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Industrial Greenhouse Gas Reduction!

We Can Do It!

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Ministry of Economic Affairs

Since the Industrial Revolution, the concentration of greenhouse gas (GHG) in the atmosphere has been increasing significantly and has caused environmental problems associated with global warming. The Earth Summit was held by the UN in 1992, in which the "United Nations Framework Convention on Climate Change (UNFCCC)" was adopted with the aim to alleviate global warming by means of global control mechanisms. By the end of 1997, "Kyoto Protocol", the legally binding international environmental protection agreement was adopted and it came into effect in February 2005. The Kyoto Protocol regulates 6 GHGs, including CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6, and requires 38 developed countries to lower their national GHG emissions from 2008 to 2012 by 5.2% below the emission level of 1990.

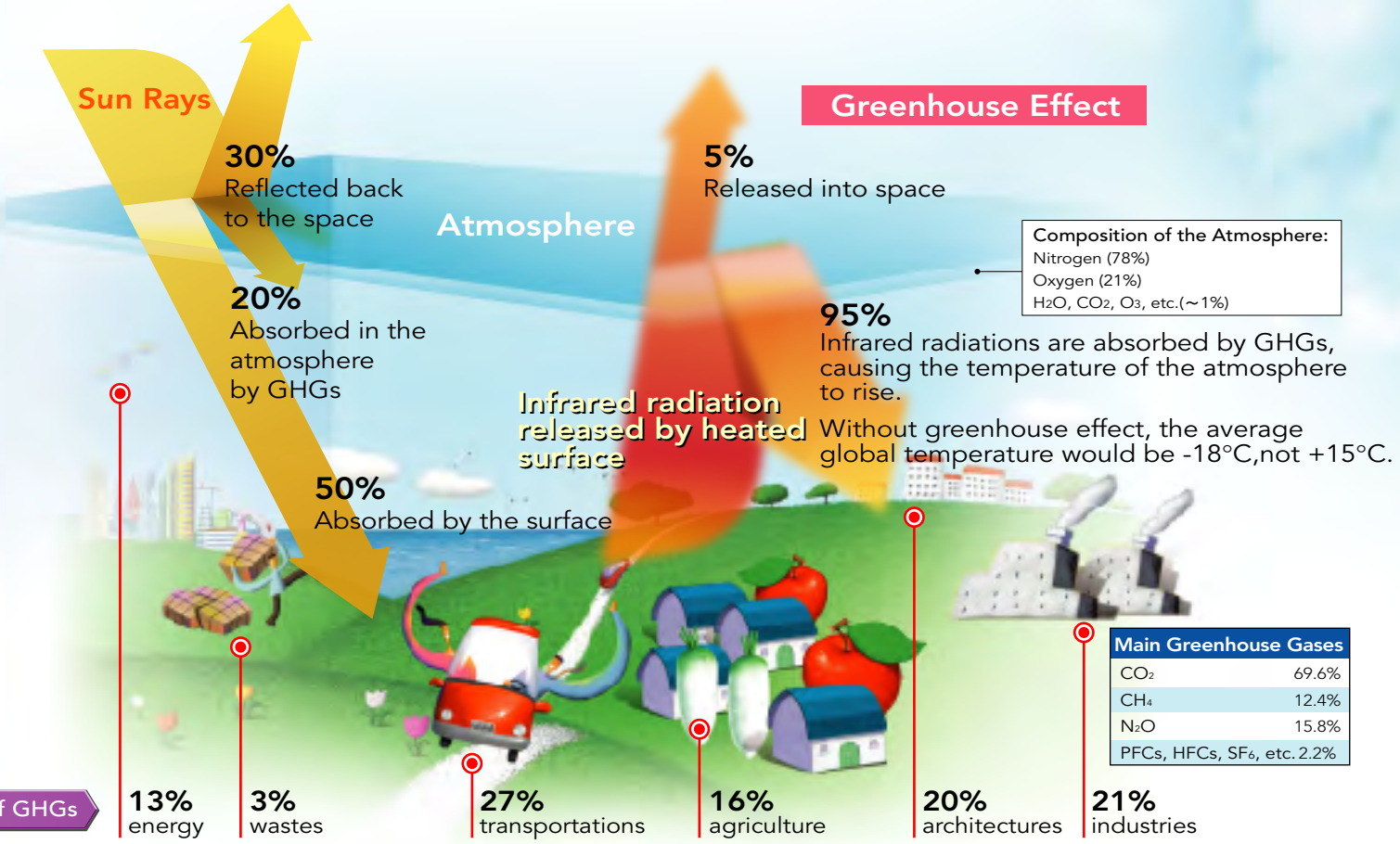
Currently, Taiwan is not a Kyoto Protocol signatory and hence is not required to reduce GHG emissions. However, taking into consideration that the Taiwanese industries are mainly export oriented, in order to deal with the potential impact of GHG reduction induced trade barriers on the domestic industries and to fully exercise Taiwan's obligation as a global citizen, various departments in the Taiwanese government have already taken active measures to promote emission reductions. Furthermore, following the global trend of GHG emission reduction, Taiwanese industries are encouraged to understand their own emission levels and draft appropriate reduction strategies to ensure their competitiveness.

Taiwan

2 What is Greenhouse Effect?

The Earth balances its temperature by absorbing incoming solar radiation and reflecting infrared radiation back to the space. Although GHGs (e.g. CO_2 and CH_4) allow solar radiation access through the atmosphere, they absorb infrared radiation reflected from the surface of the Earth. Therefore, if the amount of GHGs in the atmosphere increases, the greenhouse effect will be enhanced, in turn causing the temperature of the atmosphere to rise.

In recent years, the significant increase in the global temperature has caused the melting of the polar ice caps, the increase in the temperature and acidity of sea water, the rise in sea levels, plagues, extinction of species, draughts and floods and animal migrations that can be attributed to global climate changes.



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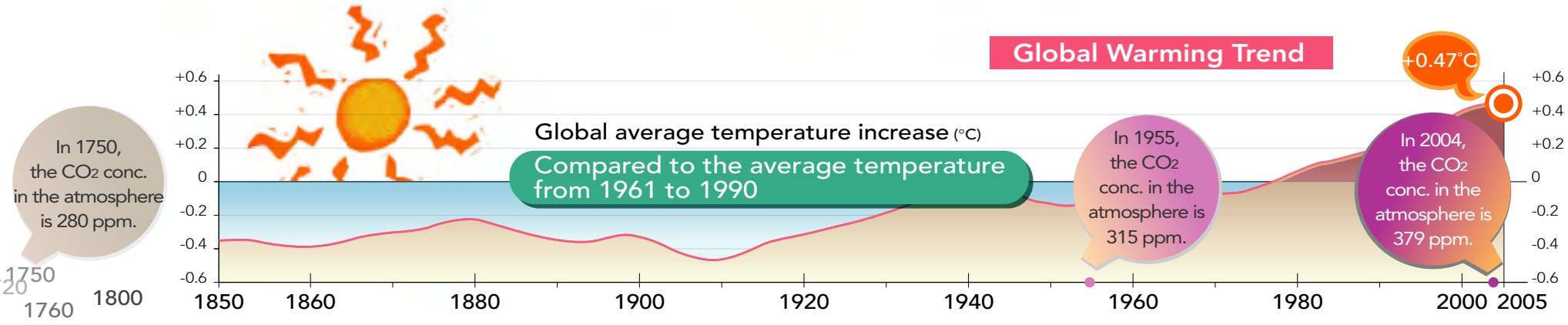

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3 Domestic and International Major Events:

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International

- 1988: IPCC established [1]
- 1992: UNFCCC adopted [2]
- 1994: UNFCCC took effect
- 1995: COP1 convened [3]
- 1997: COP3 adopted the Kyoto Protocol
- 2000: ISO/TMB/AHGCC established [4]
- 2002: UK-ETS launched [5]; GHG Protocol version 1 officially published [6]; ISO started drafting ISO14064
- 2004: GHG Protocol version 2 officially published; ISO 14064 (DIS) officially published
- 2005: Kyoto Protocol came into force; EU-ETS officially begins to operate
- 2006: ISO 14064 (IS) officially published

Taiwan

- 1998: First National Energy Meeting (1)
- 2000: GHG Control Act was drafted
- 2004: Climate Change and Kyoto Protocol Response Task Force was established (2)
- 2005: Second National Energy Meeting (3)
- 2006: Taiwan Industrial Greenhouse Office (TIGO) established (4); CNS 14064 standards issued by the Bureau of Standards, Metrology & Inspection; GHG Reduction Act (Draft) adopted by the Executive Yuan

- Since 1998, the Industrial Development Bureau has been executing various projects on GHG reduction technology promotion and guidance, industrial waste recycling, voluntary reduction agreement for energy intensive industries and promotion of cleaner productions.
- The Bureau of Energy has been executing projects on the promotion of the use of new energies or clean energies (solar energy, wind and bio-mass) and of energy conservation (buildings, electrical appliances, and vehicles).
- The State-owned Enterprise Commission has been executing projects on the promotion of energy conservation, clean energy development and GHG sequestration in companies such as Tai-power Company and Chinese Petroleum Corporation (CPC).
- Department of Industrial Technology of Ministry of Economic Affairs is dedicated to the promotion of projects such as waste recycling and toxicity reduction, which will provide substantial assistance to the reduction of GHG emissions.

[1] Inter-governmental Panel on Climate Change (IPCC) is an international organization responsible for the research of influences caused by climate changes. IPCC has published global climate assessment reports in 1990, 1995, 2001, and 2007. In the 1995 assessment report, the research finding suggests that anthropogenic GHG emissions are influencing the global climate.

[2] United Nations Framework Convention on Climate Change (UNFCCC) is an international convention which sets the voluntary GHG emission reduction targets.

[3] After UNFCCC took effect in 1994, the Conference of the Parties (COP) is held once each year, and COP12 was held in 2006

[4] ISO/TMB/AHGCC(Ad-hoc Group on Climate Change): participate in various UNFCCC meetings on behalf of ISO.

[5] UK Emission Trading Scheme (UK-ETS) is the first GHG trading scheme in the world; EU-ETS is the first international GHG trading market.

[6] Greenhouse Gas Protocol (GHG Protocol) is the key manual used to calculate and report GHG emissions of enterprises and is also an important research report that is referenced by ISO to draft the ISO 14064 series standard.

(1) In response to the reduction targets and periods set in the Kyoto Protocol, Taiwan reviewed its national energy and industrial policies in the first National Energy Conference and started planning and promoting measures to assist the reduction of industrial GHGs.

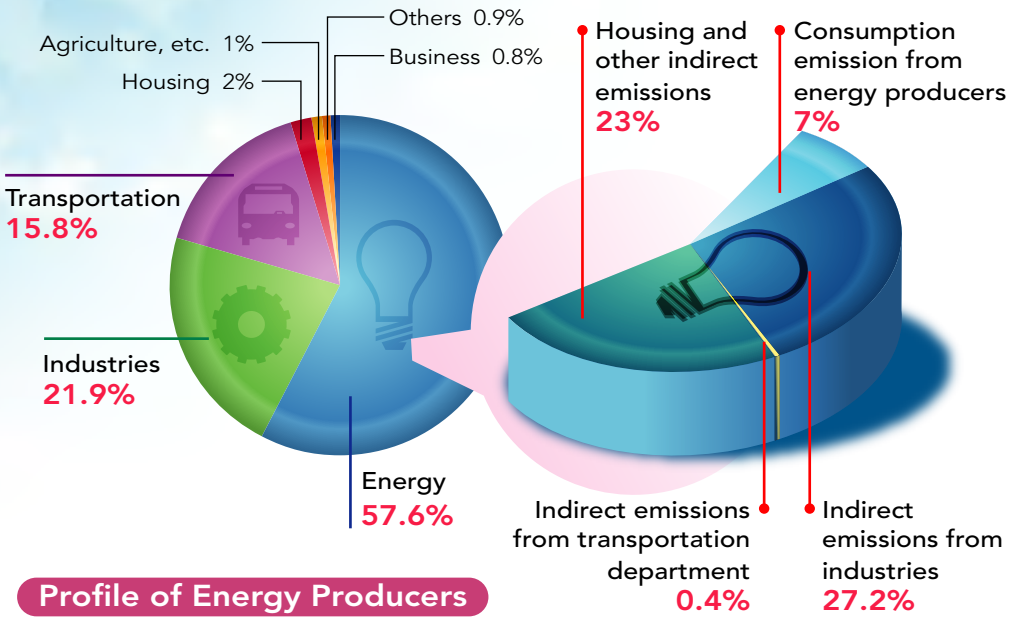
(2) The National Council for Sustainable Development of the Executive Yuan established a cross-departmental "Climate Change and Kyoto Protocol Response Task Force" to integrate and promote relevant GHG issues with greater efficiency.

(3) In the second National Energy Conference, Taiwan reviewed the policies which were to be adopted or amended by various governmental departments in coordination with the timing of when Kyoto Protocol would come into force.

(4) The Ministry of Economic Affairs established the "Taiwan Industrial Greenhouse Office" to assist the work of Taiwan's industrial GHGs management and reduction promotion.

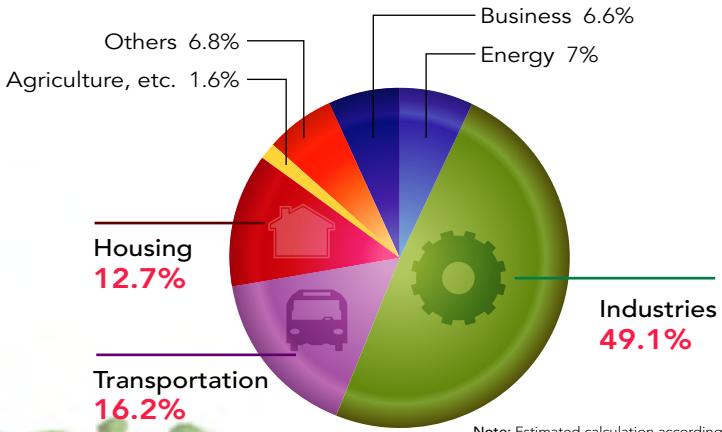
4 Where Does Greenhouse Gas Come From?

The Percentage of GHG Emission from Various Sectors



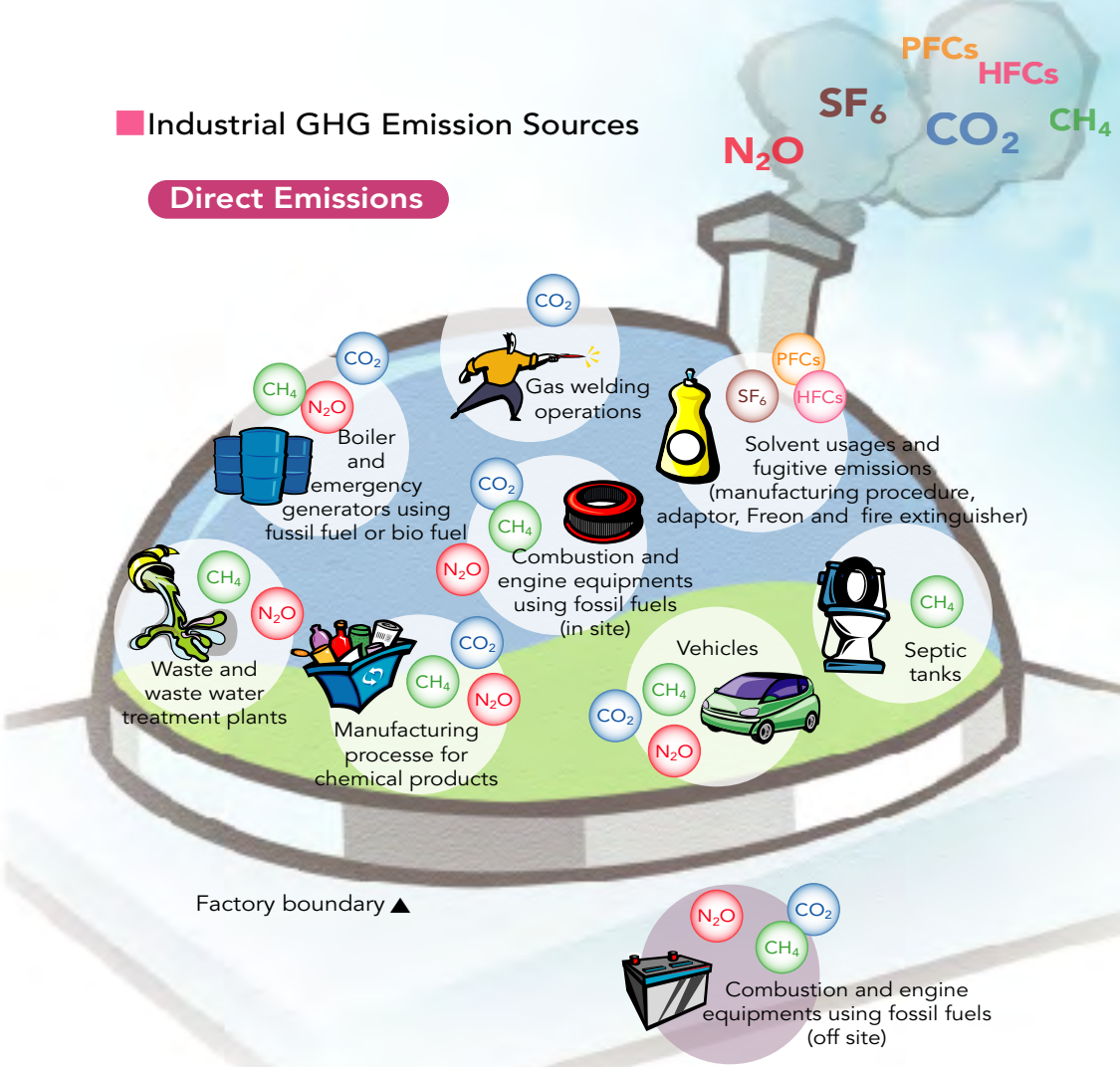
Profile of Energy Producers

Profile of Energy Consumers

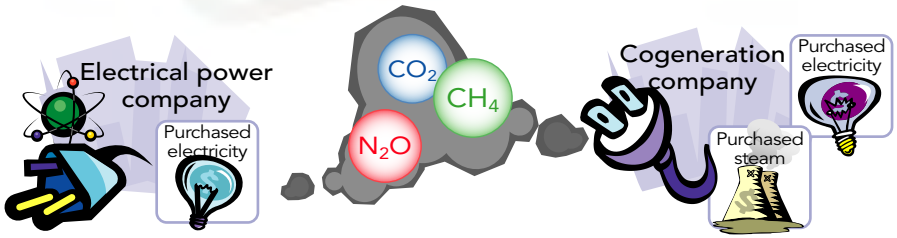


Note: Estimated calculation according to the 2005 Energy Balance Table by the Bureau of Energy

Industrial GHG Emission Sources



Indirect Emissions



Note: CO_2 produced from burning bio fuels is not included in the emissions calculation.

5 Comparison of Current Emissions:

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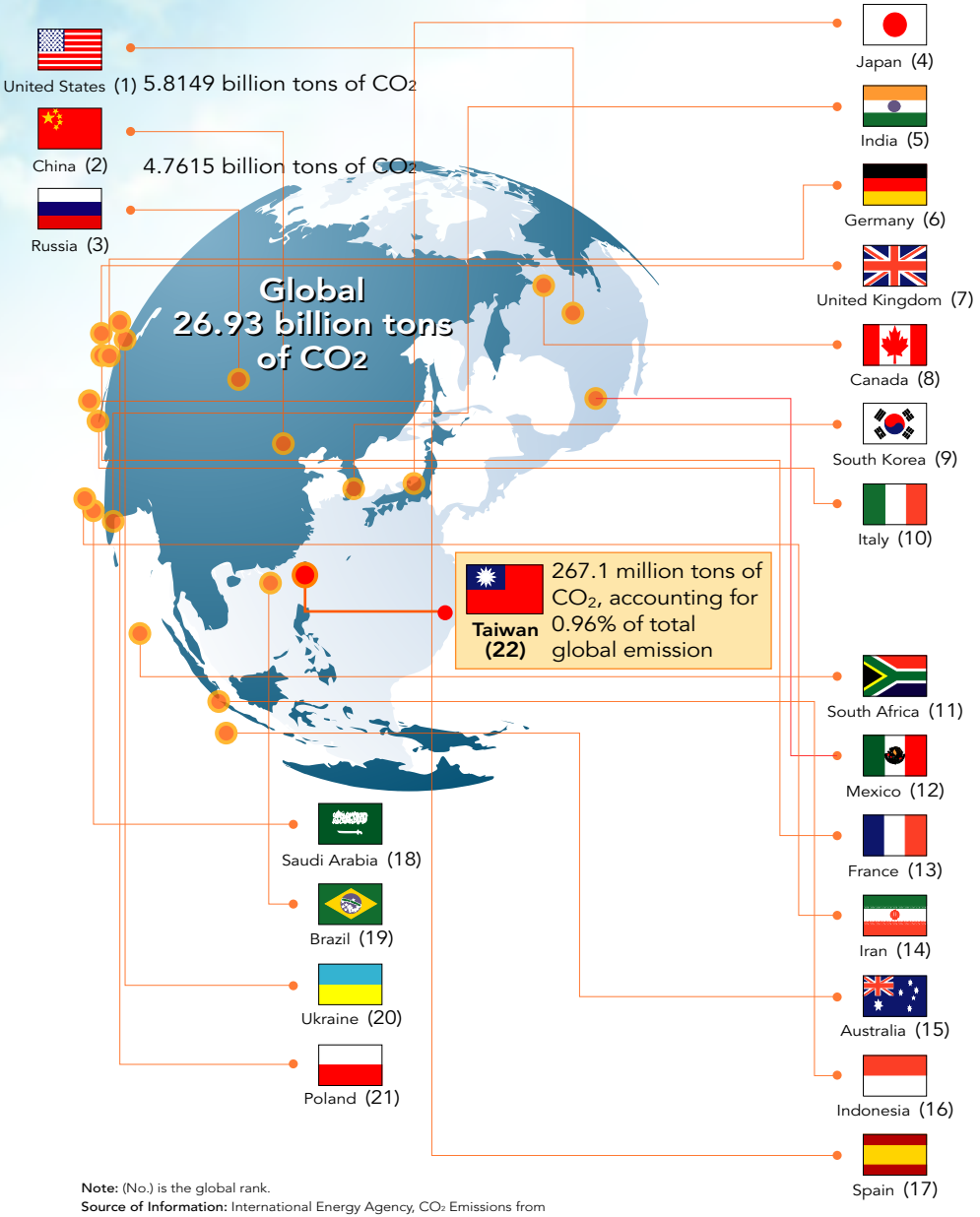
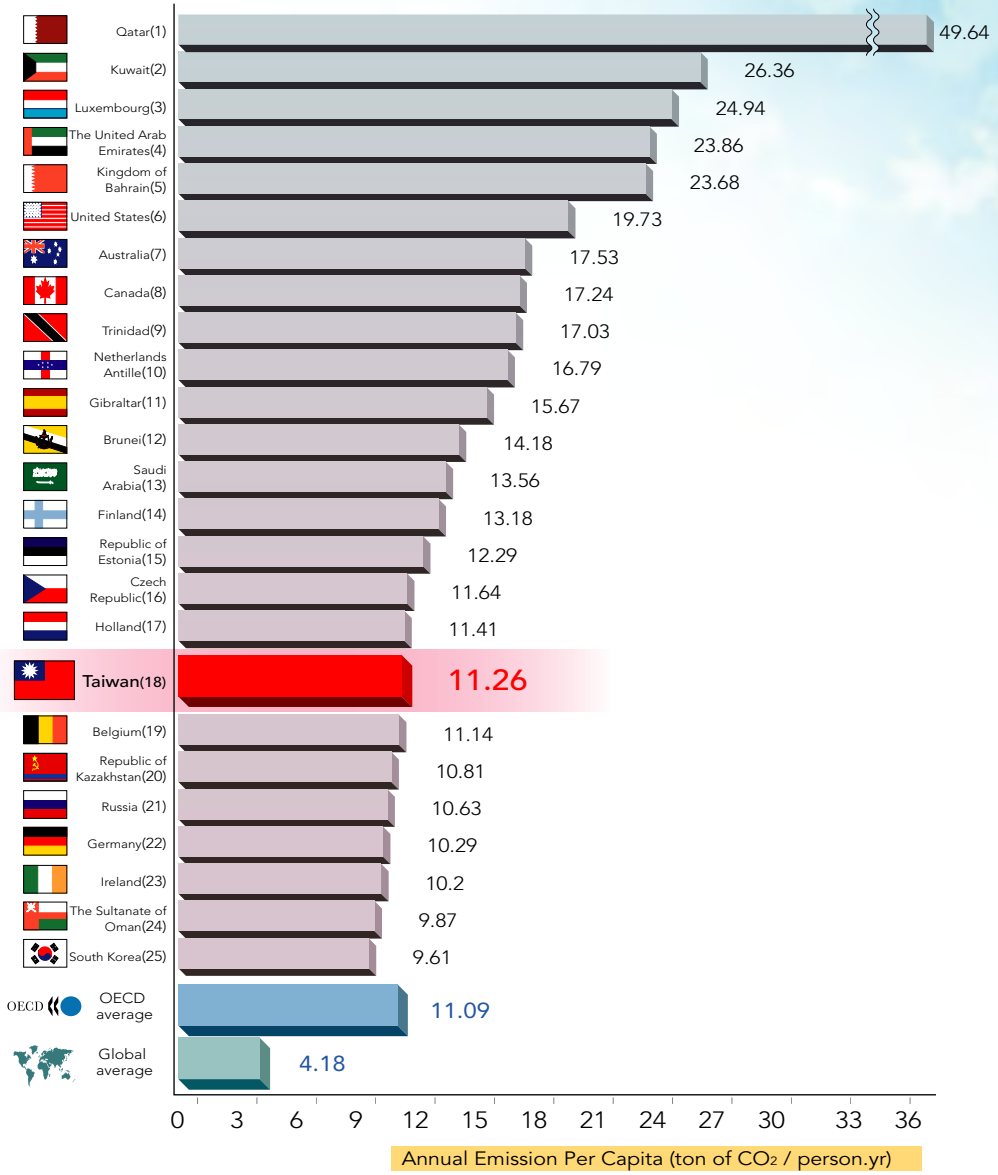
Annual Total Emissions (2004)



Note: (No.) is the global rank.
Source of Information: International Energy Agency, CO_2 Emissions from Fuel Combustion (Highlights) 1971-2004, 2006 Edition

Emissions Per Capita (2004)



Note: (No.) is the global rank.
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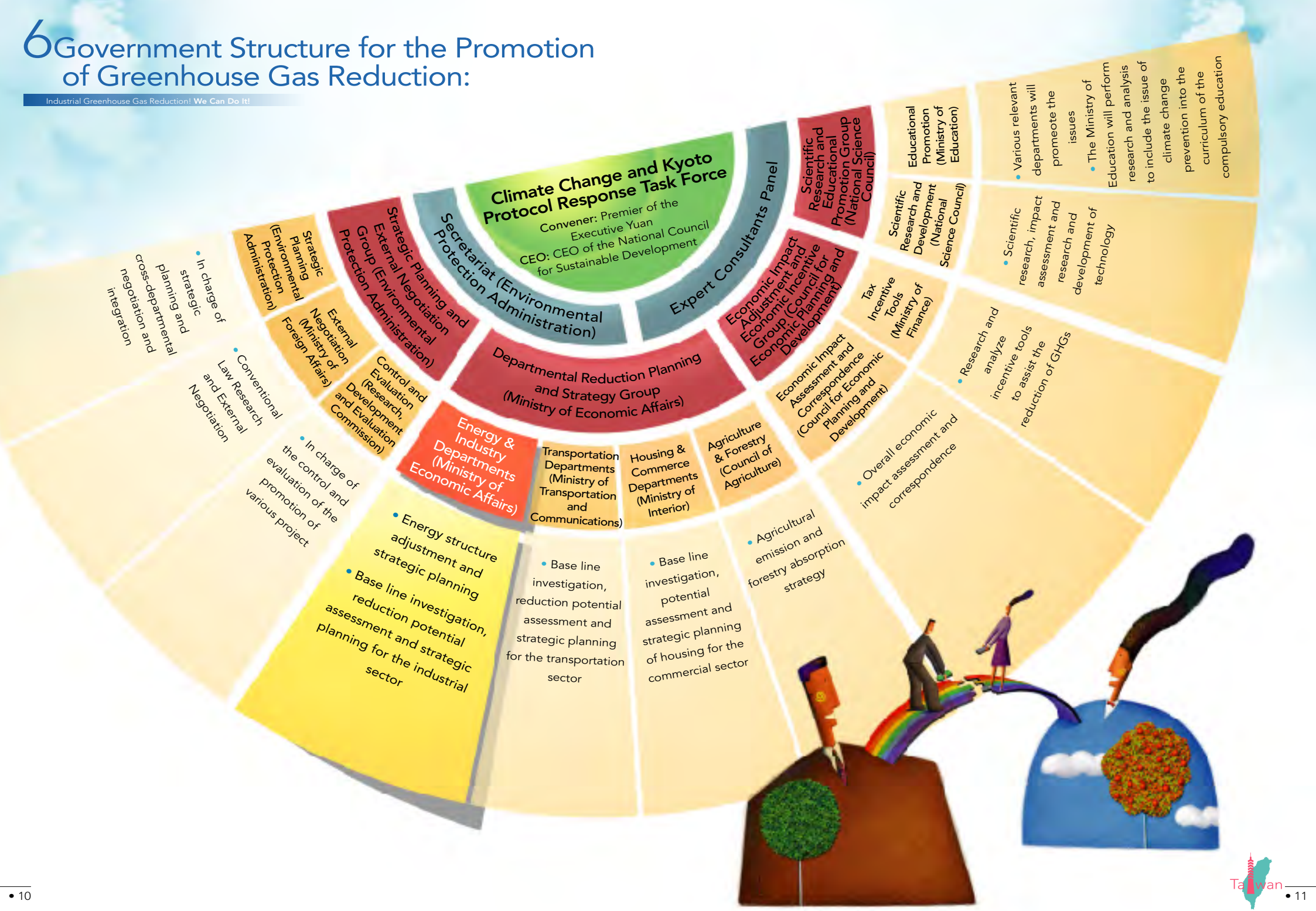
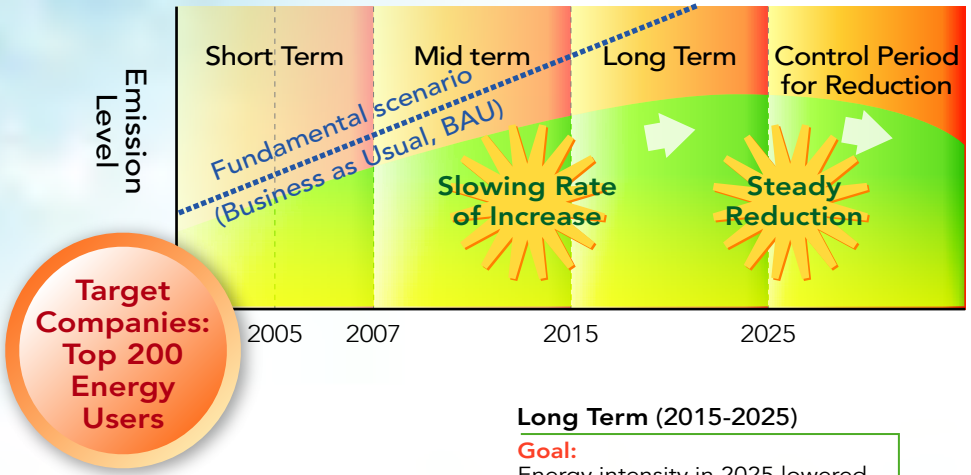
6 Government Structure for the Promotion of Greenhouse Gas Reduction:



7 Response Measures from the Industrial Department!

Stages of Management



Target Companies: Top 200 Energy Users

Short Term (2005-2007)

Goal:
Promote industrial capacity building and voluntary reduction.

Management:
Guide companies in GHG inventorying and registration.

Mid Term (2007-2015)

Goal:
GHG emission intensity in 2015 lowered by 10% below the 2000 level.

Management:
Establish reduction plans, review reduction goals by stages and re-adjust the issue of emission credits.

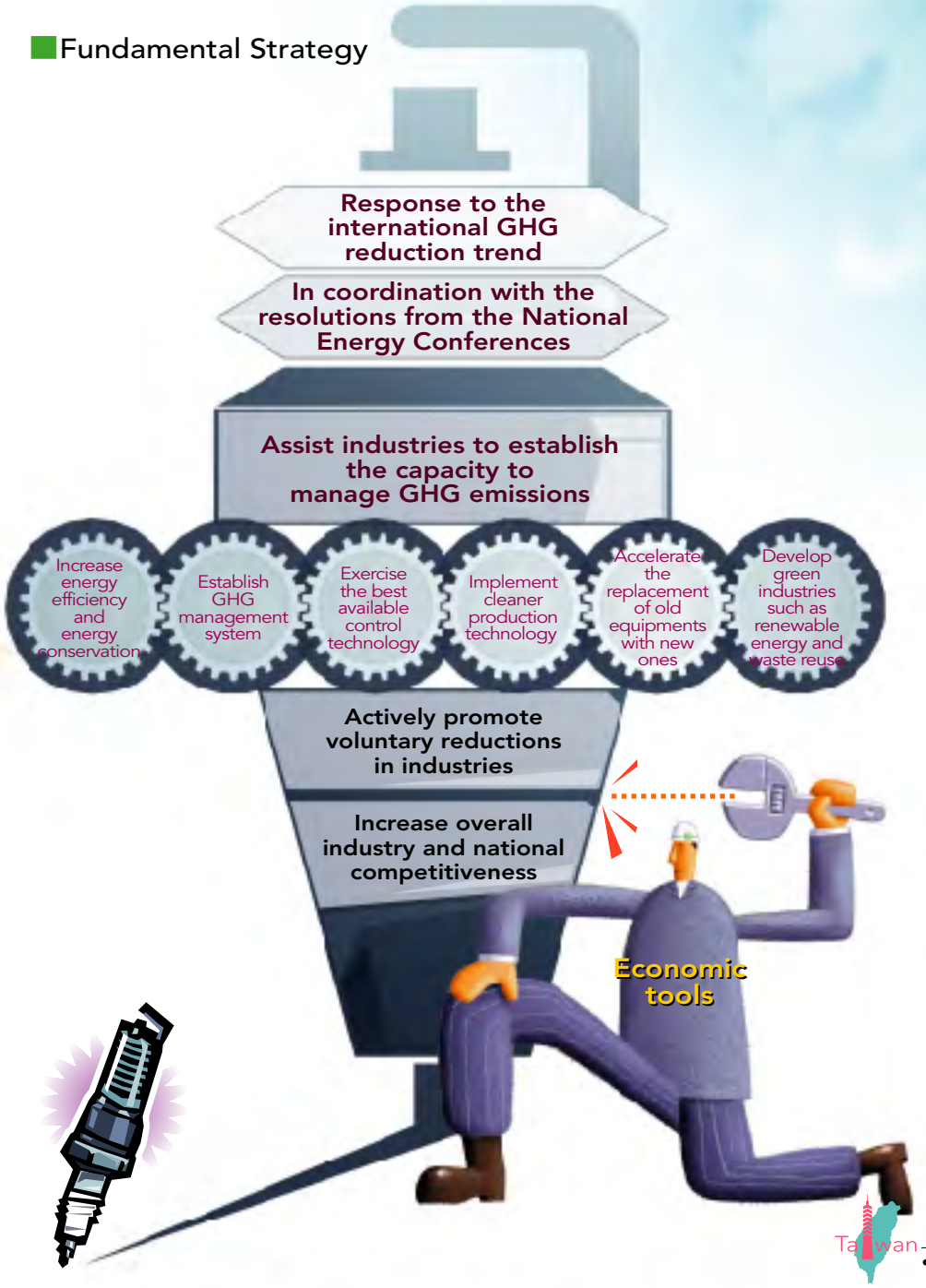
- Existing factories - allocate GHG emission quota.
- Newly established factories - adopt the best available technology.

Long Term (2015-2025)

Goal:
Energy intensity in 2025 lowered by 16% below the 2000 level.

Management:
Participate in international cooperation for reduction.

Fundamental Strategy



Response Measures

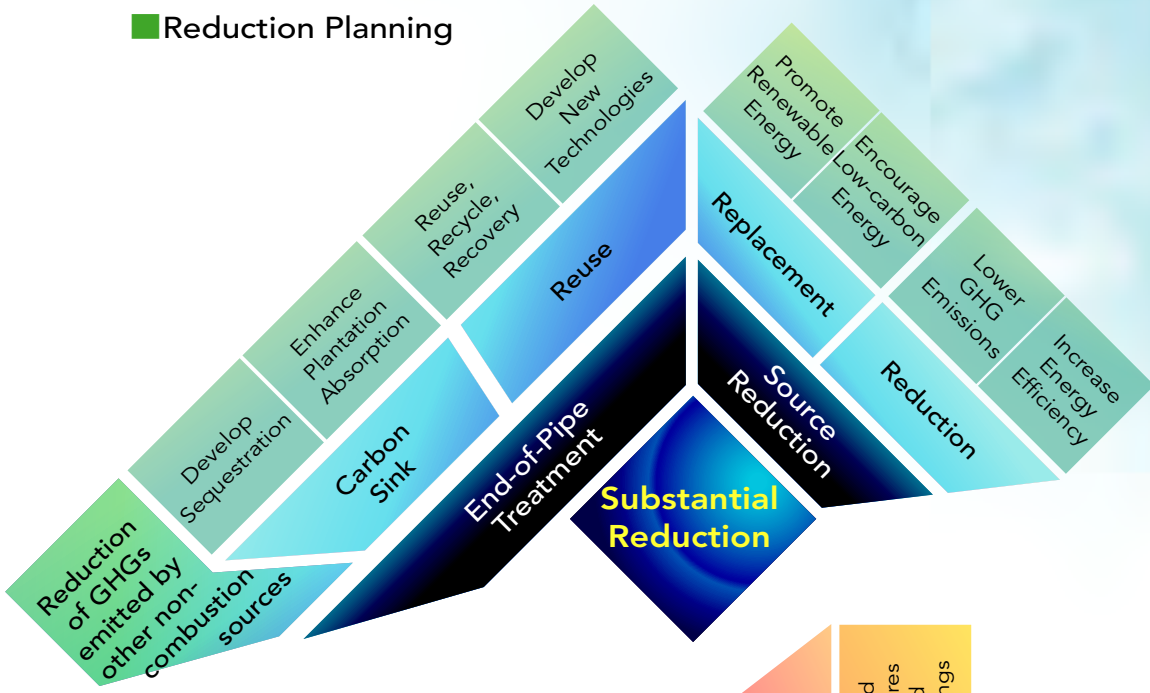
1. Guide the structural adjustment of industries, and accelerate the development of new industries.
2. Research and establish domestic GHG emission trading scheme.
3. Reinforce the examination of the efficiency of major industrial investment projects with significant GHG emissions.
4. Reinforce the promotion of domestic and international GHG policies and achievements.

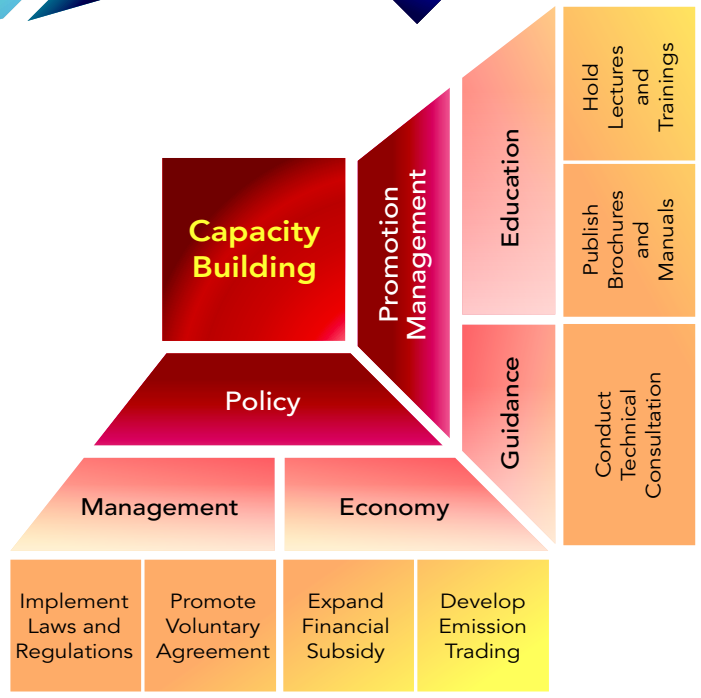
1. Accelerate the process of emission quota verification and the establishment of management system in companies.
2. Establish an industrial GHG emission database.
3. Guide industries in implementing cleaner production and green technology.
4. Assist industrial associations in establishing voluntary industrial GHG emission reduction goals.

1. Introduce technology and equipments that will reduce GHG emission and increase energy efficiency.
2. Promote industrial waste reuse and recycle.
3. Research and develop or introduce the technology of CO_2 recycle and reuse.
4. Develop the industry for the manufacturing of renewable energy equipment and parts.

1. Tax remittance for investment in equipment and technology for GHG emission reduction and cleaner energy production.
2. Two years of accelerated depreciation for energy saving and clean energy using equipment.
3. Five years of business tax break for newly established important and strategic industries.
4. Low interest rate loan.

Reduction Planning





Action Plan

- **Gradually lower industrial emission intensity**
  Reduce the industrial emission intensity by 10% below the 2000 level by 2015.
- **Expand voluntary reduction agreement**
  Expand the participating scale of voluntary reduction and enhance the promotion and guidance of energy conservation schemes.
- **Nurture emission reduction service industries**
  Promote the reduction assistance mechanisms and nurture emission reduction and energy service industries.
- **Promote domestic clean development mechanism (CDM)**
  Promote small-scale clean development mechanism, encourage industrial investments and accelerate technological progress.
- **Promote eco-design requirements for energy-using products (EuPs)**
  Promote eco-design requirements for EuPs, increase energy efficiency and reduce environmental impacts.
- **Enhance industrial energy efficiency**
  Improve the industrial energy efficiency and decrease carbon emissions.
- **Expand the reuse and recycle of wastes**
  Expand the reuse and recycle of wastes and increase the sustainable use of energy and resources.
- **Integrate regional energy and resource sharing**
  Establish regional energy and resource sharing system and fully integrate the use of energy and resource recycling.
- **Fluorinated compounds emission reduction**
  Strengthen the fluorinated compound emission reduction capacity of electronic industries to achieve the goal of cleaner production.
- **GHGs reuse technology development and application**
  Develop technology to recycle and reuse GHGs to achieve the goal of emission reduction.

Task Items

Databases Establishment:

Best available technologies, GHG emission factor, GHG reduction technology, information management platform, etc.

Guidance and Promotion:

Inventory / registration / verification / management system, industrial GHG information center, various lectures and training workshops, technical brochures, etc.

Voluntary Reduction:

Voluntary reduction counseling for industrial associations, GHG reduction verification demonstration projects, achievement awards, etc.

International Cooperation:

Technical guidance, technology outreach, international cooperation, etc.

Emission Quota Allocation:

Perform research and model analysis of allocation methods, survey of industrial responses and discussions, etc.

- Established "Industrial Greenhouse Gas Information Center" as the platform for information management of industrial GHG emissions reports.
- Completed the 2004 GHG emissions registration of 136 factories with the total registered emissions of 40.012 million tons accounting for 29.64% of the total industrial sector emissions.
- Completed the 2005 GHG emissions registration of 153 factories, with the total registered emissions of 57.016 million tons accounting for 42.07% of the total industrial sector emissions.
- Completed the inventory of 117 factories and verification of emission registration of 115 factories from 2004 to 2006.
- Successfully guided Cheng Long Corporation (paper manufacturer) in obtaining ISO 14064 verification (2006).
- Guided five industrial associations including Steel, Chemicals & Fiber, Paper, Cement and Artificial Fiber in carrying out GHG reduction, and planned the short term (2005), mid term (2010) and long term (2020) total energy conservation targets for these five industries from 2005 to 2020, with the reduction targets of 0.716 million, 1.076 million and 1.905 million KLOE respectively.
- "Taiwan Semiconductor Industry Association" and "Taiwan TFT LCD Association" have signed "Cooperation Memo for Voluntary All Fluorinated Compound Emission Reduction" with the Environmental Protection Administration.
- Assisted six major industrial associations including Steel, Chemicals & Fiber, Paper, Cement Artificial Fiber and Textile in signing voluntary energy conservation and CO_2 reduction agreements. It is estimated that from 2004 to 2008, 4.02 million tons of CO_2-e will be reduced. In 2006, the reduction figures of the various industries were verified and recognized.
- Compiling the various projects promoted by the Industrial Development Bureau from 1998 to 2005, GHG reduction in excess 9 million tons of CO_2-e has been achieved.
- Established brochures and technical guidance such as "GHG Inventory Manual for Production Plants", "Industrial GHG Inventory and Reduction Manual", "Voluntary Industrial GHG Emission Inventory Registration Guidance" and "Industrial GHG Inventory, Registration and Verification Manual".
- Held the 2005 Taiwan, Japan & Korea and 2006 Taiwan and Australia International Seminars on Practical GHG Reduction and Management.
- Taiwan Industrial Greenhouse Office (TIGO) was established by the Ministry of Economic Affairs in June 2006.
- Established the Industrial GHG Information Net and published bilingual e-news letter in Chinese and English.
- Contracted experts and scholars to perform research on the following related issues: policy research and drafting, laws and regulations, management strategies, technical tools, economic incentives and reward measures.

Join Us! Starting Now!

Emission Inventory: Industries should carry out GHG emission inventory in order to understand the plants' own emission status and to establish reduction measures.

Registration Work: Industries should establish historical records of GHG emissions to assist the industries in obtaining suitable emission quota.

Reduction Goal Setting: Responding to the national and international trend in GHG emission reduction, industries should establish voluntary GHG emission reduction goals, thereby acquiring the required carbon credits and ensuring sustainable development.

10 Work Side by Side……

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- Industrial Development Bureau, Ministry of Economic Affairs — www.moeaidb.gov.tw/
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- Department of Industrial Technology, Ministry of Economic Affairs — doit.moea.gov.tw/
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- Taiwan Industrial Greenhouse Office — proj.moeaidb.gov.tw/tigo/
- Emission Management and Guidance Project of Industrial Greenhouse Gases Net — proj.moeaidb.gov.tw/ghg/
- Industrial Greenhouse Gas Information Net, Environmental Protection Administration* — iggic.estc.tw/
- Eco-technology Assistance and Promotion Project — proj.moeaidb.gov.tw/eta/
- Industrial Greenhouse Gas Information* — proj.moeaidb.gov.tw/ghg/igic

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