



# Introduction to Greenhouse Gas Reduction Regulations

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01

## Foreign laws and regulations related to climate change

1. United Nations Framework Convention on Climate Change
2. Foreign relevant laws and objectives
3. The stated goals and schedules of the countries whose carbon reduction targets have entered into France

## United Nations Framework Convention on Climate Change

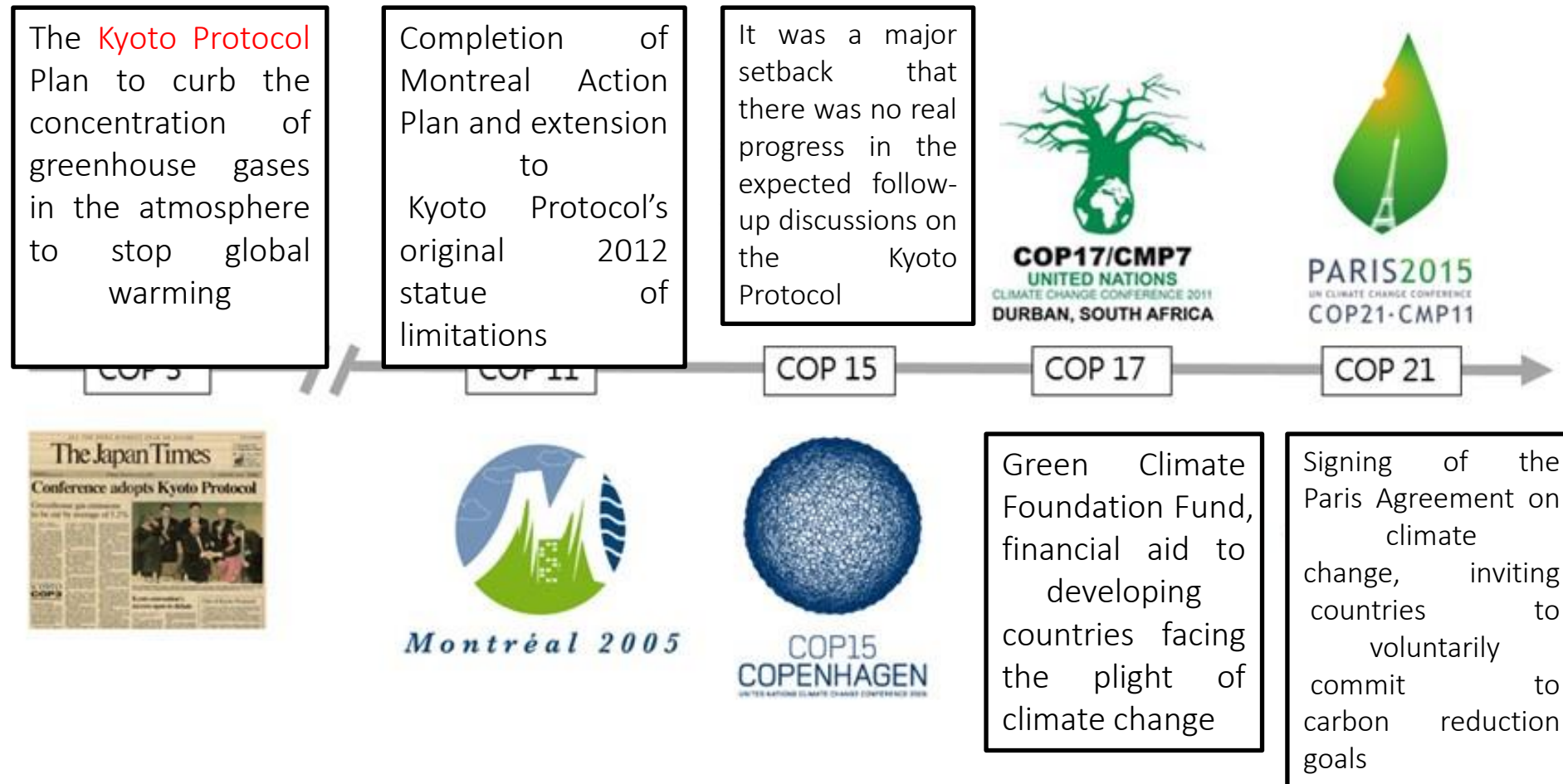
- United Nations Framework Convention on Climate Change (UNFCCC)
- Adopted at the United Nations Headquarters in New York in May 1992 and entered into force on March 21, 1994
- Article 2 of the Convention sets the ultimate goal: to stabilize the concentration of greenhouse gases in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system

- Enable ecosystems to adapt naturally to climate change
- Securing food production from threats
- The time frame that enables economic development to proceed sustainably
- The parties to the convention have met annually since 1995
  - Legal parties' meeting  
( Conferences of the Parties , COP )
  - Assessing progress against climate change ◦

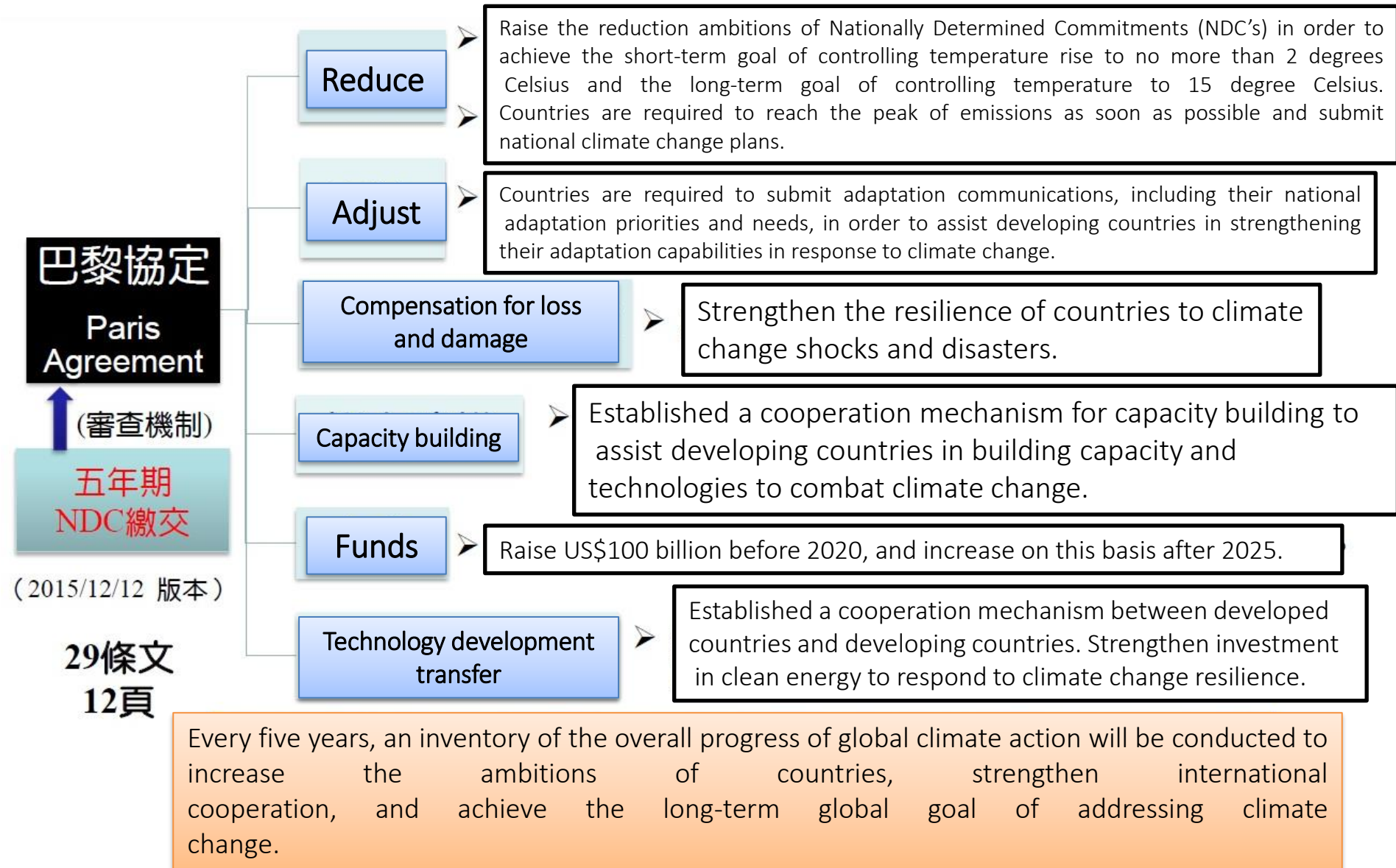
# Promotion of UN Framework Convention on Climate Change

(Nationally Determined Contributions, NDC)

Each country proposes its own greenhouse gas reduction goals and plans.



# COP21 Paris Agreement Highlights

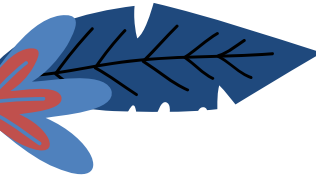


# (Glasgow Climate Pact)

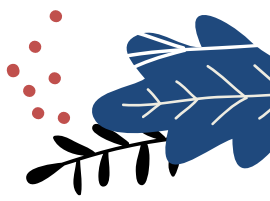
- COP26 in 2021
  - Glasgow Climate Agreement
  - [COP26: Everything you need to know](#)
  - **Reducing Coal Use, Funding Developing Countries to Adapt to Climate Change**







# COP27 Reaches Breakthrough Agreement on New “Loss and Damage” Fund for Vulnerable Countries



20 November 2022

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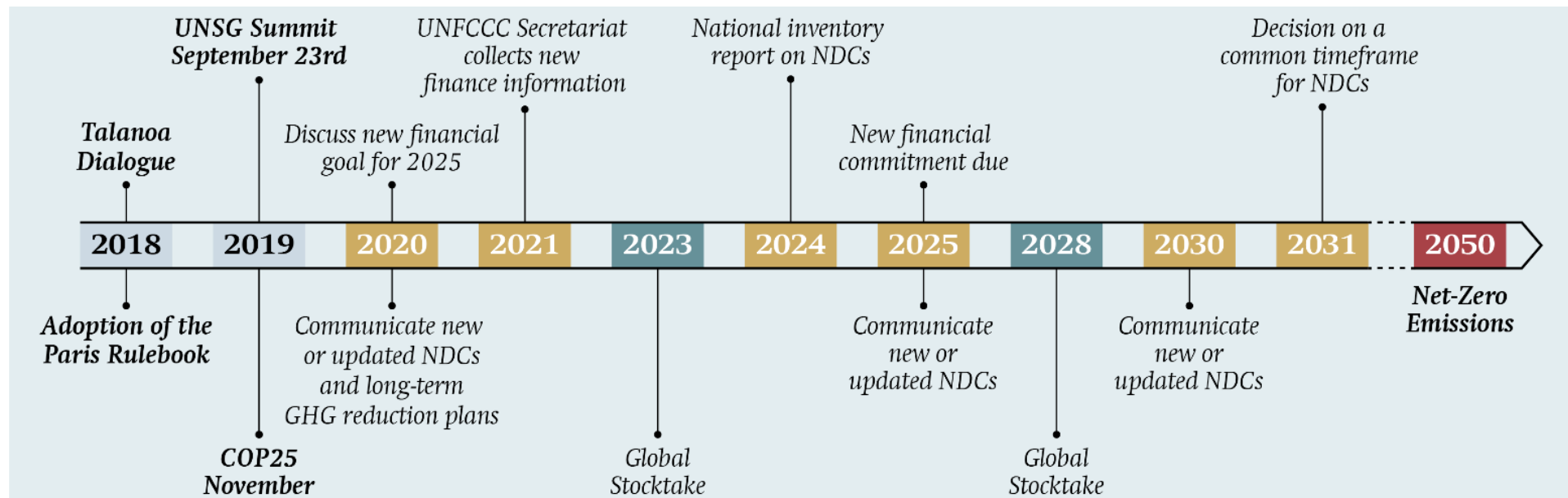
UN Climate Press Release



Establishment of a Global Fund for Loss and Damage  
Financial aid for poor countries that don't emit  
much carbon but suffer from climate catastrophe

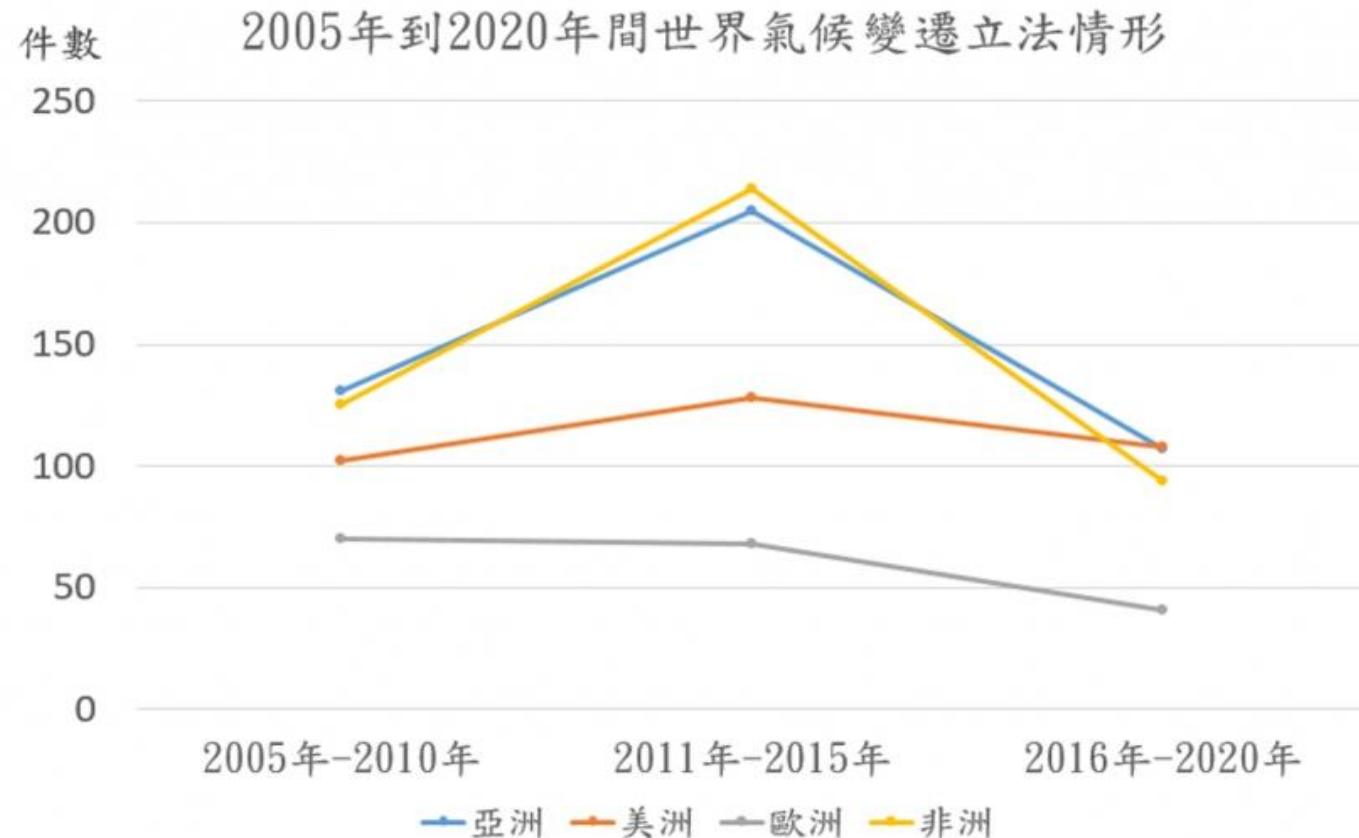
# The Future of the United Nations Framework Convention on Climate Change

- ✓ 2023\_ **Global Stocktake : Global Inventory**
- ✓ 2024\_ National Inventory Report on NDCs
- ✓ Greenhouse gas emissions from 1990 to present based on country determined Contributions
  - ✓ 2025\_ New Financial Commitment Due
  - ✓ Set new economic expiry commitments, discuss renewal of NDCs
  - ✓ 2028\_ **Global Stocktake : Global Inventory**
  - ✓ 2030\_ Communicate new or updated NDCs , **Discuss updating NDCs**
- ✓ 2031\_ Decision on a common timeframe for NDCs
- ✓ 2050\_ Net-Zero Emission



## Foreign relevant laws and objectives

- ✓ International think tank (Grantham Research Institute on Climate Change and the Environment )
- ✓ From 2005 to 2020, 1,774 climate change-related bills or policies were passed
- ✓ Legislative norms cooperate with mid- and long-term implementation plans to promote domestic low (no) carbonization or strengthen economic and environmental climate resilience as the main direction.




# The stated goals, schedules and goals of countries with carbon reduction targets

Nation	Bill name	法定目標
U.K.	The Climate Change Act 2008	100% reduction in 2050 compared to 1990 (originally 80%, revised upwards on June 27, 2019)
European Union	The Climate Energy Package Directive 2009	20% reduction in 2020 compared to 1990 (echoing the Copenhagen agreement)
	2011 "2050 Low Carbon Economy Roadmap"	40% reduction in 2030 compared to 1990, 60% reduction in 2040 compared to 1990, 80% reduction in 2050 compared to 1990
	2014 "2030 Climate and Energy Framework"	40% reduction in 2030 compared to 1990
	2018 "Long-term reduction strategy to 2050"	Reach carbon neutrality by 2050
Mexico	The Climate Change Act 2012	50% reduction in 2050 compared to 2000 (with target correction mechanism)
Switzerland	2013 "CO2 Law"	20% reduction in 2020 compared to 1990
Taiwan	2015 "Greenhouse Gas Reduction and Management Act"	50% reduction in 2050 compared to 2005 (with target correction mechanism)
France	2015 "Energy Transition Act towards Green Growth"	40% reduction in 2030 compared to 1990 75% reduction in 2050 compared to 1990
Finland	The Climate Change Act 2015	80% reduction in 2050 compared to 1990 (excluding emissions under the EU carbon trading system)
Sweden	The 2018 Climate Act	40% reduction in 2020 compared to 1990, 63% reduction in 2030 compared to 1990 75% reduction in 2040 compared to 1990 (excluding emissions under the EU carbon trading system) 0 net emissions in 2045
Netherlands	The 2019 Climate Act	49% reduction in 2030 compared to 1990, 95% reduction in 2050 compared to 1990
Germany	The Federal Climate Change Act of 2019	55% reduction in 2030 compared to 1990, carbon neutrality in 2050 compared to 1990



02

## Greenhouse Gas Management Act

1. Greenhouse Gas Reduction and Management Act
  2. Temperature tube method
  3. Stage control target
- 

# 1. Greenhouse Gas Reduction and Management Act

- ✓ Legislative principles
  - UNFCCC  
( United Nations Framework Convention on Climate Change, UNFCCC )
  - Undertake common but differentiated responsibilities, implement environmental justice, fulfill the responsibility of jointly protecting the earth's environment, and ensure the country's sustainable development.
  - ✓ Standardize my country's long-term reduction goals, government agencies' powers and responsibilities, greenhouse gas reduction countermeasures, and education and publicity
  - ✓ Domestic integration decision-making mechanism and a bridge to participate in international cooperation in the future
- ✓ Divided into 6 chapters, totaling 34 articles
  - ✓ Chapter 1 General Provisions 7 Articles
  - ✓ Chapter II Powers and Responsibilities of Government Agencies Eight Articles
  - ✓ Chapter Three Reduction Countermeasures 8 Items
  - ✓ Chapter IV Educational Propaganda and Rewards 4 Articles
  - ✓ Chapter V includes 5 penalties and Chapter VI includes 2 articles
- ✓ Promulgated by Presidential Decree on July 1, 2014

# Temperature management framework

## 溫室氣體減量及管理法 ( 六章、34條文 )



# Chapter 1: General Provisions

- ✓ Definition
  - ✓ Greenhouse gases
    - ✓ Carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF<sub>6</sub>), nitrogen trifluoride (NF<sub>3</sub>) and others Announced by the central competent authority.
    - ✓ Emission intensity: Refers to the carbon dioxide equivalent emitted by facilities, products, or other unit materials or output of emission sources.
  - ✓ Climate change
    - ✓ Adaptation: Refers to the adjustment of human systems to actual or expected climate change shocks or their impacts, in order to mitigate the harm caused by climate change or to take advantage of its beneficial situation. Adjustment includes preventive and reactive adjustment, private and public adjustment, autonomous and planned adjustment, etc.
    - ✓ Mitigation: refers to artificially reducing greenhouse gas emissions from emission sources or increasing greenhouse gas carbon sinks.
    - ✓ Carbon sink: Refers to trees, forests, soils, oceans, strata, facilities or places that absorb or store carbon dioxide or other greenhouse gases after continuous separation from emission units or the atmosphere.
  - ✓ Decrease
    - ✓ Redemption: Refers to the reduction credits produced by enterprises that adopt reduction measures, which are used to reduce emissions from emission sources.
    - ✓ Confirmation: Refers to the operation that the exchange project is reviewed by the inspection agency and confirms that the exchange project plan complies with the relevant provisions of this Act.
    - ✓ Verification: Refers to the operation of emission data or greenhouse gas reduction (including carbon sink) data verified by inspection agencies or on-site audits.
    - ✓ Inventory: Refers to the collection, calculation and analysis of emissions or carbon sinks.
    - ✓ Trading: Refers to the sale or exchange of emission credits at home and abroad during cap control.



# Chapter 1: General Provisions

- ✓ Contains the spirit of the Basic Law of the Environment
- ✓ Article 5 of the Temperature Management Law clearly stipulates that the management planning principles of relevant government laws and policies should include:
  1. In order to ensure national energy security, medium and long-term strategies for gradually reducing dependence on fossil fuels should be formulated, medium and long-term goals for renewable energy should be set, and **the vision of a non-nuclear homeland should be gradually implemented.**
  2. Adhering to the principle of environmental justice that **users pay**, the allocation of greenhouse gas emission quotas should be gradually planned from free allocation to allotment.
  3. Promoting the tax and fee mechanism for imported fossil fuels based on carbon dioxide equivalents to respond to climate change, and implement the principle of neutrality to promote social welfare.
  4. Actively assist traditional industries in energy conservation and carbon reduction or transformation, develop green technologies and green industries, create new employment opportunities and a **green economic system, and promote low-carbon green growth plans for national infrastructure.**
  5. **Improve resource and energy utilization efficiency** and promote resource recycling to reduce environmental pollution and greenhouse gas emissions.

# Chapter 1: General Provisions

- ✓ Domestically legalize the spirit of the United Nations Framework Convention on Climate Change
- ✓ Article 6 of the Temperature Management Law stipulates that the basic principles of greenhouse gas management programs or plans include:
  1. The formulation of national reduction goals and schedules should fulfill the common but differentiated international responsibilities of the United Nations Framework Convention on Climate Change, while taking into account the sustainable development of our country's environment, economy, and society.
  2. The establishment of sector-specific phase control objectives shall take cost-effectiveness into consideration and ensure that greenhouse gas reduction effects are achieved at the lowest possible cost.
  3. Actively take preventive measures to predict, avoid or reduce the causes of climate change, and mitigate its adverse effects.
  4. Actively strengthen international cooperation to maintain the international competitiveness of industrial development.

## Chapter II: Powers and Responsibilities of Government Organizations

- ✓ Article 8 of the Temperature Control Law: The promotion of greenhouse gas reduction and climate change adaptation is divided into 17 items

### 溫室氣體減量及管理法

#### 第8條 中央有關 機關推動 溫室氣體 減量、氣 候變遷調 適之事項

➢ 行政院105年6月24日召開「推動溫室氣體減量、氣候變遷調適事項分工整合會議」確立溫管法第8條推動事項之部會分工及第9條各部門別之中央目的事業主管機關。

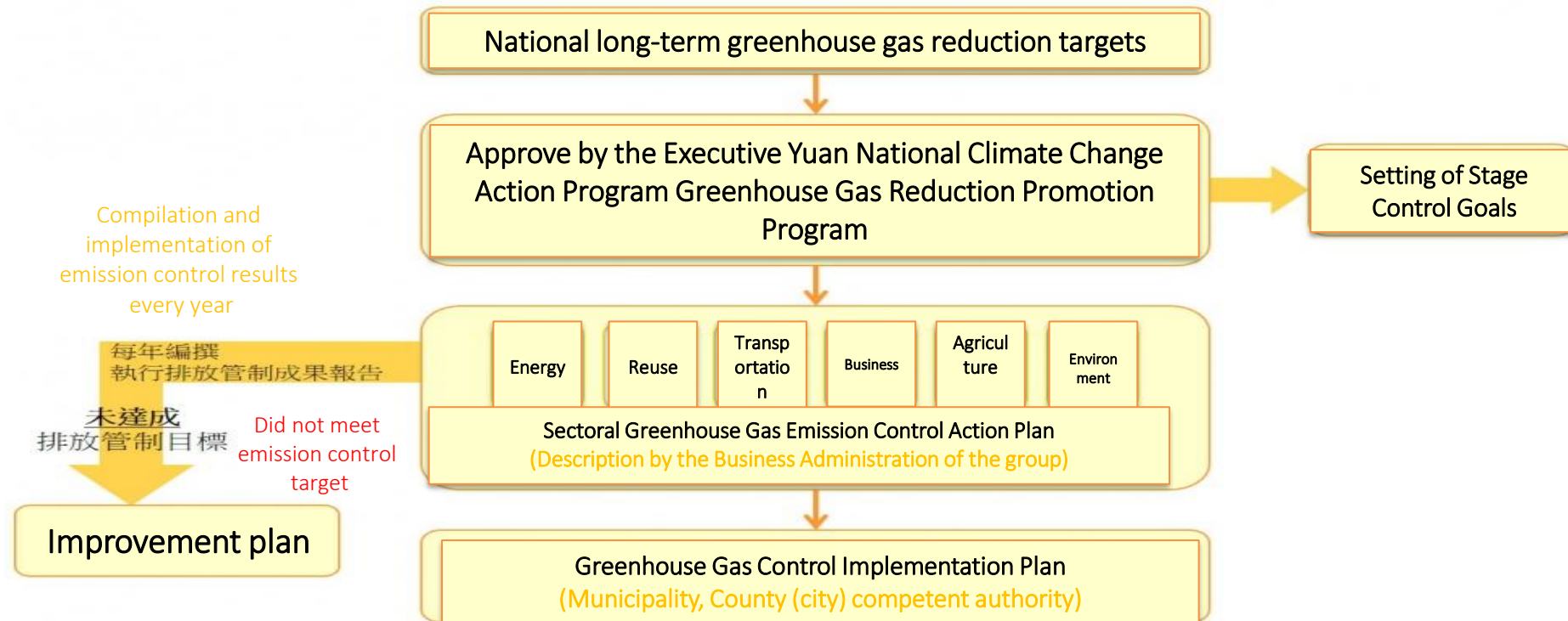
	推動事項	主辦機關	協辦機關
1	再生能源及能源科技發展	經濟部	科技部
2	能源使用效率提昇及能源節約	經濟部	各目的事業主管機關
3	工業部門溫室氣體減量	經濟部	科技部
4	運輸管理、大眾運輸系統發展及其他運輸部門溫室氣體減量	交通部	經濟部
5	低碳能源運具使用	交通部	經濟部、環保署
6	建築溫室氣體減量管理	內政部	經濟部
7	廢棄物回收處理及再利用	環保署	各目的事業主管機關
8	森林資源管理、生物多樣性保育及碳吸收功能強化	農委會	內政部
9	農業溫室氣體減量管理及糧食安全確保	農委會	-
10	綠色金融及溫室氣體減量之誘因機制	國發會	金管會、財政部
11	溫室氣體減量對整體經濟衝擊評估及因應規劃	國發會	經濟部
12	溫室氣體總量管制、抵換、拍賣、配售、交易制度之建立及國際合作減量機制之推動	環保署	經濟部、金管會、外交部
13	溫室氣體減量科技之研發及推動	經濟部	科技部
14	國際溫室氣體相關公約法律之研析及國際會議之參與	環保署	各目的事業主管機關
15	氣候變遷調適相關事宜之研擬及推動	國發會、環保署	各目的事業主管機關
16	氣候變遷調適及溫室氣體減量之教育宣導	環保署、教育部	各目的事業主管機關
17	其他氣候變遷調適及溫室氣體減量事項	環保署	-

# Chapter II: Powers and Responsibilities of Government Organizations

	Items promoted by Article 8 of the Temperature Control Law	Greenhouse Gas Emission Control Action Plan (Sectoral)	Central Target Business Authority
1	Renewable energy and energy technology development	Energy Sector	Ministry of Economic Affairs
2	Improve energy efficiency and save energy		
3	Greenhouse gas reduction in the industrial sector	Manufacturing Sector	Ministry of Economic Affairs Ministry of Science and Technology
4	Transport management, mass transport development and other transport sector green house reductions	Transport Sector	Ministry of Communications
5	Low carbon energy transport use		
6	Building Greenhouse Gas Reduction Management	Residential and commercial sector	Ministry of Interior Ministry of Economic Affairs
7	Waste recycling and reuse	Environment Sector	Environmental Protection Agency
8	Forest resource management, biodiversity conservation and carbon sequestration enhancement	Agricultural Sector	Council of Agriculture
9	Agricultural greenhouse gas reduction management and food security assurance		

# Central and local layered promotion

- ✓ Article 9 of the Temperature Control Act
  - ✓ The central government formulated the "National Action Plan for Responding to Climate Change" and the "Promotion Plan for Greenhouse Gas Reduction",
  - ✓ The central authority in charge of targeted businesses formulates the "Greenhouse Gas Emissions Control Action Plan" for each department.
  - ✓ Municipal and county (city) competent authorities must revise the "Greenhouse Gas Control Implementation Plan" based on the aforementioned promotion plan and action plan (Article 15)
  - ✓ The temperature control law establishes a greenhouse gas management fund for the central and local governments to jointly promote reduction and adjustment work.



# Chapter Three: Reduction Countermeasures

## ✓ **Phase Management Strategy**

### ✓ Step1

- ✓ Grasp the emissions of major emission sources through the inventory registration system
- ✓ Incentive and subsidy mechanism to encourage voluntary reduction actions
- ✓ Formulate emission source efficiency standards and relevant voluntary reduction incentive mechanisms to encourage businesses to reduce emissions as soon as possible

### ✓ Step2 : Promote implementation

- ✓ Develop a schedule for promoting the cap-and-trade system
- ✓ Announce emission sources in stages and set stage-by-stage total emission targets
- ✓ Through flexible mechanisms such as transactions and project swaps, the implementation is promoted phase by phase.

法源依據

空氣污染防制法

溫室氣體減量及管理法

強制盤查登錄  
自願減量

效能標準獎勵

總量管制及  
排放交易

規範對象

- 特定產業
- 排放量達25,000公噸CO<sub>2</sub>e之排放源

- 經公告之排放源

- 分配減量責任予排放源所屬事業

管理措施

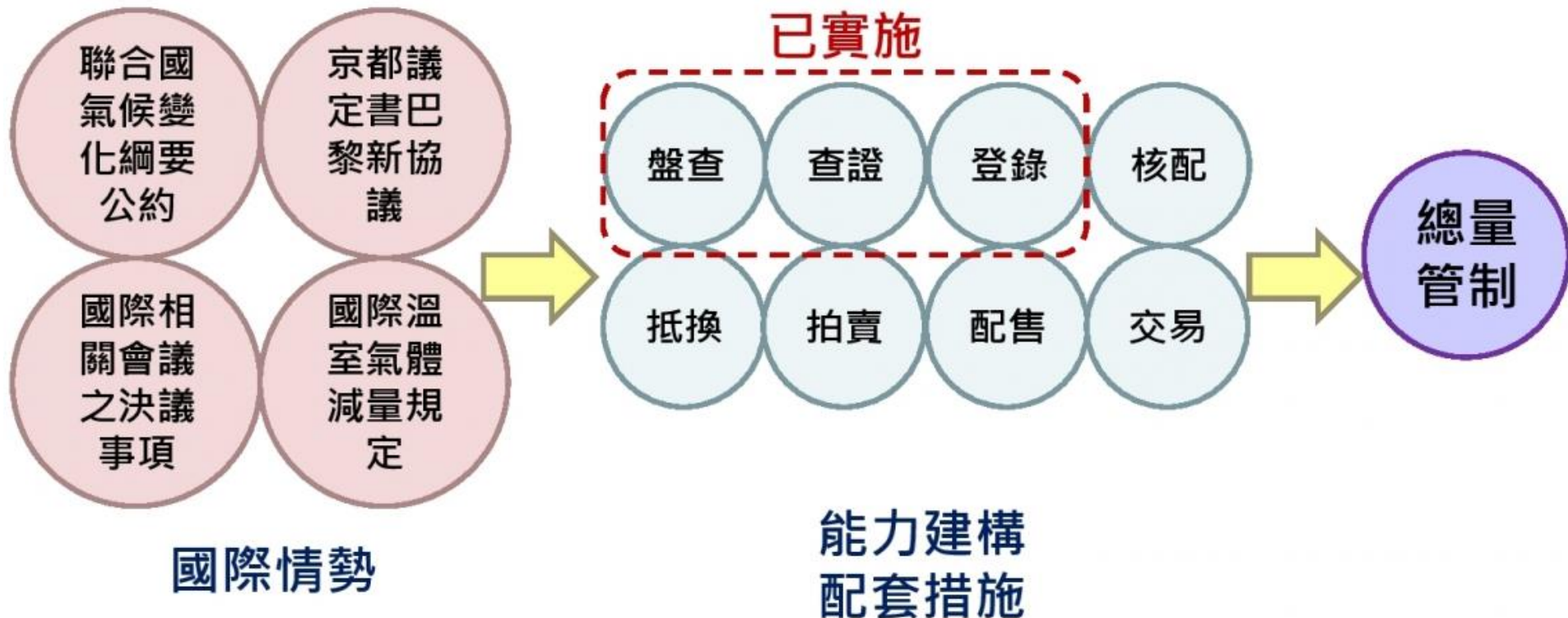
- 排放量定期申報
- 查驗機構管理機制
- 先期專案抵換專案

- 訂定效能標準獎勵
- 鼓勵未公告之排放源自願減量行動

- 公告納管排放源逐步從免費核配到有價配售方式規劃
- 建置排放額度拍賣及交易機制

# Greenhouse Gas Cap and Emissions Trading

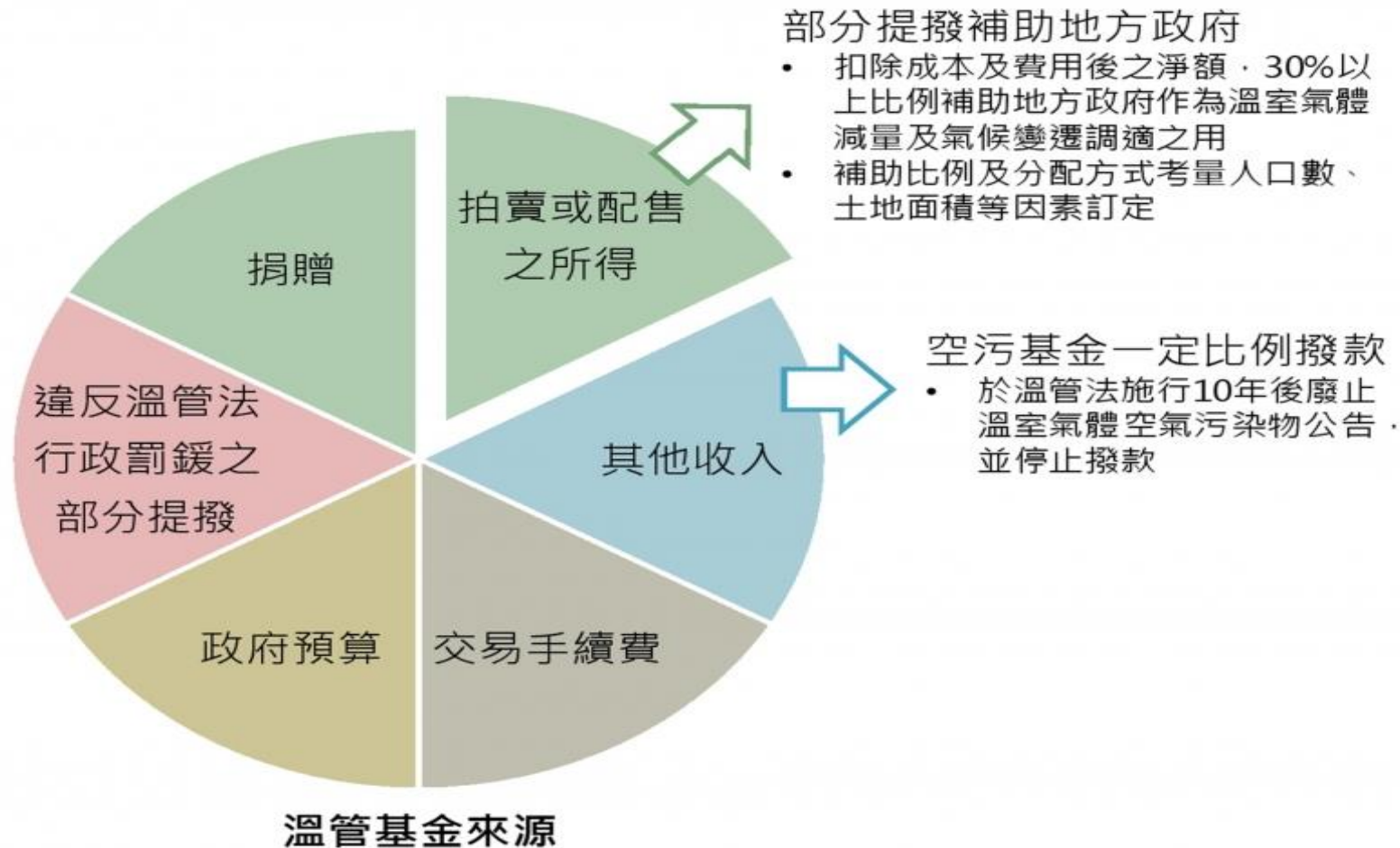
- ✓ Article 18 of the Temperature Control Act
  - ✓ After the country considers the international situation and completes the domestic supporting system, it should report to the Executive Yuan to announce the implementation of total greenhouse gas control.
  - ✓ Set limits on total greenhouse gas emissions for businesses
  - ✓ Reach the reduction target at a lower cost through reduction, exchange and trading.





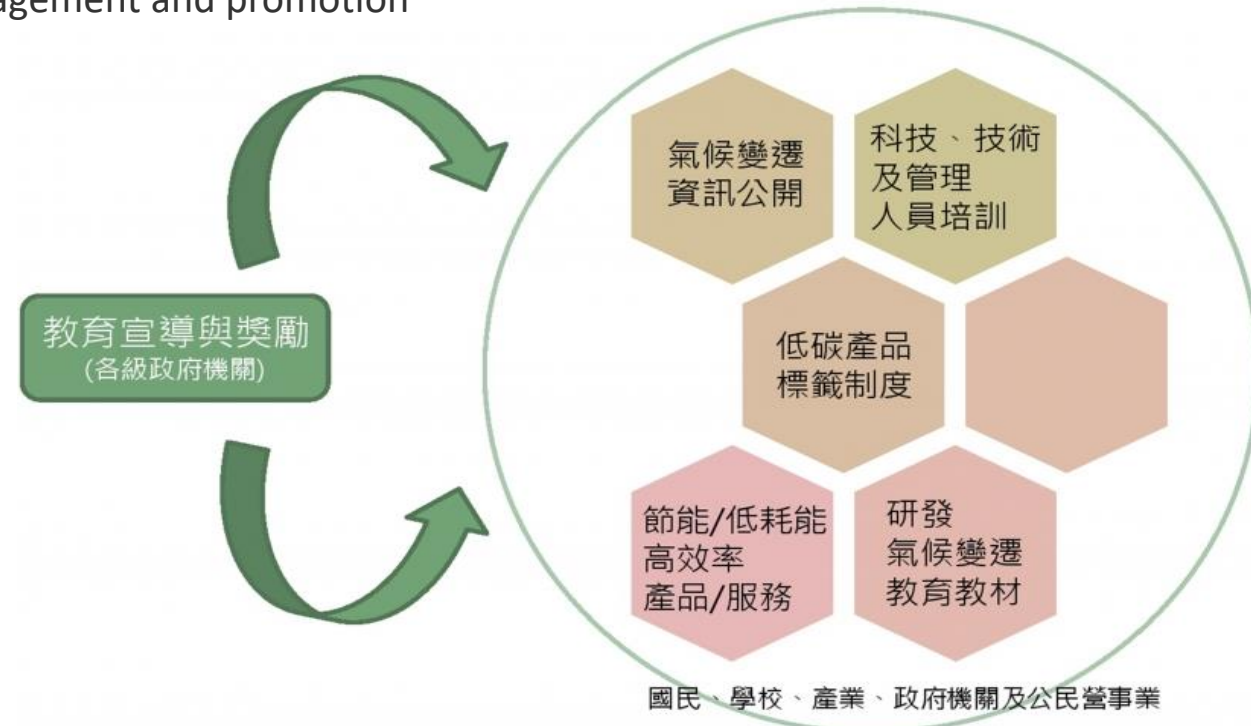
# Greenhouse Gas Management Fund

- ✓ Article 19 Greenhouse Gas Management Fund of the Temperature Control Act
  - ✓ No less than 30% of the net proceeds from auction or allotment after deducting its costs and expenses shall be subsidized to municipalities, counties and cities for greenhouse gas reduction and climate change adaptation.



## Chapter Four: Educational Publicity and Rewards

- ✓ Article 24: Requires government agencies at all levels to promote and assist non-governmental organizations to promote
- ✓ Article 25: Government agencies at all levels, public schools and public institutions shall publicize and promote energy conservation and the use of products or services with low energy consumption and high energy efficiency
- ✓ Article 26: Providers of all kinds of energy should be committed to advocating and encouraging users to save energy and improve energy efficiency
- ✓ Article 27: The central government rewards or subsidizes climate change adaptation or greenhouse gas research, management and promotion



## Chapter V: Penalties

管制對象	條次	違反內容	處罰機制
事業	第 28 條	於移轉期限日，帳戶中未登錄足夠供扣減之排放額度	每公噸超額量處碳市場價格三倍之公噸上限為新台幣 1500 元
排放源或事業	第 29 條	登錄不實之排放量	新台幣 20 萬元以上，200 萬元以下 期改善
排放源或事業	第 30 條	規避、妨礙或拒絕主管機關或目的事業主管機關之檢查或要求提供資料	新台幣 20 萬元以上，200 萬元以下 得按次處罰
排放源或事業	第 32 條	違反交易對象、使用條件或使用期限	新台幣 10 萬元以上，100 萬元以下
查驗機構	第 31 條	違反資格條件、許可事項及執行查證	新台幣 10 萬元以上，100 萬元以下 通知限期改善
查驗機構	第 31 條	違反盤查、登陸內容及頻率之管理規定	新台幣 10 萬元以上，100 萬元以下 再通知限期補正

## Chapter V: Penalties

管制對象	條次	違反內容	處罰機制
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## 2. Temperature tube method related sub-method

- ✓ According to the temperature control law, 12 regulations and orders and 5 administrative rules are implemented
  - ✓ Promote Greenhouse Gas Reduction Strategies
    - National Climate Change Action Plan
    - Greenhouse gas reduction promotion plan
    - Stage control target
    - Greenhouse gas emission control action plan for the six major greenhouse gas emission sectors, including energy, manufacturing, transportation, housing and commerce, agriculture, and the environment
  - ✓ Management of business emission sources
    - ✓ Promote the emission source inventory inspection and registration system
    - ✓ Construct a measurable, reportable and verifiable carbon emission management mechanism
  - ✓ Encourage enterprises to adopt reduction actions as early as possible
    - ✓ Refer to the spirit and practice of the United Nations Clean Development Mechanism (Clean Development Mechanism, CDM)
    - ✓ Businesses that adopt voluntary greenhouse gas reduction measures shall issue reduction quotas based on actual reduction situations

## 2. Correlation sub-method of temperature tube method

	Sub-method name	Source of temperature management method	Published/Revised Date
Regulation Orders	<a href="#">Greenhouse Gas Reduction and Management Act Enforcement Rules</a>	Article 33	Released on 105.01.16
	<a href="#">Greenhouse gas phase control objectives and control methods operating guidelines</a>	Article 11	Released on 106.03.28
	<a href="#">Greenhouse Gas Emissions Inventory and Registration Management Measures</a>	Article 16	Released on 105.01.05
	<a href="#">The first batch of emission sources that should check and register greenhouse gas emissions</a>	Article 16	Released on 105.01.07
	<a href="#">Management Measures for Greenhouse Gas Certification Institutions and Inspection Institutions</a>	Article 16	Released on 105.01.07
	<a href="#">Management Measures for Greenhouse Gas Offset Projects</a>	Article 22	Released on 104.12.31 Released on 107.12.27
	<a href="#">Measures for Incentives for Greenhouse Gas Emission Sources Complying with Efficiency Standards</a>	Article 22	Released on 106.03.15 Released on 108.01.11
	<a href="#">Greenhouse gas management fund revenue and expenditure storage and use method</a>	Article 19	Released on 105.01.30
	<a href="#">Incentives for reducing greenhouse gas emissions from general waste landfills</a>	Article 27	Released on 104.12.25
	<a href="#">Incentives for low-carbon products</a>	Article 27	Released on 106.07.10
	<a href="#">Operation method for subsidizing greenhouse gas reduction management and climate change adaptation research and development plan</a>	Article 27	Released on 107.11.13
	<a href="#">Establish or change the scale of greenhouse gas emission sources</a>	Article 20	Released on 107.12.19

## 2. Correlation sub-method of temperature tube method

Classification	Sub-method name	Source of temperature management method	Published/Revised Date
Administrative rules	<a href="#">Implementation Points of Credit Guarantee for Low-Carbon Sustainable Homeland Project of the Environmental Protection Agency of the Executive Yuan</a>	-	Released on 103.09.04
			Released on 103.10.29
			Released on 105.03.11
			Released on 106.02.23
			Released on 108.05.28
	<a href="#">Key Points of the Review Committee for the Recognition of Greenhouse Gas Reduction Achievements of the Environmental Protection Agency of the Executive Yuan</a>	Article 22	Established on 105.01.04
			Fixed 105.09.09
			Fixed 108.08.26
	<a href="#">Greenhouse gas phase control target advisory committee setting points</a>	Article 11	Released on 105.01.28
			Fixed 105.05.17
			Fixed 106.02.14
	<a href="#">Key Points of the National Greenhouse Gas Emissions Inventory Review Meeting</a>	Article 13	Released on 105.10.11
			Fixed 106.02.14
	<a href="#">National Climate Change Action Plan</a>	Article 9	Approved by the Executive Yuan
106.2.23			
<a href="#">Greenhouse gas reduction promotion plan</a>	Article 9	Approved by the Executive Yuan	
		107.03.22	
<a href="#">Sectoral Greenhouse Gas Emission Control Action Plan</a>	Article 9	Approved by the Executive Yuan	
		107.10.03	
<a href="#">Key Points for Coding Greenhouse Gas Emission Credits</a>	Article 3	Released on 108.05.22	

### 3. Phase Control Objectives

- ✓ Reach the national long-term greenhouse gas reduction target stipulated in Article 4 of the Temperature Management Law
  - ✓ Reduce greenhouse gas emissions by 139 (2050) to below 50% of 94 (2005) greenhouse gas emissions
- ✓ Article 11 of the Temperature Control Law: Five years as a phase
  - ✓ The central competent authority consults with the central target industry competent authority to set the control objectives at each stage
- ✓ Control objectives of Article 3, Paragraph 20 of the Temperature Control Act
  - ✓ According to the national greenhouse gas reduction promotion plan, the total amount of carbon dioxide emissions within a certain period of time is controlled.
- ✓ National Greenhouse Gas Reduction Target Planning (Base Year 2005)
  - ✓ The first phase (2016-2020) goal: reduce to 260.717 million metric tons of carbon dioxide equivalent by 2020
    - ✓ 2% reduction compared to the base year (94 years)
  - ✓ The second phase (2021-2025) goal: to reduce to 241.011 million metric tons of carbon dioxide equivalent in 2025
    - ✓ 10% reduction compared to the base year (94 years)
  - ✓ The third phase (2026-2030) goal and vision: maintain a reduction of 20% in 2030 as the direction of efforts, rolling review



# Management Measures for Greenhouse Gas Offset Projects

- ✓ The Environmental Protection Agency revised and issued the "[Greenhouse Gas Offset Management Measures](#)" on December 27, 2017
  - ✓ Micro-Scale Trade-In Program Category
    - ✓ The total installation capacity of renewable energy is less than 5,000 watts, the electricity saving is less than 20 million kWh/year, or the total reduction of greenhouse gas emissions is less than 20,000 metric tons of CO<sub>2</sub>e/year
    - ✓ The applicant only needs to demonstrate that the reduction is not a matter to be followed by the regulations.
    - ✓ Simplify application process




溫室氣體抵換專案管理辦法

1-2	法源依據及專有名詞
3	抵換專案類型及申請資格
4	抵換專案申請程序及查證作業規定
5-6	減量額度帳戶申請程序及審查規定
7-8	計畫型抵換專案申請註冊之規定
9-10	計畫型抵換專案申請減量額度之規定
11-12	方案型抵換專案申請註冊之規定
13-14	方案型抵換專案申請減量額度之規定
15-16	減量方法認可申請及審查規定
17	已註冊之抵換專案申請變更之應遵循事項
18	申請案件審查及補正時間之規定
19	減量績效換算額度與其編碼規定
20	審議會授權機制
21	減量額度用途之規定
22	本法及本辦法施行前之追認規定



## 03

### Program of Action and Planning

1. National Climate Change Action Plan
  2. Greenhouse gas reduction promotion plan
  3. Sectoral Greenhouse Gas Emission Control Action Plan
  4. Greenhouse Gas Control Implementation Plan and Results Report
  5. Industrial Greenhouse Gas Management
- 

# 1. National climate change action plan

- ✓ Legal basis: drafted by Article 9, Item 1 of the Temperature Control Law  
Approved by the Executive Yuan on February 23, 106
  - ✓ Clearly promote the general policy of **greenhouse gas mitigation and climate change adaptation policies**
  - ✓ The Action Program takes into account the Paris Agreement and the United Nations 2030 Sustainable Development Goals and upholds the spirit of balancing mitigation and adaptation,
  - ✓ List 10 basic principles of my country's response to climate change
- ✓ Connotation
  - ✓ Greenhouse Gas Reduction in 6 Major Sectors
  - ✓ 8 major areas of climate change adaptation and policy support, and start cross-departmental response actions
- ✓ Goal: Improve my country's ability to adapt to climate change and achieve my country's long-term greenhouse gas reduction goals to ensure sustainable development of the country

# 國家因應氣候變遷行動綱領

## 前言

- 氣候變遷未來情境與衝擊挑戰
- 公約因應
- 溫管法落實

## 願景及目標

- 願景：  
綠色低碳家園、國家永續發展
- 目標：  
健全氣候變遷調適能力、達成溫室氣體長期減量目標

## 基本原則

- 國際公約
- 決策透明
- 綠色金融
- 非核家園
- 減緩調適
- 預警能力
- 資源循環
- 協力夥伴
- 國際合作
- 全民參與

## 政策內涵

- 調適策略：  
防災風險治理、維生基礎韌性、國土安全管理、產業調適能力等
- 減緩策略：  
能源結構調整、綠色產業、低碳運輸、永續建築及農業、能資源循環利用等
- 政策配套

## 後續推動

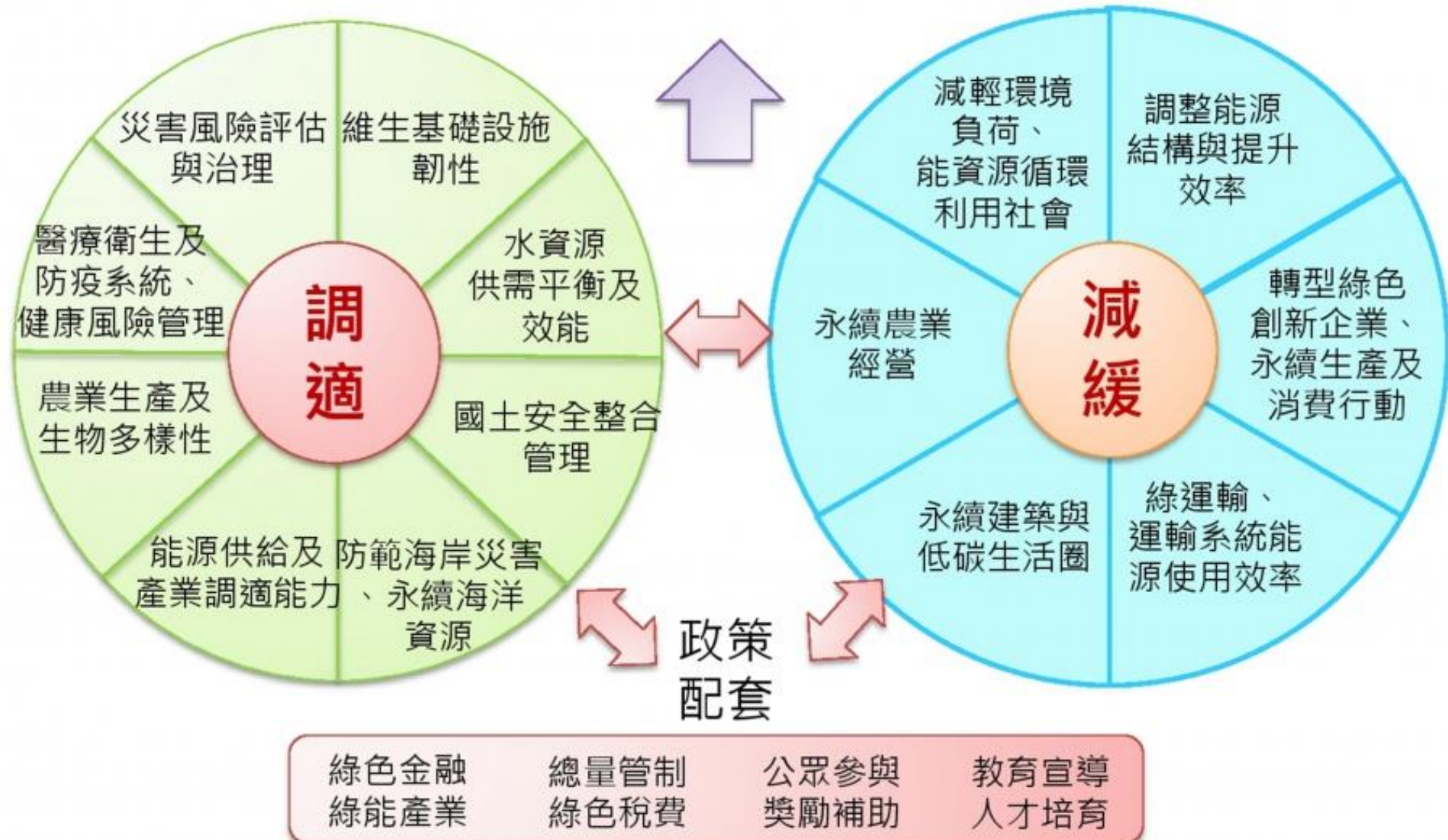
- 五年定期檢討
- 橫向縱向整合

## Basic principles and policy connotations

- ✓ **The basic principle:** Announcing policy directions for addressing climate change
  - ✓ Follow the Paris Agreement, the Montreal Protocol Kigali Amendment
  - ✓ Consider the co-benefits of various environmental issues → Promote green finance and carbon pricing mechanism, vision of non-nuclear homeland
  - ✓ Incorporate adaptation and mitigation strategies into environmental impact assessment considerations, resilient development, and international standards.
- ✓ **Policy connotation**
  - ✓ Eight domains of climate change adaptation
  - ✓ Six Sectors for Greenhouse Gas Mitigation
  - ✓ Respond to the opinions of all walks of life and strengthen policy support for public participation, green finance, carbon pricing, and education and publicity.

# Basic principles and policy connotations

## 永續發展、綠色成長



# Greenhouse gas reduction promotion plan

- ✓ On January 10, 2022, the Executive Yuan approved the "Second Phase (110-114) Greenhouse Gas Reduction Promotion Plan"
- ✓ Promote the content of the program
  - ✓ Stage control target
  - ✓ Specific reduction strategies for the six major sectors of energy, manufacturing, transportation, housing and commerce, agriculture, and the environment
  - ✓ Clearly divide the division of powers and responsibilities of the various central ministries and committees in terms of greenhouse gas reduction and capacity building promotion
- ✓ Achieving long-term greenhouse gas reduction targets
  - ✓ Integrating cross-ministerial meetings can jointly promote carbon reduction
  - ✓ Through the joint efforts of the central and local governments, and the participation of the industry and the public, implement various specific actions for reduction



## 推動方案

### 前言

- 推動方案定訂目的及依據

### 階段管制目標

- 114年國家及部門別溫室氣體排放量及電力排放係數階段目標
- 第二期（110-114年）國家及部門別溫室氣體排放總當量

### 機關權責分工

- 依溫管法第8條部會權責分工

### 推動策略

- 依行動綱領政策內涵展開，包括：
  - 1.訂定部門別及政策配套重要評量指標
  - 2.六大部門減量策略
  - 3.八大政策配套

### 預期效益

- 完備法規制度、落實具體行動、達成減量目標
- 實現社會、經濟、環境之永續發展

### 執行管考

- 透過推動方案、行動方案、地方執行方案具體落實
- 搭配階段管制目標執行狀況報告、成果報告、改善計畫管考

## Six departments to promote strategies

### 能源部門

- 規範及落實用電大戶設置一定比例再生能源發電設備，低壓電錶布建數量300萬具。

### 製造部門

- 強化產業責任，訂定減碳目標，推動產業低碳轉型。

### 運輸部門

- 新增119年新能源機車占新售車比率35%，兼顧傳統汽機車產業轉型，並建置基礎電網設施及健全充（換）電場站。
- 提升無縫轉乘便利性，行塑人本運輸使用環境。

### 住商部門

- 評估淨零耗能可行性，研議評估工具及推動制度。
- 增修「新建築物節約能源設計標準」條文，納入中央空調系統設計基準。
- 鏈結地方政府、企業與公協會等機關團體，共同推動服務業溫室氣體自主減量。

### 農業部門

- 維護國家糧食安全，強化能資源使用效率及自然環境碳匯能力。
- 「農業為本，綠能加值」，在不影響農漁民權益、產業及環境下，推動農業綠能。

### 環境部門

- 落實能資源循環利用及開創共享經濟社會，提升區域能資源再利用。
- 推展污（廢）水處理回收甲烷回收設施，研訂法規或政策配套。

# Implement the evaluation indicators of the six major departments and strive to achieve the reduction target

## 能源部門

- 再生能源設置量
- 114年30,161MW

## 製造部門

- 碳密集度
- 114年較94年下降55%
- 119年較94年下降60%

## 農業部門

- 有機及友善耕作面積
- 114年達22,500公頃
- 輔導畜牧場沼氣再利用(發電)，其總頭數至114年維持250萬頭
- 造林面積
- 105至114年完成造林6,600公頃

## 運輸部門

- 全國公共運輸運量
- 114年較104年成長11.5%以上
- 119年較104年成長20%以上
- 車廠全年銷售新車加權平均能效容許值114年較106年提升
- 小客車新車提升38%以上
- 小貨車新車提升20%以上
- 機車新車提升10%以上
- 新能源機車占比
- 119年新能源機車占新售車比率35%

## 住商部門

- 公部門建築用電效率
- 114年較104年改善10%
- 增修「新建築物節約能源設計標準」條文，納入中央空調系統設計基準
- 114年研議建立建築能源資料庫，發展建築能源護照。

## 環境部門

- 全國污水處理率
- 114年達70%
- 大型污水廠污泥處理採厭氧消化比例
- 114年提升至90%

## Eight supporting policies

推動溫室氣體總量管制

掌握排放源基線資料，並建構總量管制及排放交易制度。

推動綠色稅費制度

研議開徵能源稅或碳稅之可行性，建立與相關稅費之競合評析及整合配套機制。

綠色金融及綠能產業發展

推廣綠色融資及綠色債券，活絡民間資金運用，引領綠能產業發展，促進低排放韌性建構。

因應溫減對經濟衝擊及減量科技研發

評估溫室氣體減量對整體經濟衝擊影響，並推動溫室氣體減量科技研發。

建立資訊管道並提供獎勵補助

建立民眾易取得之氣候變遷資訊管道，提供獎勵或補助措施，促進全民行為改變。

培育人才及提升全民認知與行動力

推廣氣候變遷環境教育，培育因應氣候變遷人才，提升全民認知、技能及行動力。

檢討修正溫室氣體減量相關法規

檢視推動制度障礙，並盤點與溫減相關之管制與獎勵機制，整合並擴大推動作為。

健全氣候變遷減緩財務機制

盤點相關基金來源、用途與金額，運用於推動氣候變遷減緩事項。

## 完善八大政策配套，建構減量基礎能力。

### 溫室氣體總量管制

- 109年前完成總量管制法規建置
- 預計114年前啟動總量管制

### 綠色金融

- 109年完備促相關法規及配套制度之研議

### 綠色稅費

- 配合國內減碳路徑，研議綠色稅費相關經濟誘因制度

### 健全財務機制

- 109年完成可運用基金盤點
- 114年前完成能源及溫室氣體減量相關基金之執行成效報告

### 檢討修正相關法規

- 109年完成各部門主管機關法規盤點
- 114年完成法規障礙排除、整合管制及獎勵工具

### 減量經濟衝擊及科技研發

- 109年前完備溫室氣體減量對整體經濟衝擊評估
- 114年完成溫室氣體減量科技先導試驗及實場應用

### 建立資訊管道並提供獎勵補助

- 109年暢通氣候變遷資訊管道，辦理網路推廣
- 114年前各目的事業主管機關完成研訂鼓勵溫室氣體研究、節能減碳等相關獎勵或補助辦法

### 培育人才及提升全民認知

- 109年完成調查全民氣候變遷認知程度
- 114年完備中央與地方政府機關因應氣候變遷專責單位及人力

### 3. Sector-specific GHG emission control action plans

- ✓ Article 9 of the Temperature Control Act
  - ✓ The central authority in charge of target enterprises should **formulate departmental greenhouse gas emission control action plans** based on the promotion plan
  - ✓ Implement and implement greenhouse gas reduction work
- ✓ Sectoral action plan
  - ✓ **Sectoral greenhouse gas emission control goals, schedule, and measures with economic incentives.**
- ✓ Brief introduction to the action plans of each department
  - ✓ **Energy**
  - ✓ **Manufacture**
  - ✓ **Transportation**
  - ✓ **Business**
  - ✓ **Agriculture**
  - ✓ **Environment**

### 能源部門

- 修正**再生能源發展條例**，完善再生能源推動法制環境
- 提高**再生能源發電裝置容量**
- 提高**液化天然氣卸收容量**
- 推動**能源產業能源查核與自願性減量措施**，提高能源轉換與使用效率

### 運輸部門

- 發展公共運輸系統，**加強運輸需求管理**
- **推廣低碳運具**使用，建置綠色運具導向之交通環境
- 提升運輸系統及**運具能源使用效率**

### 農業部門

- 推廣**有機與友善環境耕作**
- 推廣**畜牧場沼氣再利用**(發電)
- **造林**及加強森林經營



### 住商部門

- 提昇新建建築物之**建築外殼節約能源設計基準值**
- 強化**既有建物減量管理**
- **規劃建構**服務業部門各目的事業主管機關**減碳能力**
- **公部門建築用電效率提升**

### 製造部門

- 輔導產業轉型為**綠色低碳企業**，發展**綠能產業**
- 建立完善溫室氣體減量誘因，加強**產業減量措施**
- 建立民眾永續消費習慣，促使產業調整為**永續生產製程**

### 環境部門

- 提升**全國污水處理率**
- 加強廢棄物掩埋場及事業廢水之**甲烷回收**
- 執行物料永續循環，推動**能資源循環利用**
- 建構溫室氣體減量**法規及配套機制**
- 推動**氣候變遷人才培育**
- 協力推動**綠色金融**

## 4. Greenhouse gas control implementation plan and results report

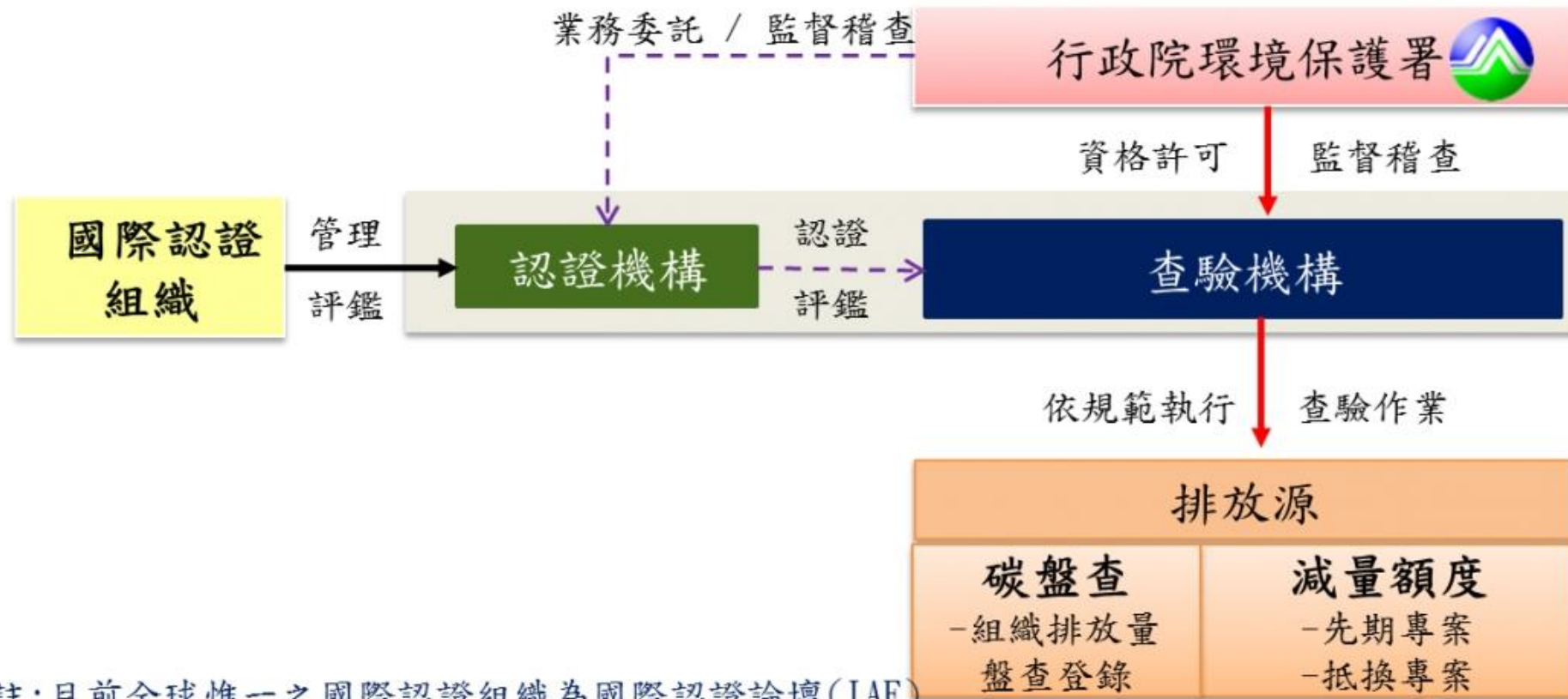
- ✓ Article 15 of the Temperature Control Act
  - ✓ The competent authorities of municipalities, counties and cities shall revise and revise the implementation plan of greenhouse gas control according to the promotion plan and departmental action plan, and submit it to the central competent authority for approval after consultation with the central competent authority for target industries.
- ✓ Achievement
  - ✓ The implementation plan of 22 counties and cities has been approved and completed in 2019
  - ✓ In 2021, the latest annual executive achievement report was published.
- ✓ In principle
  - ✓ Based on local characteristics, develop strategies tailored to local conditions
  - ✓ Focusing on people's livelihood issues, give priority to promoting actions in the housing, commercial and transportation sectors
  - ✓ Prioritize strategies that are executable, quantifiable, and cost-effective
  - ✓ Promoting civic engagement and expanding public-private partnerships
  - ✓ The central government and the local government work together to implement the implementation through local governance
  - ✓ Promotion of cross-office integration and clear division of labor in the organization
- ✓ Implementation plans and results reports of counties and cities



# 5. Industrial greenhouse gas management

- ✓ Greenhouse Gas Reduction and Management Act Chapter 3 Reduction Measures (Articles 16 to 23)
  - ✓ Inventory of emissions from emission sources, setting of performance standards before the implementation of total amount control, and setting of total amount control goals.
- ✓ Enterprise implementation stage management strategy
- ✓ The central competent authority grasps the emissions of major emission sources through the inventory and registration system
  - ✓ According to the announcement, [the first batch of emission sources that should be checked and registered for greenhouse gas emissions](#) shall be checked and registered on the "[National Greenhouse Gas Registration Platform](#)"
  - ✓ At the end of 2020, a total of 287 registered
    - ✓ Direct greenhouse gas emissions of 222.77 million metric tons CO<sub>2</sub>e
    - ✓ Energy indirect greenhouse gas emissions were 42.36 million metric tons CO<sub>2</sub>e.
- ✓ Encourage domestic industries to invest in greenhouse gas reduction actions early
  - ✓ The "[National Greenhouse Gas Logging Platform](#)" is a special area for the application and management of planning offset projects and reduction methods, and serves as a window for the issuance and approval of reduction quotas.
- ✓ After the relevant mechanisms are in place
  - ✓ Refer to the situation of international climate negotiations and the principle of maintaining my country's industrial competitiveness
  - ✓ Develop a schedule for promoting the cap-and-trade system
  - ✓ Announce emission sources in stages and set stage-by-stage total emission targets
  - ✓ Through flexible mechanisms such as transactions and project swaps, the implementation is promoted phase by phase.

# ISO14064-1 inventory and ISO14064-2 reduction



註:目前全球唯一之國際認證組織為國際認證論壇(IAF)

04

## Climate Change Response Act

1. Taiwan's 2050 Net-Zero Emissions Pathway and Strategy General Description
2. Greenhouse Gas Reduction and Management Act  
Amendment



Taiwan 2050 net discharge path

# 臺灣2050淨零排放路徑 及策略總說明

2022年3月30日



# 2050 Net Zero Transformation

## 2050 淨零轉型 化危機為轉機並掌握商機

### 臺灣與世界共同邁向淨零

Taiwan and the world are moving together toward a clean world

Climate Emergency  
Global Challenges

Global warming will warm by 1.5°C in 20 years

International Trend of Net Zero Carbon Emission

136 countries worldwide have declared net-zero emissions targets

Green Supply Chain and Carbon Tariff

Our country is an export-oriented country

Total export value will reach USD 446.3 billion in 2021 ( about 57% of GDP)

#### 氣候緊急全球挑戰

全球暖化將在20年內升溫1.5 °C

#### 淨零碳排國際趨勢

全球已有136個國家宣示淨零排放目標

#### 綠色供應鏈與碳關稅

我國為出口導向國家

2021年出口總值達4,463億美元 約佔GDP之57%

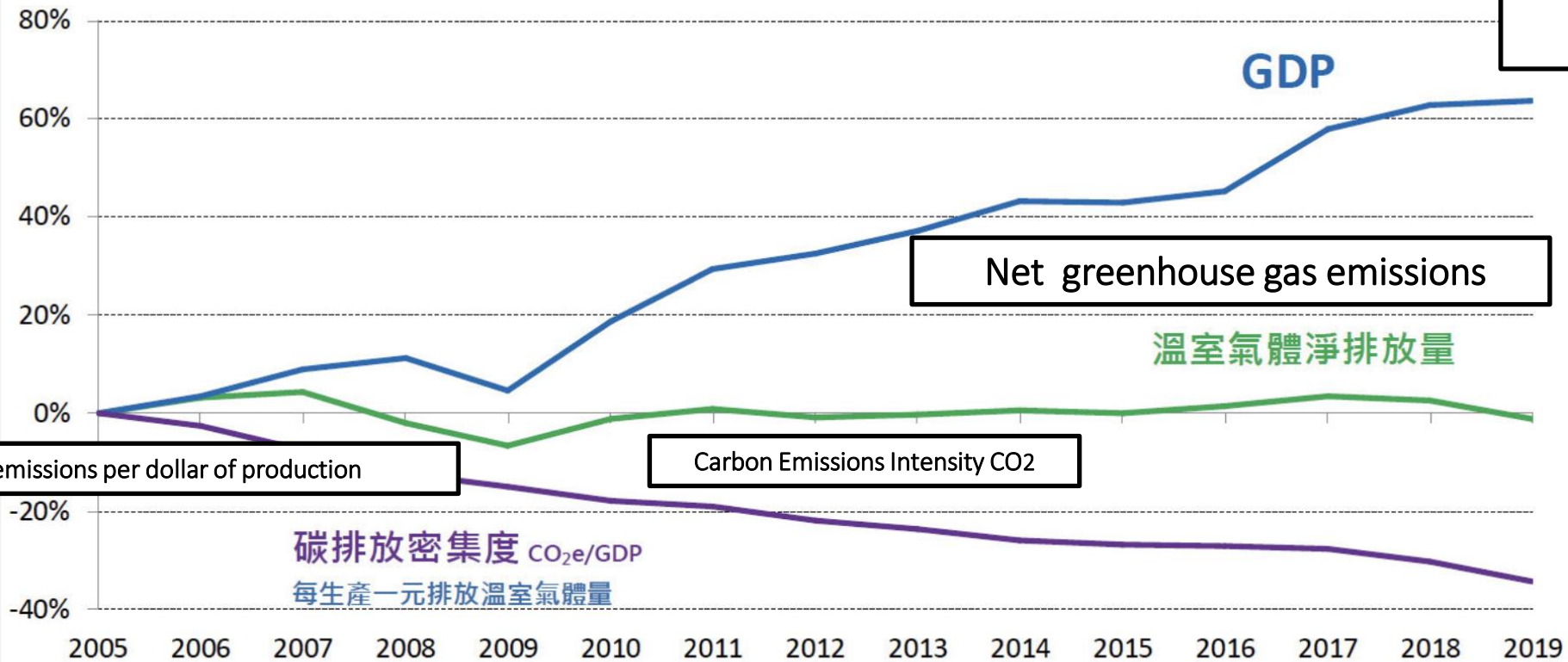


# 我國經濟成長與 溫室氣體排放脫鉤

以 2005 年為基準，  
臺灣 GDP 成長 64%，  
但碳排放密集度 (CO<sub>2</sub>e/GDP)  
降低 34%

Based on 2005, Taiwan's  
GDP grew by 64%, but  
Carbon emission intensity  
(CO<sub>2</sub>e/GDP)  
34% reduction

Our economic growth and Greenhouse Fluoride Emissions Decoupling



Greenhouse gas emissions per dollar of production

Carbon Emissions Intensity CO<sub>2</sub>

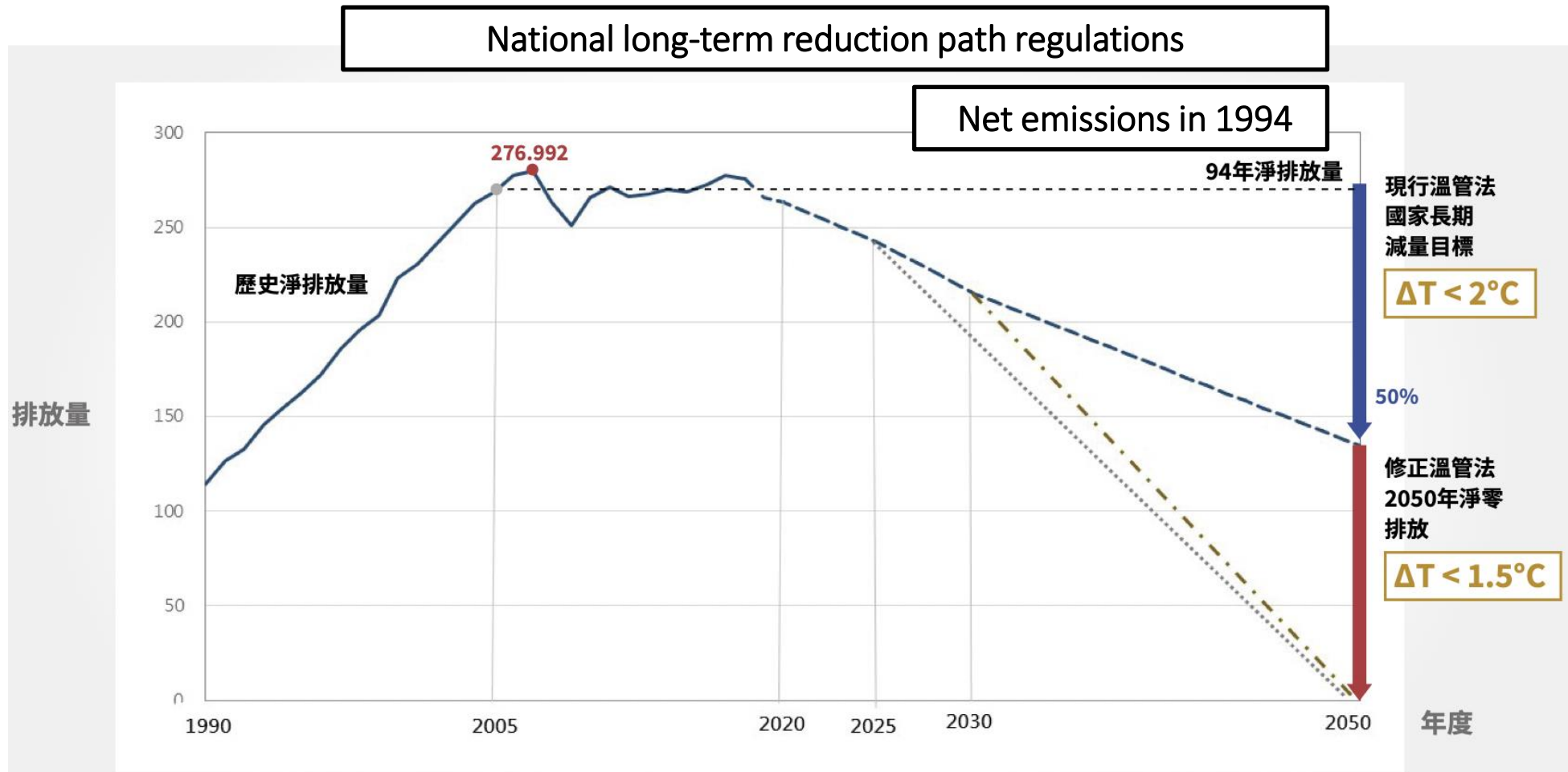
碳排放密集度 CO<sub>2</sub>e/GDP

每生產一元排放溫室氣體量

Greenhouse gas intensity : The ratio of carbon dioxide emission equivalent to gdp of the six greenhouse gases Carbon dioxide intensity is the ratio of carbon dioxide emissions to gdp .

Reduction target: 50% reduction in 2050 compared to 2005

# 國家長期減量路徑規劃



# Energy and electricity demand

The growth of energy demand is slowing down, and the demand for electricity is growing

## 能源及電力需求

能源需求成長趨緩，電力需求呈成長趨勢

電氣化為淨零主要趨勢，且民生產業、資通訊系統的發展，將驅動電力需求成長，因此全球主要國家電力需求規劃，均呈成長趨勢

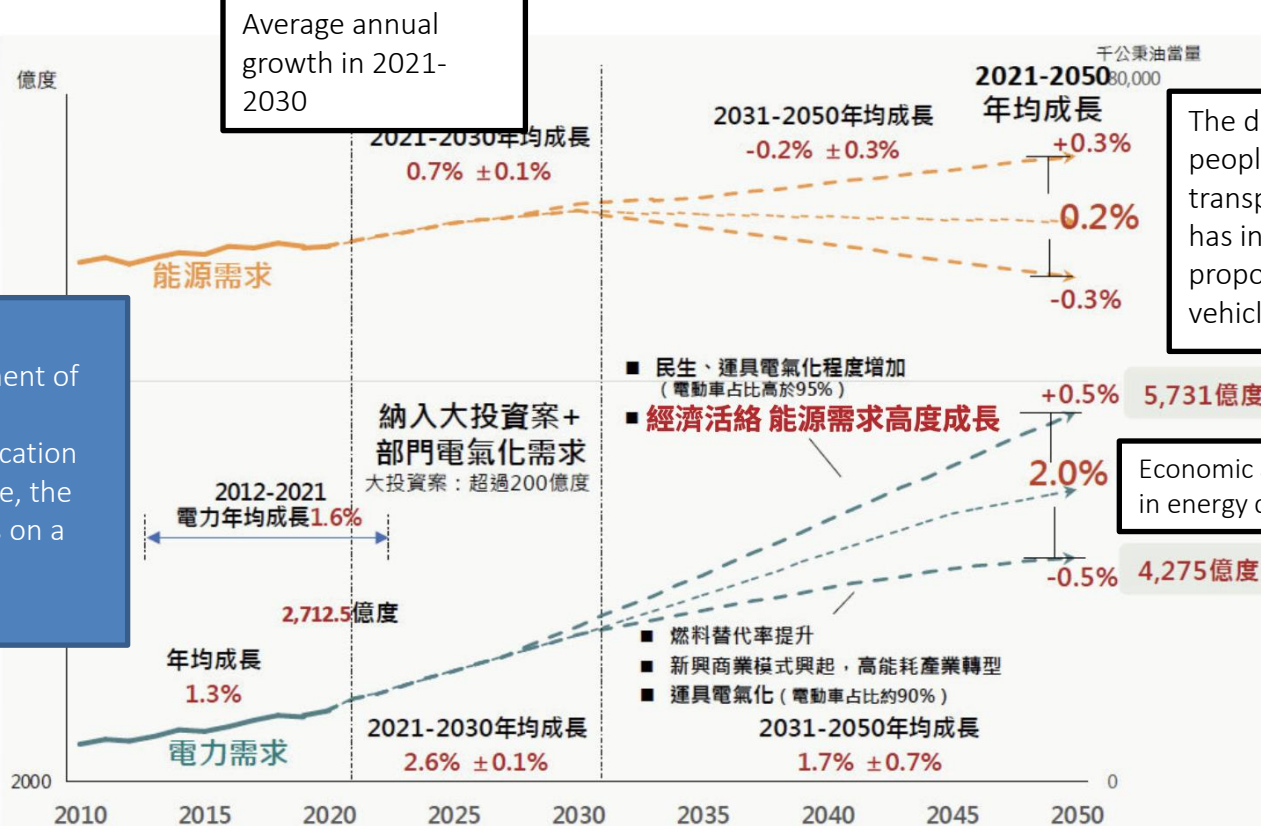
Electrification is the main trend of net zero, and the development of livelihood  
The development of industries and information and communication systems will drive the growth of electricity demand. Therefore, the demand for electricity in major countries around the world is on a growth trend



2.5~2.6%

註：

1. 全球淨零情境電力需求係依據 IEA (2021) Net Zero by 2050 A Roadmap for the Global Energy Sector 估計結果。
2. 北美、歐盟淨零情境電力需求係依據 IEA(2021) World Energy Outlook 2021 估計結果。
3. 韓國淨零情境電力需求係依據韓國2050年碳中和情境草案估計結果。



The degree of electricity in people's livelihood and transportation equipment has increased (The proportion of electric vehicles is about 95%)

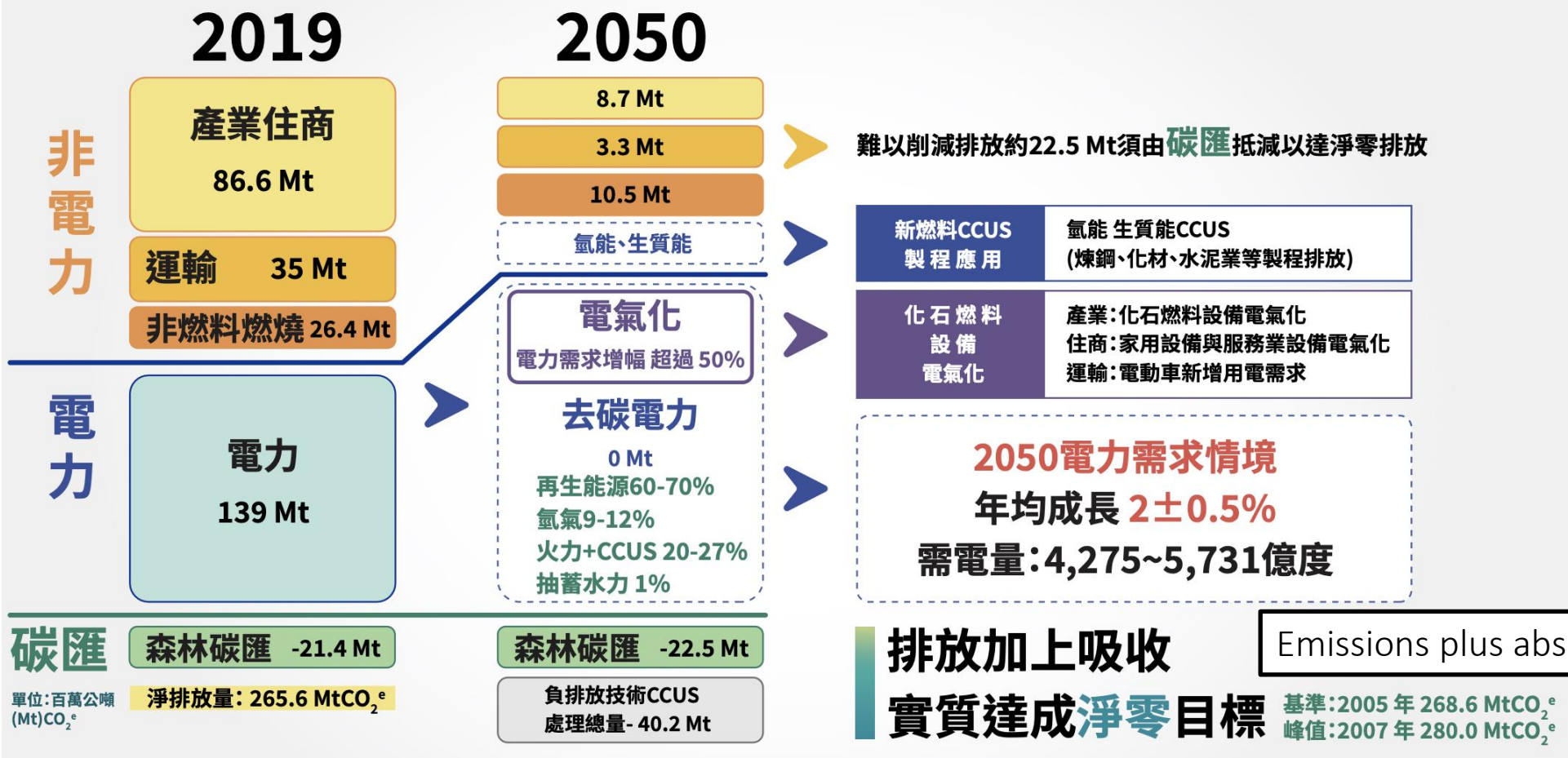
Economic activity, high growth in energy demand

註：需求規劃考量經濟成長(包含大投資案持續增加、產業自動化生產與電氣化程度提高)、遠距辦公與智慧商業模式普及、電動運具普及率提高至90%及家庭智慧化提高之推估結果；另，納入節能措施，包含電力成長管理(如：導入智慧能源管理系統)、工業低碳製程導入、生活模式與行為改變等需求抑低趨勢。



# 2050 淨零排放規劃

## 2050 Net Zero Emission Plan



Substantial achievement of net-zero goal

2050 Net Zero path Planning

# 2050 淨零路徑規劃

## 階段里程碑

**CONSTRUCTION**  
Improve the building shell, Building energy efficiency and household appliances Standard efficiency

**TRANSPORTATION**  
Change the way of Yunhan, reduce the demand of the ship, and electricity the equipment

**INDUSTRY**  
Improve energy efficiency and fuel Conversion, circular economy, innovation process

**ELECTRIC POWER**  
Renewable energy continues to expand, develop new energy technology and storage

**NEGATIVE CARBON TECHNOLOGY**  
2030 enters the demonstration stage 2050 enters the popularization stage

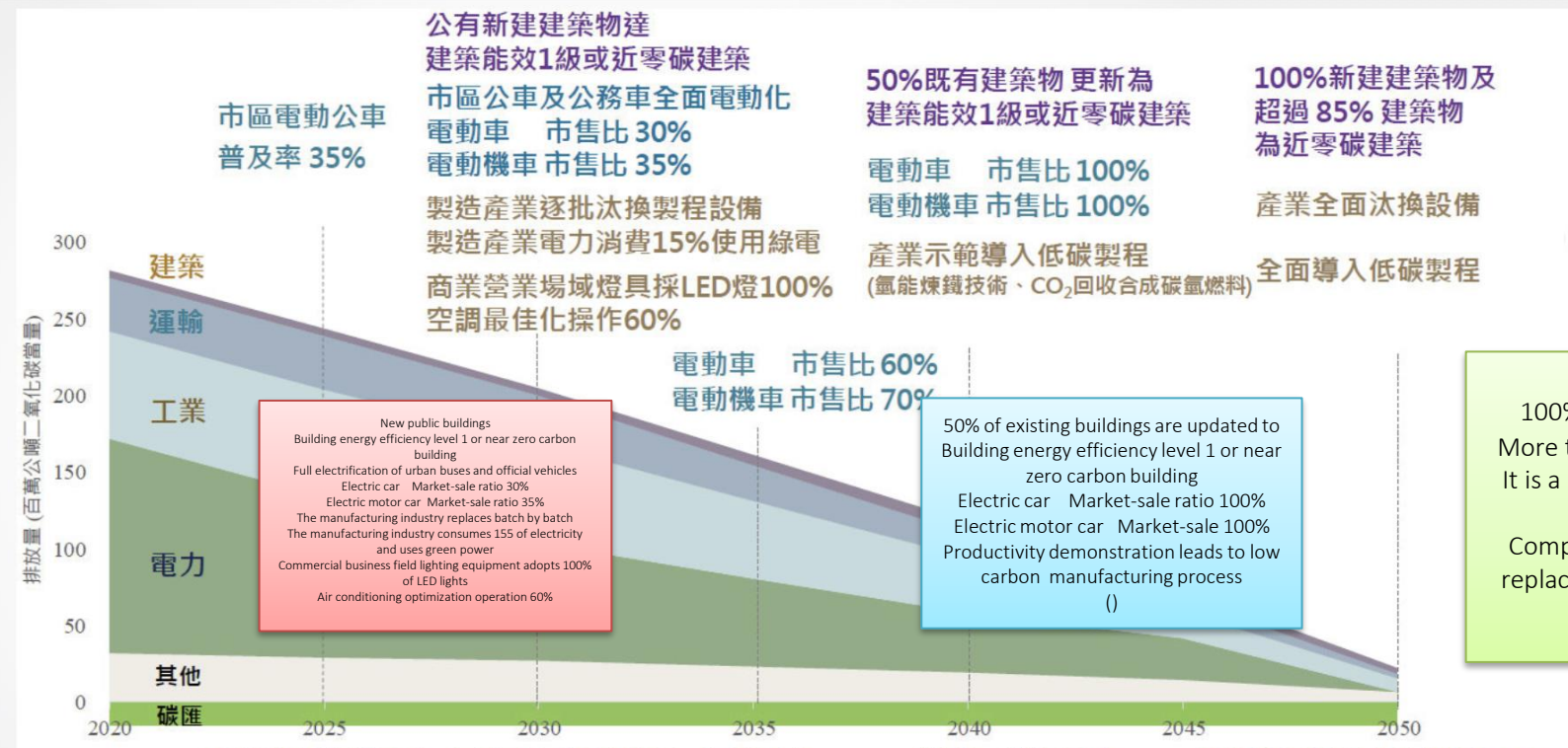
**建築**  
提升建築外殼設計、建築能效及家電能效標準

**運輸**  
改變運輸方式，降低運輸需求，運具電氣化

**工業**  
提升能效，燃料轉換，循環經濟，創新製程

**電力**  
再生能源持續擴大，發展新能源科技、儲能、升級電網

**負碳技術**  
2030 進入示範階段 2050 進入普及階段



市區電動公車普及率 35%

公有新建建築物達建築能效1級或近零碳建築  
市區公車及公務車全面電動化  
電動機車 市售比 30%  
電動機車 市售比 35%

製造產業逐批汰換製程設備  
製造產業電力消費15%使用綠電  
商業營業場域燈具採LED燈100%  
空調最佳化操作60%

50%既有建築物更新為建築能效1級或近零碳建築

電動機車 市售比 100%  
電動機車 市售比 100%

產業示範導入低碳製程 (氫能煉鐵技術、CO<sub>2</sub>回收合成碳氫燃料)

100%新建建築物及超過 85% 建築物為近零碳建築

產業全面汰換設備

全面導入低碳製程

New public buildings Building energy efficiency level 1 or near zero carbon building  
Full electrification of urban buses and official vehicles  
Electric car Market-sale ratio 30%  
Electric motor car Market-sale ratio 35%  
The manufacturing industry replaces batch by batch  
The manufacturing industry consumes 15% of electricity and uses green power  
Commercial business field lighting equipment adopts 100% of LED lights  
Air conditioning optimization operation 60%

50% of existing buildings are updated to Building energy efficiency level 1 or near zero carbon building  
Electric car Market-sale ratio 100%  
Electric motor car Market-sale 100%  
Productivity demonstration leads to low carbon manufacturing process

100% new buildings and More than 85% of buildings It is a near-carbon building

Comprehensive industrial replacement of equipment

No construction of new coal-fired power plants

Wind power photovoltaic accumulation device Accumulation up to 40GW

Smart meters The construction rate reaches 100%

煤炭、燃氣電廠依CCUS發展進程導入運用

Coal and gas-fired power plants

再生能源發電占比超過 60% 智慧變電所布建率達 100%

Renewable energy accounts for more than 60% Smart substation deployment rate reached 100%

Taiwan 2050 Net Zero Transformation

# 臺灣2050淨零轉型

## 四大策略 兩大基礎

Four strategies, two foundations

Energy transformation

Industrial transformation

Life transformation

Social transformation

轉

### 能源轉型

### 產業轉型

### 生活轉型

### 社會轉型

Wind, solar and photoelectric  
System integration and energy storage  
New energy  
(hydrogen energy, deep geothermal, ocean energy, etc.)

風力、太陽光電  
系統整合及儲能  
新能源

高科技產業、傳統製造業  
建築營造業、運具電氣化  
食品農林、資源循環

綠運輸  
電氣化環境營造  
住商生活型態

公正轉型  
公民參與  
(社會對話)

Fair transformation  
Citizen participation  
(social dialogue)

(能、深層地熱、海洋能等)

Science and technology research and development

High-tech industry, traditional manufacturing industry  
Construction industry, transportation electrification  
Food, agriculture, forestry and resource recycling

(行為改變)

治理基礎

### 科技研發

### 氣候法制

淨零技術  
負排放技術

法規制度及政策基礎  
碳定價綠色金融

Fluorine preparation method

Net zero technology  
Negative emission technology

Regulatory system and policy basis  
Carbon pricing green finance

# Energy transformation



## 能源轉型

- 打造零碳能源系統
- 提升能源系統韌性
- 開創綠色成長

Build a zero-carbon energy system

Enhancing the resilience of energy systems

Create green growth



# ENERGY TRANSFORMATION

## 能源轉型

3 STRATEGIES 9 MEASURES

## 3大策略 9項措施

Build a zero-carbon energy system

### 1 打造零碳能源系統

- ▶ **最大化再生能源**  
擴大成熟光電風電布建，搭配前瞻地熱海洋能
- ▶ **零碳化火力發電**  
導入氫能發電，燃氣 CCUS
- ▶ **逐步去煤**  
短期混燒氨降低碳排，長期轉為安全備用
- ▶ **建構零碳燃料供應系統**  
提供產業運輸所需氫氨、生質燃料
- ▶ **適時導入先進技術** 增加零碳能源運用空間  
掌握全球前瞻技術動向，依國內條件適時引進

\* Maximize renewable energy  
Expand the construction of mature photoelectric wind power with forward-looking geothermal ocean energy

\*Zero carbonization thermal power generation  
Introduction of hydrogen power generation, gas CCUS  
\*Gradually remove coal  
Short-term mixed ammonia reduces carbon emissions and turns into safe backup in the long term

\*Build a zero-carbon fuel supply system  
Provide hydrogen ammonia and raw fuel for industrial transportation

Enhancing the resilience of energy systems

### 2 提升能源系統韌性

- ▶ 優先擴充再生能源電網基礎設施
- ▶ 擴大再生能源所需儲能設備

\* Prioritize the expansion of renewable energy grid infrastructure  
\*expand the energy storage equipment needed for renewable energy

Create green growth

### 3 開創綠色成長

- ▶ **打造綠能產業生態系**  
港埠風電專區、綠能新創產業
- ▶ **促進去碳投資與國際合作**  
促進公私部門綠能投資，建立國際夥伴關係引進關鍵技術，並創造我國優勢去碳技術輸出機會

\* Build a green energy industry ecosystem  
Minato Wind Power Zone, Green Energy New Innovation Industry

\*Promote decarbonization investment and international cooperation  
Promote public and private sector green energy investment, establish international partnership, to introduce key technologies, and create opportunities for export of China's advantageous decarbonization technologies

# Energy transformation

Strategy 1: Build a zero-carbon energy system

## 能源轉型

### 策略1 打造零碳能源系統

確立關鍵技術項目與技術發展排序  
並辦理落實規劃及對外溝通

Establish the ranking of key technical items and technological development  
Handle the implementation of planning and external communication

2020

short and medium term (2030)

long term (2050)

2050

Regeneration Energy

再生能源

Increase self-produced renewable energy  
(Priority deployment of mature photoelectric wind power)

太陽光電 (傳統矽晶) 2025年累計 20GW; 2026-2030年每年 2GW  
離岸風電 (固定式) 2025年累計 5.6GW; 2026-2035年每年 1.5GW

Maximize self-produced renewable energy  
Expand photovoltaic and wind power installation site, continuous technological breakthroughs, fostering the advantages of forward-looking mature marine energy to build base-planted green power.

太陽光電 朝高效率模組發展 至2050年目標累計達40-80gw  
離岸風電 朝浮動式、大型化機組發展 至2050年目標累計達40-55gw

Firepower Power generation

火力發電

Low carbonization of thermal power generation  
(Promote the exchange of gas for coal into argon mixed burning)

天然氣 (煤轉氣; 燃煤亞臨界視供電情形提前停轉)  
氫氨混燒示範 (興達、林口)

Maximize self-produced renewable energy  
(Gas + CCUS, imported carbon-neutral LNG, hydrogen-generated coal combustion turned into safe backup)

天然氣 (+CCUS、進口碳中和LNG)  
氫氨 (混燒比例提高、專燒)  
燃煤 (超超臨界機組+CCUS、2050年轉為安全備用)

Carbon-free Fuel

無碳燃料

Build a carbon-free fuel supply system  
(Provide hydrogen ammonia and raw fuel for industry and transportation)

生質能 (國內料源為主) 氫能 (成立經濟部氫能推動小組 (推動國際合作、建置示範系統)) 氫能 (進口綠氫 (餘電產氫)) 生質能 (佈局國外料源)

## 能源轉型

### 策略2 提升能源系統韌性

Prioritize the expansion of renewable energy grid infrastructure

#### 優先擴充再生能源電網基礎設施

\*Expansion of renewable energy feeder capacity: I response to the increase in the proportion of the renewable energy in the future. We will expand the construction of renewable energy feeder networks and conduct feasibility studies on the deployment of high voltage DC grids  
Strengthen grid resilience and system integration

究

#### ○ 強化電網應變能力與系統整合

- ✓ 推動電網數位化，提升電力資訊掌握及應用能力，檢討強化輸配電系統規劃
- ✓ 增加電網操作彈性 (彈性交流輸電系統(FACTS)、動態線路容量、固態變壓器等)
- ✓ 透過資通訊與物聯網技術強化資源整合 (如：虛擬電廠、微電網整合發電端、負載端、儲能資源等)，提升電網韌性

#### 擴大因應再生能源變動所需儲能等彈性資源規劃

- 精進再生能源預測技術，透過資通訊與物聯網技術，強化發電、儲能、用電端資源整合
- 檢討電業法相關法規給予儲能設備明確定位，設計儲能商業模式以提供設置誘因

# 能源轉型

## 策略3 開創綠色成長

### 打造綠能生態系

#### 整合資源預算投入優勢技術研發

- 依減碳潛力、成本、技術成熟度、產業競爭優勢等條件，篩選去碳能源**關鍵技術**，啟動多元關係人共同討論，建立短中長期本土優勢去碳能源技術發展路徑與**策略藍圖**。
- 整合**資源預算**投入具本土產業化潛力優勢技術研發，透過產學研合作，擴大研發能量。

#### 扶植零組件國產化打造綠能產業生態圈

- 推動**港埠風電專區**，建立次世代離岸風力機關鍵零組件本土化開發能力，成為亞太離岸風電產業樞紐。
- 強化複合運用系統服務，輸出結合**智慧科技**的整合性綠能系統方案。

#### 培育綠色新創產業

- 建立本土實證場域，營造新創生態系。
- 發展**智慧能源產業**商業模式，整合**AIoT、大數據分析、能源即服務(EaaS)**等技術，提供創新能源服務。

### 去碳投資國際合作

#### 促進公私部門綠能投資

- **國營事業**(中油、台電)帶頭，整合中下游廠商，投入能源系統淨零轉型投資。
- 針對淨零轉型技術研發與應用提供**獎勵補助**或**租稅優惠**，引領公私部門資金投入綠能市場。

#### 建立國際夥伴關係促進技術合作

- 追蹤核心能源技術全球發展動態，建立雙邊合作管道，促進我國能源技術發展。
- 建立**國際合作機制**推廣我國優勢減碳技術與服務，開拓**海外淨零商機**。





# 產業轉型

Industrial transformation

- 製造部門
- 商業部門
- 建築部門
- 運輸部門

Manufacturing Department

Commercial Department

Construction Department

Eight Ministry of Translation



# 製造部門 3大面向 11 項措施

## Process improvement

- Update of old equipment
- Energy saving ( digitalization)
- Hydrogen technology development
- Reduction of fluorine gas

## Energy conversion

- Expand the use of natural gas
- Expand the use of raw energy
- Use green power / hydrogen energy

## Circular Economy

- Replacement of raw materials
- Derivative of waste
- Ability to integrate resources
- CCU technology

# 產業轉型

## 製造部門

研發階段

示範階段

普及階段

製造部門淨零  
碳排路徑藍圖



2025

2030

2050

低碳

零碳

### 1. 製程改善

1.1  
設備汰舊  
更新

- 製程改善與設備汰舊更新
- 廢熱與廢冷回收技術應用

新設備及節能技術示範

擴大導入

1.2  
智慧節能  
管理

- 建置智慧化能源管理系統
- 導入智慧化能源監控系統

數位管理技術減少CO<sub>2</sub>排放示範

擴大導入

1.3  
氫氣技術  
開發

建置高爐高溫  
反應模擬器

完成高爐噴吹氫氣噴嘴設置

啟動氫能冶煉  
技術研發計畫

建造連續式  
示範線

以示範線結果評估選用技術，建立綠氫直接還原鐵技術

1.4  
含氟氣體  
削減

含氟氣體替代技術開發

示範建立

擴大導入

註：

1. 製造部門淨零路徑藍圖(初稿)係與石化、電子、鋼鐵、紡織、水泥、造紙及其他業者透過相關研商會議討論盤點出現階段可行或已處於研發及待推廣之策略。

2. 依據國際能源總署(IEA)研究指出，當今減碳技術可協助產業達成減碳30%，剩餘70%排碳尚處於概念或實驗/示範階段，需依靠新興技術的開發才有機會達成，意即目前成熟技術尚不足以達成2050淨零排放。

# 產業轉型

## 製造部門

研發階段

示範階段

普及階段

製造部門淨零  
碳排路徑藍圖



2025

2030

2050

低碳

零碳

2. 能源轉換

2.1  
天然氣

擴大一般鍋爐使用天然氣

推動汽電鍋爐使用天然氣

天然氣+碳捕捉封存(CCS)

碳中和天然氣

2.2  
生質能

擴大水泥業生質燃料使用 4%

擴大造紙業生質燃料使用 5%

擴大使用生質燃料

2.2  
使用綠電

鼓勵企業實踐RE100目標 15%使用綠電

擴大使用綠電

3. 循環經濟

3.1  
原料替代

水泥業礫石原料替代 7%

鋼鐵業增用廢鋼作為替代原料

擴大水泥業礫石原料替代

擴大導入

3.2  
廢棄物衍生  
燃料

擴大水泥業替代燃料占比 10%

擴大造紙業SRF燃料替代 20%

擴大水泥業替代燃料占比

擴大造紙業使用固體再生燃料(SRF)燃料替代

3.3  
能資源整合

推動循環產業園區/產業聚落能資源整合

3.4  
CCU技術

擴大石化業CO<sub>2</sub>回收利用

CO<sub>2</sub>回收合成化學品

示範建立

擴大導入

# 產業轉型

## 商業部門

### 商業部門淨零 碳排路徑藍圖



2025

2030

2050

低碳

零碳

#### 設備或操作行為 改善

- 30%空調與冷凍冷藏設備逐步採用能效1級之產品；
- 60%空調最佳化操作；汰換老舊燈具，100%改採用LED燈

- 空調與冷藏全面採用能效1級產品；全面採用更高效能燈具及空調操作最佳化

#### 使用 低碳能源

- 業者運具電動化
- 70%燃油鍋爐轉換為熱泵或燃氣鍋爐
- 能源大用戶5%使用綠電

- 採用更高效率之熱泵或氫能鍋爐；能源大用戶 30%使用綠電

#### 商業模式 低碳轉型

- 輔導零售業導入智能管理
- 餐飲業推在地食材
- 物流業導入智能檢貨、智能運算，優化路線，減少燃料耗用

- 全面導入淨零排放技術，智慧化維運及管理

#### 綠建築

- 新建建築之外殼需須符合綠建築規範之隔熱效果

- 既有建築60%須符合綠建築之外殼隔熱效果

# 產業轉型

# 建築部門

## 2050年 100%新建建築物及 超過85%既有建築物為近零碳建築

### 分階段推動實施

示範推廣/強制實施

#### 1 新建建築

- ✔ 建立能效評估系統
- ✔ 強化建築節能法規

能效評估: 納管公有建築/容積獎勵納入能效評估  
節能法規: 外殼節能基準/中央空調基準(EAC)

#### 3 家電設備

- ✔ 提升家電產品能效基準
- ✔ 預留充電設備停車位

家電產品: 分階段提高能效基準/節能家電減徵貨物稅  
充電設備: 修正公寓大廈管理條例

#### 2 既有建築

- ✔ 提升公有既有建築能效
- ✔ 提升民間既有建築能效

公有建築: 列管未達能效建築/要求編列預算改善  
民間建築: 節能績效保證專案/都市更新整建維護補助  
企業社會責任(CSR)

#### 4 減碳技術 減碳工法

- ✔ 建築物導入節能技術
- ✔ 低碳工法研發

節能技術: 智慧能源管理系統/智慧電表  
充電設備: 預鑄構造、木竹構造/循環經濟、建築延壽

### 跨域整合



### 政策擴散普及

公有建築帶動  
民間建築低碳轉型

# 產業轉型

# 運輸部門

## 2040年電動車/電動機車 市售比100%



### 輔助策略

1. 強化都市規劃 • 公共運輸導向之土地使用

2. 綠色運輸生活

- 減少非必要運輸需求
- 視訊會議
- 遠距教學



# 生活轉型

Life transformation

食·衣·住·行

Food, clothing, housing, transportation





# 生活轉型

# Life transformation

## NET ZERO CIRCULAR BUILDINGS

- ✓ Passive building design, intelligent control introduction and deep energy-saving development, high efficiency equipment application, multi-power integration, construction material carbon storage

### 淨零循環建築

- ✓ 被動建築設計、智慧控制導入與深度節能開發、高效設備應用、多元電力整合、建築材料碳儲存

## LOW-CARBON TRANSPORTATION NETWORK

- ✓ Remove unnecessary movement
- ✓ Friendly traffic environment
- ✓ Convenient public transportation

### 低碳運輸網絡

- ✓ 減少不必要的移動
- ✓ 友善交通環境
- ✓ 便捷公共運輸

### 全民對話

- ✓ 共同目標
- ✓ 共同責任
- ✓ 共同行動

- ## DIALOGUE FOR ALL
- ✓ common goal
  - ✓ Shared responsibility
  - ✓ Act together

# 未來生活

### 零浪費低碳飲食

- ✓ 更謹慎的採買習慣
- ✓ 零浪費的餐飲服務
- ✓ 更高效的產銷配送
- ✓ 再生型的農法

### 使用取代擁有

- ✓ 設計輕量化
- ✓ 易升級維修的產品
- ✓ 延長物品使用壽命
- ✓ 循環運用零組件

## ZERO WASTE AND LOW-CARBON DIET

- ✓ More cautious buying habits
- ✓ Zero-waste catering service
- ✓ More efficient production, sales and distribution

## USE INSTEAD OF HAVING

- ✓ Lightweight design
- ✓ Products that are easy to upgrade and repair
- ✓ Extend the service life of items
- ✓ Recycle parts



# 社會轉型

Social transformation

- | 公正轉型
- | 公民參與

- Fair transformation
- Citizen participation



社會轉型

Social transformation

社會支持體系篇：  
落實公正轉型及公民參與

Social support System

Implement fair transformation and citizen participation

Net Zero Transformation for Conflict Resolution  
Social Engineering for Opportunity

淨零轉型為化衝突  
為機會的社會工程

Do your best not to leave anyone behind

公正轉型

Fair transformation

盡力不遺落  
任何人

公民參與

Citizen Participation

辨識及協調轉型  
衝突與爭議

Identifying and  
coordinating  
transformation  
Conflicts and  
controversies

精進衝突與爭議  
的處理機制

Refine conflict  
and dispute  
Handling  
mechanism

建立支持體系的  
工具手段

公私協力提高  
轉型社會之韌性



# 科技研發

Science and technology research and development

## 淨零全方位科技

Clean zero all-round technology



# Science and technology research and development

## 科技研發

Low carbon  
Low carbon-process  
Green building  
Green transportation

The Cycle  
Energy resources  
Reuse

### 循環

Negative Carbon  
Carbon capture and storage  
Natural carbon sink

### 負碳

Social Sciences  
Net zero policy benefit evaluation  
Adaptation and on-ground planning

### 社會科學



Sustainable energy  
Grid system integration  
Energy storage  
Hydrogen energy  
Other forward looking technologies

Review updates every five years

## 每五年檢討更新一次

前瞻技術

Anterior courage technology

目標導向

Goal-oriented

公私協力

Public-private cooperation

國際合作

International cooperation

滾動檢討

Rolling reviews



# 氣候法制

## Climate Law

- 溫管法修法、綠色金融
- 能源三法、碳捕捉封存管理制度
- 氫能管理專法、建築相關法規

Green Finance Act Amendment

Energy Three Law, Carbon Capture and Storage  
Management System

Hydrogen Energy Management Act Building  
Regulations

# Climate Law

Improve the climate legal environment

## 氣候法制

### 完善氣候法制環境

The current "Greenhouse Gas Reduction and Management Law" was amended to "Climate Change Response Law"

#### 氣候

The climate

#### 現行「溫室氣體減量及管理法」修正為「氣候變遷因應法」

- ✓ 國家長期減量目標修正為2050淨零排放
- ✓ 因應企業碳盤查及查驗需求
- ✓ 應國際碳關稅趨勢，推動碳費及碳交易

The national long-term reduction target is revised to 2050 net zero emissions

In response to corporate carbon inventory and inspection needs

Promote carbon fee and carbon trading in response to international carbon tariff trend

#### 能源

Energy

#### 持續精進「能源管理法」、「電業法」、「再生能源發展條例」

Continue to improve the "Energy Management Law", "Electricity Law" and "Regulations Energy Development"

#### 氫能

Argon energy

#### 配合氫能發展需要，訂定氫能管理專法

Cooperate with the needs of argon energy development and formulate a special method for argon energy.

#### 建築

Construction

#### 新建築提升中央空調及外殼節能設計、強制增設太陽能光電

New building to upgrade central air conditioning and envelope energy-saving design, and the mandatory addition of solar photovoltaic

#### 運輸

transportation

#### 修訂推廣運具電動化相關法規

Revise regulations related to the promotion of the electrification of transport

# 金融基礎

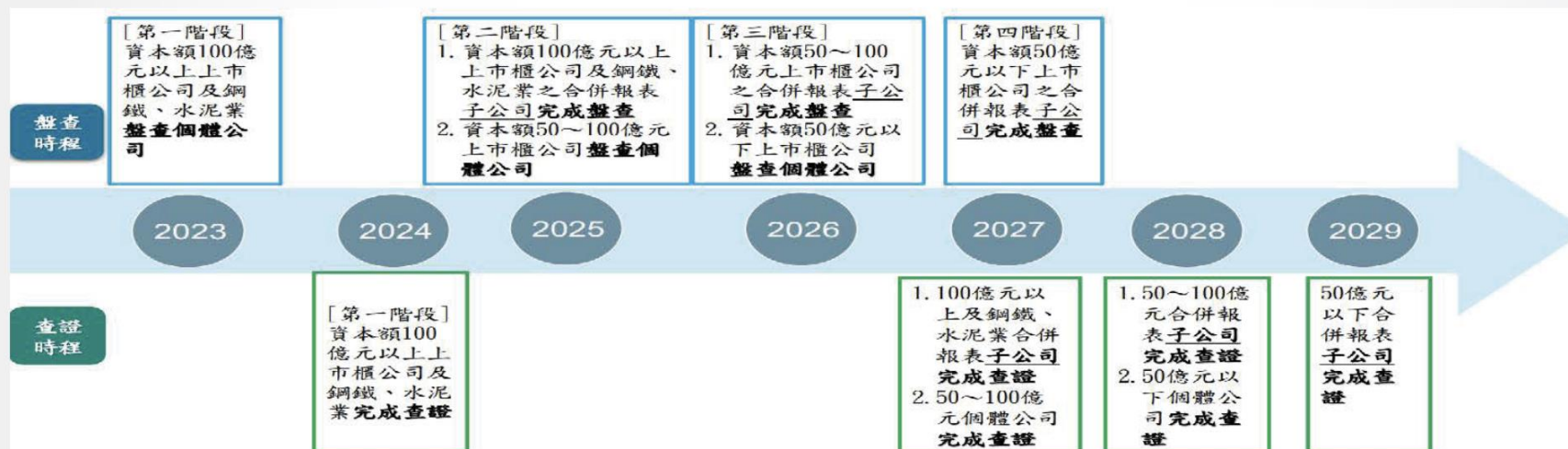
## 綠色金融 運用金融量能 引導淨零轉型

### 核心策略

- 有效資訊揭露促進適當的企業決策
- 驅動金融業因應氣候變遷之風險並掌握商機
- 運用市場機制引導經濟邁向永續發展



## 上市櫃公司永續發展路徑圖 協助企業及早因應與訂定減碳目標







Taiwan 2050 Net zero transformation

12 Key Strategies

Green finance

Net Zero  
Green life

Natural carbon sink

Resource cycle  
Zero abandonment

Motorization of transport tools  
And non-carbonization

Fair transportation

TAIWAN  
2050 

Wind power/  
photovoltaic

Hydrogen energy

Forward-looking  
energy

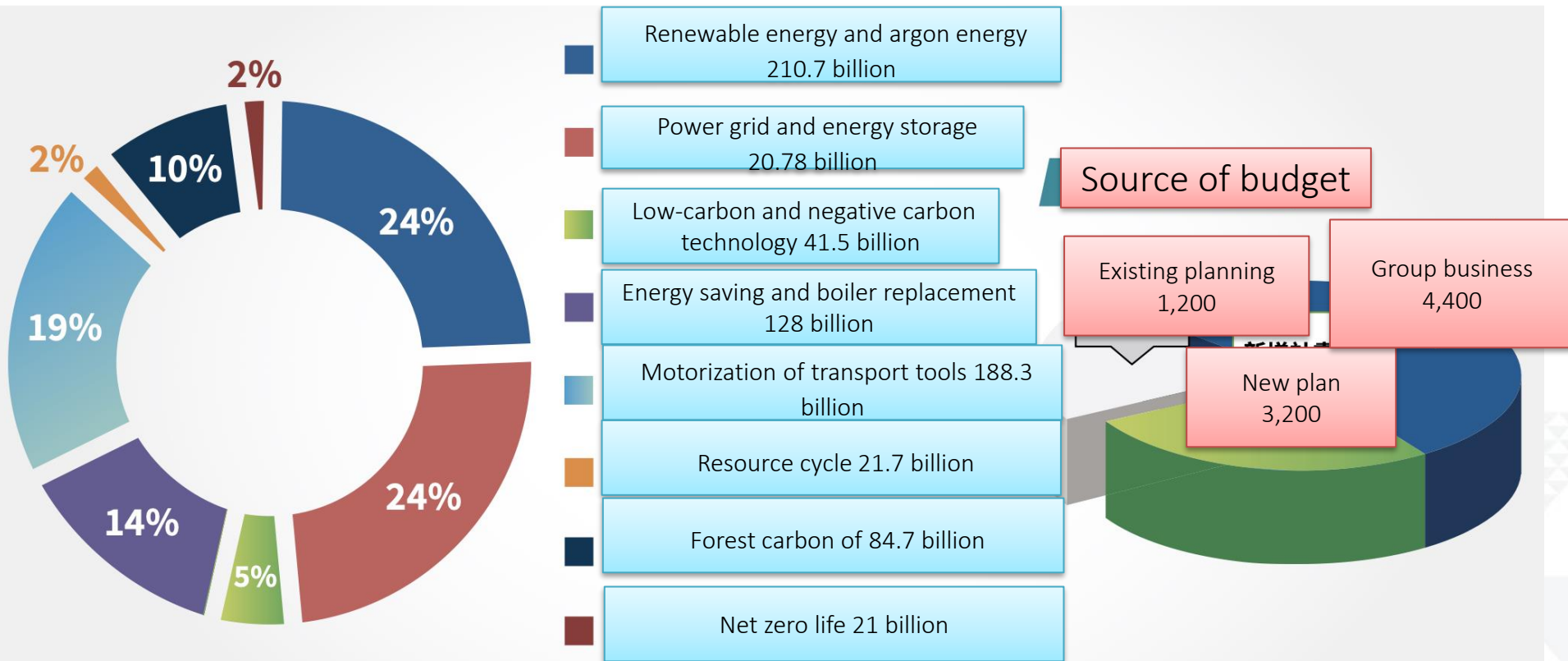
Power system and  
energy storage

Energy saving

Carbon capture  
Use and storage



2050 Net zero transformation main plan  
 Nearly 900 billion budget by 2030



## 2050 Net Zero Transformation

Promote economic growth and drive private investment. Create green jobs

Energy Transformation  
Safer

Industrial Transformation  
More competitive

Life transformation  
More sustainable

Social Transformation  
More resilient

- Flipping High imported Energy Dependence Risks
- Industrial transformation and Creation of Green Growth Momentum
- Government investment drives private investment
- Improve the quality of life and sustainable environmental development

From 97.4% in 2021 to less than 50% in 2050

By 2030, drive private investment of more than 4 trillion yuan

The amount of air pollution in 2019 will be reduced by about 30% by 2030

Assist the industry in net-zero transformation

Four aspects

1

Build an enterprise  
Carbon inventory inspection ability

3

Assist the enterprises  
Hold the information

2

Improve the industry  
Carbon reduction capacity

4

Enhancement of financial sector net zero  
Capacity building for transformation

Two large cooperation model



Adopt the model of “big first, small second” and “big with small”



Combining the strength of industrial associations and leading by example in the state sector

# Instructions for the revision of the Greenhouse Gas Reduction and Management Law



行政院環境保護署  
Environmental Protection Administration  
Executive Yuan, R.O.C. (Taiwan)

Greenhouse Gas reduction and Management law  
Amended instructions

Reporting unit: Environmental Protection  
Department of the Executive Yuan

**111年4月21日**



# 2050 Net zero transformation, Taiwan and the world move towards net zero together



Basic Legal System:  
Amend the “Greenhouse gas Reduction and Management Act” to ‘Climate Change Response Act”

## Amendment to Article 4

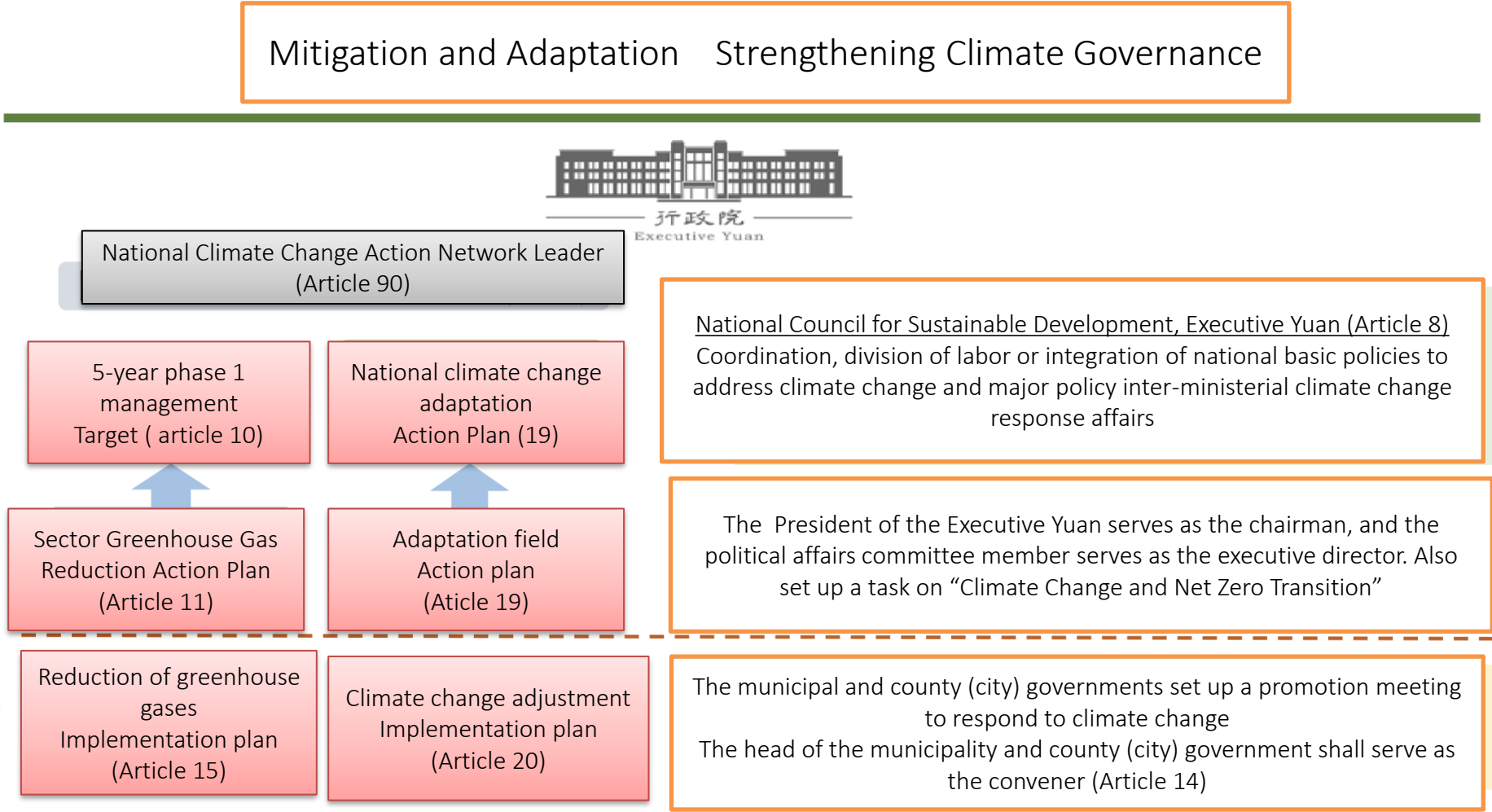
The national long-term reduction target is 139 years of greenhouse gas  
Net zero emissions  
Government at all levels promote national food, chapter music, and national sports together

# Mitigation and Adaptation Strengthening Climate Governance



中央

地方



## Accelerate carbon reduction and improve industrial competitiveness

### Interrogation and inspection (Article 21-22)

- Hierarchical management
- Improve inspection capacity

### Performance standards (Article 23)

- Product production process
- Manufacture or import vehicles
  - New construction

### Response to international carbon tariffs (Article 31)

- Implementation in response to prudent assessment of the international economic and trade situation
- Import announcement products declare carbon emissions
  - Pay the reduction amount according to the carbon emission difference

### Robust implementation of carbon trading (Article 25)

- Encourage voluntary reduction and issue reduction quota
- Establish a supply and demand mechanism to promote quota transactions

### Carbon Fee (Article 29)

- Promoting carbon reduction with economic tools
- Raise incentives through collection and spending

### Carbon capture utilization storage (Article 39)

- Promote the development of negative carbon technology
  - Environmental impact management



# 徵收碳費 專款專用

## 徵收對象

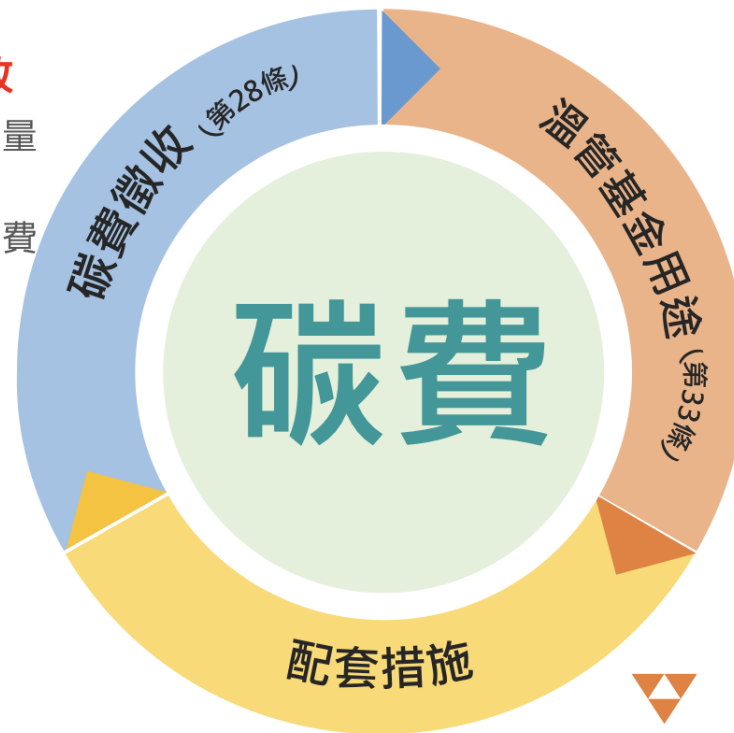
- **先大後小，分階段徵收**
- 被徵收對象之直接排放量及使用電力間接排放量
- 電力業扣除提供電力消費之排放量

## 徵收費率

子法訂定，考量原則：

- 我國溫室氣體減量現況
- 排放源類型
- 溫室氣體種類
- 排放量規模
- 自主減量情形及減量成效

定期檢討



## 自主減量計畫+優惠費率(第29條)

提出自主減量計畫能有效減少排放量達指定目標者，適用優惠費率

## 專款專用

專供執行溫室氣體減量及氣候變遷

## 優先用於輔導、補助及獎勵

- 事業投資溫室氣體減量技術
- 溫室氣體減量、研究及開發溫室氣體減量技術。

## 補助相關機關

補助地方政府及相關機關執行溫室氣體減量工作事項。

## 減量額度抵減碳費(第30條)

碳費徵收對象得以減量額度扣除排放量

# 全民參與 建構減碳行動力

## 擴大公民參與(第10-15、17條)

- 強化政府計畫、方案等之資訊公開、公民參與及檢討機制
- 融入綜合性及以社區為本之氣候變遷調適政策及措施

## 碳足跡標示(第37條)

- 建立碳足跡核算及標示
- 促使廠商生產低碳產品
- 提供民眾低碳消費選擇



## 氣候變遷人才培育與技術發展 (第6、8、17、42條)

- 推動溫室氣體減量、負排放及調適技術之研究發展
- 推動氣候變遷調適教育、相關科學、技術及管理人才培育

## 氣候變遷推動事項納入公正轉型 (第6、8條)

- 因應氣候變遷之基本原則、中央各機關推動溫室氣體減量及氣候變遷調適事項，增列公正轉型



THANK YOU