraging the issuance of diverse ESG financial products, such as securities and sustainable funds. At the same time, we proactively embrace the shift toward ESG by introducing climate change alongside carbon governance-related education plus training to increase the sustainability awareness of listed companies, while enhancing the TWSE's reputation.

### Opportunity impacts

**Products and services**

- By staying on top of the demand for sustainable financial markets plus domestic and international development trends, we will **continue to introduce ESG-related ETFs, ETNs, and indices.** In addition, we will expand the range of sustainable financial products, augment our business activities and revenue sources, as well as channel funds toward sustainable activities.
- To attract more overseas funds and connect with the local and international capital market, the TWSE created **the Investment InfoHub and ESG InfoHub websites to enhance the accessibility and comprehensiveness of investment as well as sustainability information.**
- **In response to the increasing market demand for sustainability talent, we have launched education and training related to sustainability** to cultivate talent in the capital market. At the same time, **we work with the FSC to assist companies in aligning with international sustainability disclosure standards, develop practical examples and guidelines** for reference by the companies in their sustainable transformation, deepen their understanding of sustainable development, and ultimately enhance the TWSE's reputation.
- With the increase in demand for carbon credits from domestic enterprises, the **TCX actively engages with the international community, as well as facilitating communication between the industry and the Ministry of Environment**, to promote domestic and international carbon credit trading. In addition, the TCX assists enterprises in implementing carbon reduction measures and offers related education alongside training. The **TCX plans to establish the pilot trading platform for the TW ETS in coordination with the Ministry of Environment**, creating a comprehensive carbon pricing system with both compliance and voluntary markets, thereby realizing corporate and national carbon reduction goals.

### Response strategies

**Products and services**

- **TIP will expand the offering of sustainability indices and ESG value-added data** by gathering data on investor needs. By enhancing the TIP Taiwan ESG Ratings system, expanding the local ESG database, and deepening cooperation with international index providers, TIP will research and expand the types of sustainability themed indices, develop new applications, plus promote ESG-related index investment products.
- **The IR ENGAGE platform provides a strong communication channel between listed companies and institutional investors.** Through it, TIP provides multi-tier ESG value-added databases and enhances engagement information, plus matchmaking services for investors. This will assist institutional investors in complying with responsible investment principles and following due diligence governance, in addition to apply ESG factors in the investment process. These services also help institutional investors in addressing their concerns about sustainability issues, and provide an informational foundation on which they can engage in bilateral communication and ESG negotiations with the TWSE and TPEx listed companies in which they invest.
- **Continue to optimize the ESG InfoHub and conduct investor education activities** to strengthen investors' understanding of sustainable finance and enhance risk awareness.
- **Providing sustainable finance related reports and files through our Data E-Shop** in a systematic and standardized manner enhances clients' efficiency in accessing information and facilitates the promotion of sustainable information.
- In response to the many sustainable regulatory requirements facing businesses, the TWSE collaborates with government agencies, peripheral units of the securities industry, schools, NGOs, and platform operators to jointly organize **education in tandem with training activities covering sustainable information disclosure and carbon governance**, in order to deeply instill the concept of sustainable development in corporate culture plus enhance their competitiveness.
- Continue to optimize the carbon credit trading platforms and promote the listing of high-quality international carbon credit projects. In coordination with the Ministry of Environment, the TCX will also establish the pilot trading platform for the TW ETS, while continuing to promote carbon literacy and net-zero training courses to broaden public awareness of net-zero concepts.

### Financial impacts

**Increased revenue**

- **TIP will compile new ESG thematic indices, issue ESG products linked to these indices, and expand ESG database applications** to open up new markets to attract investors, boost trading volume, and ultimately increase revenue.
- Diversify information products and generate additional revenue through the **online sale of sustainable finance related information.**
- **Offering diverse and high-quality carbon credit products to meet the varying needs of enterprises, alongside providing international certification courses related to carbon management, to help them boost their revenue.**

**Estimated financial gains of TWD89.055 million per year, accounting for 0.52% of revenue.**

### Estimated costs

**Increased operating costs**

- To compile new ESG thematic indices, deepen TIP Taiwan ESG Ratings, develop ESG data applications, and establish a local ESG database, it is necessary to incur increased expenses. This includes those related to the recruitment of more talent, increased human resources, establishing system functions, plus marketing costs. Furthermore, the IR ENGAGE platform requires optimization and expansion for new IR services, deepening ESG value-added data, and developing differentiation functions.
- Hosting net zero and sustainability related seminars, lectures, along with training courses will increase operating costs, including speaker fees and venue expenses.

**Increased capital expenditure**

- The development and maintenance of related platforms and databases, as well as the establishment of relevant infrastructure, will lead to increasing capital expenditure.

**Estimated increased cost of TWD19.826 million per year, accounting for 0.12% of revenue.**

## Opportunity 2 Increased listing opportunities for low-carbon and green industries

To spur the advancement and spread of low-carbon technologies, the TWSE encourages companies to embrace low-carbon transformation through innovation, as well as promoting the listing of low-carbon and green industries. More listings of such companies on the TWSE will help attract foreign investors plus funding, and enhance Taiwan's international influence in the field of low-carbon transformation, thereby increasing revenue and international visibility.

### Opportunity impacts

**Products and services**

- **The TWSE encourages businesses to embrace low-carbon transformation and develop new technologies**, which will improve ecological benefits while enhancing market competitiveness. These advancements will attract domestic and foreign investment and participation, further enhancing Taiwan's international influence in the field of low-carbon transformation.
- The increasing opportunities for listing low-carbon and green industries are expected to **expand and diversify the market.** Investors will be able to choose from a wider variety of companies, thereby spreading risk and increasing the diversity of their investment portfolios.
- Corresponding with sustainable development trends and national development strategies, **the TWSE supports the development of new economy industries.** We promote the capital marke's transition to sustainability, and provide a diverse range of sustainability-related investment products.
- **The TWSE will continue to promote the industrial category for listed companies, green energy and environmental services,** which has been enthusiastically received. We hope that, by leveraging the influence of the capital market, this momentum will drive growth and fuel the formation of a cluster of environmentally friendly listed companies.

### Response strategies

**Products and services**

- To enhance information transparency, establish questionnaire for companies to report sustainable economic activities, in accordance with the Reference Guidelines for Identifying Sustainable Economic Activities (2nd edition) released by the FSC, Ministry of Environment, Ministry of Economic Affairs, Ministry of Transportation and Communications, Ministry of the Interior, and Ministry of Agriculture, along with the accompanying recommended scope of the transformation plan.
- **Regularly survey market industry trends and developments,** while also paying attention to foreign sustainable and low-carbon technology development trends, in order to stay on top of overall market dynamics.
- **Conduct industry-specific seminars and briefings with the collaboration of government, industry, and academia,** to promote knowledge of low-carbon and innovative technology industries, enhance overall market sustainability awareness, and provide relevant consulting services.
- **Continue to conduct industry activities and invite government, industry, along with academia representatives to share the latest trends in green energy and environmental protection industries as well as listing experiences.** These events attract company representatives, demonstrating the abundant momentum of Taiwan's green industries, and accelerate companies' entry into the capital market for further growth and development.
- **Actively communicate with the startup ecosystem.** Currently, tib listed companies hail from 14 pioneering industries spanning digital and cloud services, green energy and environmental services, biotech medical, and unmanned vehicles. The goal is to develop tib into a "boutique" offering specialized products driven by innovation and growth.
- **Loosen regulations for issuance and trading** attract more new economy industry companies to go public, expanding market capitalization and further enhancing the vitality of startup companies in the capital market.

### Financial impacts

**Increased revenue**

- The increase in the number of listed industry categories and companies can meet investors' needs, enhance the attractiveness of Taiwan's securities market to domestic and foreign funds, plus increase trading volume to drive revenue growth.

**Estimated financial gains of TWD3.816 million per year, accounting for 0.02% of revenue.**

### Estimated costs

**Increased operating costs**

- Organizing relevant promotional events, briefings, and other activities generates related expenses for the activities and personnel.
- Conducting Green Energy and Environmental Services and thematic institutional investor conferences.
- Conducting regular surveys of market industry trends and revising issuance/trading rules as needed will increase related human resource costs.
- Engaging international public relations companies to strengthen foreign media publicity will generate related publicity expenses.

**Increased capital expenditure**

- Building functions, including questionnaires and reporting of sustainable economic activities, has led to an increase in capital expenditure.

**Estimated increased cost of TWD1.194 million per year, accounting for 0.007% of revenue.**

## Opportunity 3 Adoption of renewable energy and energy-saving measures

In response to the global momentum to achieve net zero emissions, the TWSE is committed to transitioning to low-carbon operations. The use of renewable energy and the adoption of diverse energy-saving measures will effectively reduce the TWSE's carbon emissions. Related measures include leasing environmentally friendly and energy-saving vehicles, implementing green procurement policies, as well as replacing energy-consuming office equipment to reduce energy consumption and achieve carbon reduction goals. Thus, the TWSE can lead by example, guiding listed companies to adopt similar measures, thereby enhancing our reputation.

### Opportunity impacts

**Climate adaptation and mitigation**

- **Using renewable energy can effectively reduce carbon emissions during operations,** achieve carbon reduction goals, and also help mitigate climate change.
- **The introduction of energy-saving equipment effectively reduces operational energy consumption**, lowers peak electricity demand for the Taiwan Power Company, and minimizes the risk of operational interruptions caused by insufficient power supply.

**Products and services**

- By using renewable energy, **the carbon emissions generated by TWSE services are reduced,** providing stakeholders, including intermediaries, listed companies, and investors among others, with lower-carbon services while making strides towards a sustainable securities market.

### Response strategies

**Climate adaptation and mitigation**

- Achieve RE100 by 2040.
- **Install high-efficiency and energy-saving servers, network equipment, and electromechanical equipment, optimizing cooling systems,** reducing operational carbon emissions, plus improving energy usage efficiency.
- According to the climate characteristics of different regions, evaluations should be conducted to **introduce green building planning** to ensure that operational bases can adapt to local climates. In addition to reducing energy consumption, it also reduces the impact of extreme weather on business and enhances climate resilience.

**Supply chain and value chain**

- T**he TWSE encourages the use of renewable energy and energy-saving equipment in the supply chain** to help reduce the TWSE's Scope 3 emissions. This will diversify energy resources, reduce operational disruption risks, and enhance operational resilience.

### Financial impacts

**Decreased operating costs**

- Energy-saving equipment is expected to reduce energy consumption for business operations, thereby reducing operating costs such as electricity bills.

**Estimated financial gains of TWD0.563 million per year, accounting for 0.003% of revenue.**

### Estimated costs

**Increased operating costs**

- The cost of renewable energy is higher, leading to an increase in electricity costs in the short term.

**Increased capital expenditure**

- Capital expenditure will increase due to the purchase of energy-saving equipment.

**Estimated increased cost of TWD42.730 million per year, accounting for 0.25% of revenue.**



## Climate change related indicators and goals

| Item | Indicator | Goal | 2025 Progress | 2025 Achievements |
|---|---|---|---|---|
| **Risk 1** Increased severity of extreme weather events such as typhoons and floods | | | | |
| **Risk mitigation plan** | • Improve energy efficiency, reduce reliance on unstable energy supply.<br>• Maintain re-certification of ISO 22301 Business Continuity Management System (BCMS).<br>• Regularly conduct system backup drills. | • The power usage effectiveness (PUE) of the servers does not exceed the highest value of the past five years.<br>• Conduct a regular business continuity management review meeting once a year.<br>• Hold an annual external audit of ISO 22301 BCMS ensure continuous validity of the certification.<br>• Conduct regular system backup drills twice a year with 100% pass rate. | • PUE did not exceed the highest value of the past five years.<br>• Conducted one regular business continuity management review meeting.<br>• Maintained validity of ISO 22301 BCMS after external audit.<br>• Conducted two system backup drills with a 100% pass rate. | ✓ All goals achieved. |
| **Risk2** Rising mean temperatures | | | | |
| **Resilience of equipment operations** | • The First Data Center system architecture is certified international standard TIA942 Rated 4. | • The First Data Center continues to meet the standards for TIA942 Rated 4. | • The First Data Center continued to meet the standards for TIA942 Rated 4. | ✓ All goals achieved. |
| **Risk 3** Failure to urge listed companies to disclose comprehensive ESG and climate-related information | | | | |
| **Establish a review mechanism** | • Review a specific number of cases, including the sustainability reports of listed companies and auditors' assurance working papers, plus notify (in writing or via other means) the listed companies and accounting firms to make improvements if deficiencies are found. | • Conduct random checks each year on the sustainability reports of listed companies; for those with deficiencies, 100% are notified (in writing or via other means) to make improvements.<br>• Conduct sample checks on the working papers of accounting firms; for those with missing items, 100% are notified in writing. | • Conducted random checks on 206 sustainability reports of listed companies; 100% were notified (in writing or via other means) of review results, and those with deficiencies were notified to make improvements.<br>• Conducted sample checks on four working papers of accounting firms and four GHG assurance working papers of auditing institutions; 100% were notified in writing of review results. | ✓ All goals achieved. |

## Climate change related indicators and goals

| Item | Indicator | Goal | 2025 Progress | 2025 Achievements |
|---|---|---|---|---|
| **Opportunity 1** Increased demand for sustainable financial products and services; diversified business activities | | | | |
| **Expand business operations** | • Promote sustainable financial information services and collect market feedback.<br>• Promote key business initiatives and conduct various outreach activities, including awareness campaigns on ESG and carbon trading services. | • Collect feedback from at least three potential clients each year on the market opinions regarding sustainable financial information services.<br>• Conduct at least ten ESG-related events and at least 20 carbon credit trading promotional events each year. | • Collected feedback from three potential clients on their market opinions regarding sustainable financial information services.<br>• Conducted 25 ESG-related events:<br>① 6 educational sessions on the Corporate Governance Evaluation.<br>② 5 educational sessions on the ESG Evaluation.<br>③ 3 sessions of the Greenhouse Gas Management Practical Workshop and Sustainability Development Promotion Conference in northern, central, and southern Taiwan.<br>④ 3 sessions of the Sustainable Disclosure Practice Training and Advocacy Meeting for TWSE/TPEx Listed Companies in northern, central, and southern Taiwan.<br>⑤ 4 sessions each of the IFRS Sustainability Disclosure Standards Conference, and IFRS S2 Disclosure Practical Workshop.<br>• Conducted 39 events related to carbon credit trading: The TWSE and the TCX held nine domestic and international forums along with over 30 net-zero and sustainability seminars in 2025, drawing over 2,500 participants, working with top academic institutions, research institutes, NGOs, and digital platforms. | ✓ All goals achieved. |
| **Opportunity 2** Increased listing opportunities for low-carbon and green industries | | | | |
| **Market promotion** | • Support the development of new economy industries and continue to optimize regulations for issuance and trading. | • Conduct at least two promotional events or seminars per year related to listed companies in new economy industries.<br>• Work with the public sector and startup ecosystem to encourage new economy businesses with key technologies and innovative capabilities or business models to join the capital market. | • Conducted 14 themed events, participated in 32 startup activities, and attended 34 investment seminars to promote tib and encourage companies to list.<br>• Attended overseas startup events at the invitation of the National Development Council in Japan, Korea, and Singapore.<br>• Took part in major startup events in Singapore, Malaysia, and Korea in partnership with KPMG, AppWorks, and SparkLabs.<br>• Actively collaborated with TiEA, AAMA, the Taiwan Creative Content Agency, Taiwan Academy of Banking and Finance, National Innovation and Entrepreneurship Association, in addition to other agencies, to hold seminars, workshops, plus other interactive activities to spark up engagement between startups. | ✓ All goals achieved. |
| **Opportunity 3** Adoption of renewable energy and energy-saving measures | | | | |
| **Use of renewable energy** | • Increase the proportion of renewable energy use. | • For renewable energy usage goals, please refer to 4.2 Energy and carbon management. | • Renewable energy usage of the First Data Center improved from RE50 to RE60.<br>• Completed the installation of additional photovoltaic modules, with a total of 76 modules and a total installed capacity of 54.45 kW. | ✓ All goals achieved. |
| **Set up energy-saving measures** | • Continue to increase implementation of energy-saving equipment to reduce greenhouse gas emissions. | • For greenhouse gas reduction goals, please refer to Pathway to Net Zero and 4.2 Energy and carbon management. | • Older company cars were replaced with environmentally friendly and energy-saving models, and employees are encouraged to share rides using the corporate taxi service.<br>• Replaced electrical equipment on office floors nine to eleven with energy-saving models in conjunction with office renovations.<br>• Replaced all old lighting equipment in the First Data Center with LED panel lights that are certified with the Energy Label. | |

Note: The TWSE annually reviews the implementation of various strategies and the fulfillment of climate change-related goals when compiling each year's sustainability report.

# 4.2 Energy and carbon management

The TWSE and its subsidiaries mainly provide financial and IT services, and the majority of its energy consumption is by its offices (including public facilities) and data centers, as well as gasoline consumption by company cars plus diesel fuel consumption by backup power generators. In 2022, the TWSE and its subsidiaries first completed its GHG Inventory Report in accordance with ISO 14064-1:2018, establishing the year 2022 as the inventory base year, in order to measure our greenhouse gas emissions and to formulate our carbon reduction plans accordingly.

To enhance the credibility of the inventory report, the TWSE and its subsidiaries acquired third party verification for Category 1, Category 2, and Category 4 of our GHG Inventory Report in 2025 [1]. The inventory scope includes Category 1's direct greenhouse gas emissions (refrigerants, gasoline, diesel, etc.), Category 2's indirect greenhouse gas emissions from imported energy (electricity), Category 3's indirect greenhouse gas emissions generated by transportation (business travel emissions), and Category 4's total indirect greenhouse gas emissions caused by organizations' use of products (capital goods, fuel, including energy-related activities).

Note 1: The TWCA, TIP, and the TCX have acquired third party assurance for Category 1 and Category 2. Please refer to the 2025 Sustainability Report of the TDCC for the third-party assurance statement of the TDCC and FundRich.

## • Energy usage

| Item | 2024 | | 2025 | |
|---|---|---|---|---|
| | Energy consumption | GJ | Energy consumption | GJ |
| **Gasoline** (liters) | 12,234.02 | 399.32 | 14,530.46 | 461.50 |
| **Diesel** (liters) | 8,662.00 | 304.47 | 6,825.39 | 246.79 |
| **Purchase of non-renewable energy** (kWh) | 11,779,138.91 | 42,404.90 | 12,016,279.45 | 43,258.61 |
| **Purchase of renewable energy** (kWh) | 9,782,483.00 | 35,216.94 | 11,511,382.76 | 41,440.98 |
| **Self-generated renewable energy** (kWh) | 16,330.00 | 58.79 | 19,920 | 71.71 |
| **Total energy consumption** (GJ) | - | 78,384.42 | - | 85,479.59 |
| **Energy intensity** (GJ/person) | - | 56.19 | - | 59.61 |

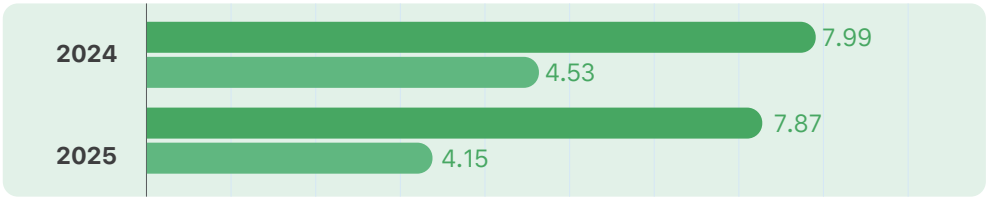
Note 1: This report covers data from the TWSE, TWCA, TIP, the TDCC, FundRich, and the TCX for 2025 and 2024, adjusted according to the GHG inventory results with assurance for such year. All calculations are rounded to the nearest two decimal places.
Note 2: The heating value coefficient is based on the latest announcement issued by the Ministry of Environment. For 2025, the heating value coefficient is 7,856 kcal/L for gasoline and 8,636 kcal/L for diesel.
Note 3: 1 gigajoule (GJ) = 10^9 joules (J); 1 kilocalorie (Kcal) = 4,186.8 joules (J); 1 kilowatt hour (kWh) = 3.6 megajoules (MJ)
Note 4: The energy types covered by the energy intensity ratio are fuel and electricity, additionally this ratio uses the energy consumption within the organization. Energy intensity is calculated based on the number of employees as of December 31 of that year, with 1,434 employees in 2025 and 1,395 employees in 2024.
Note 5: The types of greenhouse gases covered include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride ($SF_6$), and nitrogen trifluoride ($NF_3$).

## • Greenhouse gas emissions

| Item | 2024 | 2025 |
|---|---|---|
| **Category 1 direct GHG emissions** ($tCO_2e$) | 500.63 | 529.03 |
| **Category 2 indirect GHG emissions from imported energy** ($tCO_2e$)(by location) | 10,651.44 | 10,755.51 |
| **Category 2 indirect GHG emissions from imported energy** ($tCO_2e$)(by market) | 5,818.89 | 5,428.03 |
| **Category 3 indirect GHG emissions from transportation** (business travel) ($tCO_2e$) | 196.67 | 341.42 |
| **Category 4 indirect GHG emissions from products an organization uses** (capital goods, fuel, and energy-related activities) | 9,228.38 | 9,218.06 |
| **Total** ($tCO_2e$)(by location) | 20,577.13 | 20,844.02 |
| **Total** ($tCO_2e$)(by market) | 15,744.59 | 15,516.54 |

Note 1: This report covers data from the TWSE, TWCA, TIP, the TDCC, FundRich, and the TCX in 2025 and 2024. All calculations are rounded to the nearest two decimal places.
Note 2: The calculation of greenhouse gas emissions is based on the operational control approach. The calculation method is activity data multiplied by the emission coefficient multiplied by GWP values. The emission coefficient is based on the Ministry of Environment's Greenhouse Gas Emission Coefficient Management Table published on February 5, 2024. GWP values are based on the IPCC Working Group III Sixth Assessment Report published in 2022. If there are no updates in the Sixth Assessment Report, the calculations should be based on the content of the IPCC Working Group I Sixth Assessment Report published in 2021.
Note 3: For Category 2 greenhouse gas emissions, purchased electricity is the main source. In 2025 and 2024, the electricity emission factors are based on the Bureau of Energy, Ministry of Economic Affairs' 2024 and 2023 electricity emission factors of 0.474 and 0.494 $kgCO_2e/kWh$, respectively.
Note 4: The types of greenhouse gases covered include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride ($SF_6$), and nitrogen trifluoride ($NF_3$).
Note 5: In accordance with GHG Protocol Scope 2 Guidance (2015), the TWSE discloses Scope 2 emissions according to both the location-based method and market-based method due to its purchase of renewable energy. For Category 2 emissions in the above table, location-based emissions are calculated by multiplying total electricity consumption by the average electricity emission factor of the location, while market-based emissions are calculated by multiplying solar power used and the amount bought through the power purchase agreement with Taiwan Power Company with the contract source emissions factor.

## •Greenhouse Gas Emission Intensity (Category 1 + Category 2)







GHG emission intensity ($tCO_2e$/person) (by location)
GHG emission intensity ($tCO_2e$/person) (by market)
GHG emission intensity ($tCO_2e$/TWD million) (by location)
GHG emission intensity ($tCO_2e$/TWD million) (by market)

Note 1: GHG emission intensity is calculated based on the number of employees as of December 31 of that year, with 1,434 employees in 2025 and 1,395 employees in 2024.
Note 2: GHG emission intensity is calculated based on the consolidated revenue for that year with TWD28,705 million in 2025 and TWD27,806 million in 2024.

## Use of renewable energy

To mitigate climate change, the TWSE strongly supports the government's promotion of renewable energy use. In 2025, all the TWSE offices in Taipei 101 continued to achieve 100% green energy usage. The First Data Center continued to purchase green energy and, as of June 2025, achieved its short-term goal of improving its renewable energy usage from RE50 to RE60. In addition, the First Data Center's solar panels and energy storage system generated 19,920 kWh of electricity in 2025, with a carbon reduction benefit of approximately 9,442 kg of $CO_2e$. The TWSE's renewable energy usage rate reached 60.96% in 2025, continuing its upward trajectory over the previous year. Furthermore, the installation of additional photovoltaic modules at the First Data Center was completed in November 2025, and is expected to generate 43,000 kWh in 2026, which can reduce carbon emissions by approximately 20,382 kg of $CO_2e$.

### •TWSE renewable energy use

| Year | Energy used (kWh) | % of total energy used |
|---|---|---|
| 2024 | 9,231,246 | 56.56% |
| 2025 | 10,512,330 | 60.96% |

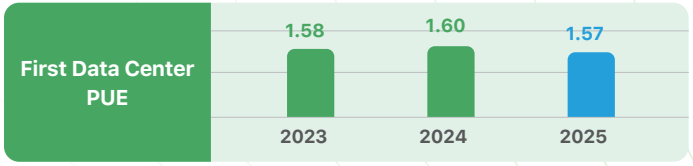
The TWSE exerts great effort in energy conservation to achieve its carbon reduction targets. In addition to using renewable energy, the TWSE has replaced older company cars and leases environmentally friendly and energy-saving models, gradually installed and upgraded energy-saving office equipment, as well as the central air-conditioning water-cooling system makes ice at night and uses it for cooling during the day. Furthermore, to reduce environmental harm caused by consumption, the TWSE has established an eco-friendly procurement policy for products purchased for operations, including most commonly purchased goods such as paper, computer supplies, office supplies, batteries, and light fixtures. The policy gives priority to products that meet the government's Green Mark criteria or are made of recycled materials.

### •TWSE energy conservation measures

| Item | Content |
|---|---|
| Chiller | The chiller units are operated alternately on a schedule so as to ensure optimum efficiency. The First Data Center building is also equipped with ice storage air conditioning, which creates ice during the night at off-peak hours, plus uses the cooling from the ice melt during the day. The process can divert energy consumption from peak hours and is cost-effective and energy saving. |
| Chilled water pump, cooling water pump, cooling tower | Using frequency conversion technology, the chilled water pumps, cooling water pumps, and cooling towers can be adjusted depending on motor rotational speed to achieve energy conservation. |
| Computer room | Computer rooms adopt high-efficiency EC fans plus constant temperature and humidity air conditioning units for regulating the temperature in addition to the humidity of the environment. |
| Air distribution system | The First Data Center building adopts frequency conversion technology with its air handling units to cool entire sections through the VAV air distribution system. |
| Central control system | The central control system manages and monitors the building's systems/operations, ensuring energy conservation, and issuing alerts in the case of abnormal situations. |
| Air conditioning system energy conservation | The operational parameters for the central air conditioning system of the First Data Center continue to be optimized to achieve energy conservation. |
| Thermal insulation in the data center | The use of thermal insulation materials in the First Data Center effectively blocks outdoor heat from entering the building, achieving energy savings. |
| Eco-friendly procurement | The TWSE established an eco-friendly procurement policy, giving priority to products that meet the government's Green Mark criteria or are made of recycled materials. |

### • Data center PUE

The Power Usage Effectiveness (PUE) of the TWSE's First Data Center fell slightly from 2024 to 2025's 1.57. Through ongoing HVAC system energy-saving initiatives, improvements to the server room operating environment, and regular maintenance practices, the TWSE is reducing electricity consumption and continuously working toward lowering the PUE value and reducing carbon emissions.




Note 1: Power Usage Effectiveness (PUE) is calculated by dividing the total power usage by the data center by the total power usage of ICT equipment in the server rooms.
Note 2: Since the solar power generation and consumption in 2023, 2024, and 2025 account only for a small percentage of total electricity consumption, it is not included in either the numerator or denominator of PUE calculations.

## •TWSE carbon reduction targets and performance

### 2025 Performance

- Due to office renovations in Taipei 101 this year, the TWSE had to temporarily expand its lease area, resulting in a substantial purchase of capital goods and a sudden increase in overall emissions for this single year. Since the cause is a single, abnormal event and not an ongoing trend, the increase in emissions is expected to cease once the renovations are complete. Excluding the emissions caused by the new capital expenditures, the emissions from other sources have decreased by a total of 36.32% compared to the base year (2022), achieving the annual reduction target of 14.2%.
- Received numerous sustainability-related awards: BSI's ESG Sustainable Development Award – Net Zero Award; Outstanding Private Enterprise in Green Procurement, recognized by the Department of Environmental Protection, Taipei City Government.
- Conducted a paperless competition to promote the policy of a paperless office.
- Completed the 2024 GHG inventory and assurance and obtained ISO 14068-1:2023 carbon neutrality verification.
- The First Data Center achieved 60% renewable energy use, and following the installation of additional solar power equipment, the installed solar panels generated 19,920 kWh.
- The Taipei 101 offices achieved 100% green energy use.
- Replaced all electric equipment with products that meet the Level 1 Energy Label; replaced company cars with environmentally friendly and energy-saving models.
- Promote suppliers' commitment to sustainable development; conducted SDG activities with the theme, Sustainable Piggy Bank: Saving Green for the Future.
- Replaced electrical equipment on office floors nine to eleven with energy-saving models in conjunction with office renovations; all office materials are environmentally friendly, non-toxic, and low-formaldehyde.

### Short-term targets (2026)

- Conduct the 2025 GHG Inventory, verification, and achieve carbon neutrality.
- Increase annual solar power generation of the First Data Center by over 100%; implement an energy management platform to record energy consumption and analyze energy-saving measures; optimize office lighting by replacement with flat LED panel lights.
- Promote the use of renewable energy for the Second Data Center.
- Continue to organize activities that combine sustainability strategic goals with public welfare and social responsibility, including family day, paperless office, and the Earth Guardians SDG initiative.
- Report green procurement performance for 2025 on the Ministry of Environment's Net-Zero Green Life Information Platform.
- Expand solar power generation.
- By 2026, reduce GHG emissions by 18.9% from the baseline (2022).

### Medium-term targets (2030)

- By 2030, reduce GHG emissions by 37.8% from the baseline (2022).
- Reduce emergency generator diesel fuel consumption and carbon emissions by 4%.
- Replace and upgrade equipment with energy-saving models.
- Reduce office paper usage and purchase of mineral water by 10%.

### Long-term targets (2050)

- Continue to include other items in the scope of inventory, and formulate corresponding measures according to future development to achieve net zero emissions.

# 4.3 Resource management

## Waste management

The TWSE mainly provides financial and IT services; the majority of our waste is general waste and photocopier paper. There are no concerns about pollution or waste from actual development or manufacturing activities. The office has switched to environmentally friendly toner cartridges, which are 100% recycled after use by the original manufacturer to avoid pollution and waste of resources. The TWSE generated a total of 9.3 metric tons of general waste in 2025, which has been handed over to qualified disposal facilities for further processing.

| Waste composition | Waste produced (metric tons) | Waste diverted from disposal (metric tons) | Waste directed to disposal (metric tons) |
|---|---|---|---|
| **General waste** | 9.3 | 6.3 | 3 |
| **Hazardous waste** | 0 | 0 | 0 |

| | | |
|---|---|---|
| Waste intensity | **Total waste** (metric tons) | 9.3 |
| | **Revenue** (TWD thousand) | 16,979,257 |
| | **Waste intensity** | 0.0000006 metric tons/TWD1,000 |

## Going paperless

The TWSE is proactive in digitalizing internal systems and has set up mechanisms to reduce paper usage along with energy consumption in every department. Based on the amount of paper procured by each department in 2024, the target is to reduce usage by 3% by the end of 2025. Departments that achieved the target were rewarded, while those that fail to do so have to explain at a project meeting to ensure that environmental protection and carbon reduction measures are implemented company wide. All departments of the TWSE achieved their annual paper reduction goals as of the end of 2025. To incentivize departments in adhering to paperless and carbon reduction policies, the TWSE conducts paper reduction assessment in parallel with reward measures to encourage departments to reduce paper usage through streamlining or digitalizing their workflow. In addition, the TWSE continues to improve the operational efficiency of the electronic official document exchange system, and encourages listed companies that have not yet adopted the system to join.

## Water resource management

The main source of water for the TWSE comes from the Taiwan Water Corporation, without using groundwater or other water sources. The total water intake in 2025 was 26.5 million liters. In recent years, climate change has indirectly altered the water cycle and precipitation patterns. The TWSE is committed to conservation and management of water resources. In addition to raising awareness of water-saving measures among employees, water saving devices have been installed. The water tower in the building is cleaned regularly. Water quality testing and periodic inspections of water equipment are also conducted. The First Data Center has fully adopted water-saving devices, including sensor operated faucets and water-saving taps, dual-flush water-saving toilets certified by the Water Efficiency Label, automatic sensor operated urinals, and water-saving shower fixtures, in order to reduce everyday water consumption. In outdoor areas, a drip irrigation system has been installed, and the water usage is automatically controlled by a schedule to reduce water used for irrigation. In the future, we will replace the old air conditioning cooling towers with more efficient water-saving cooling towers to reduce the loss of cooling water through drift, evaporation, and emissions. The goal is to use less water for air conditioning.

Note: The waste and water intake refer only to the TWSE. Waste and water usage from the TDCC, TCX, FundRich, TIP, and the TWCA are handled by their respective building management committees and paid for in management fees, and therefore is not included in calculations.