2024
能源技術服務業國際交流研討會
INTERNATIONAL ESCO SEMINAR 2024

The New Landscape of ESCO

Under 2050 Net Zero Emission Policy in Taiwan

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About the Speaker

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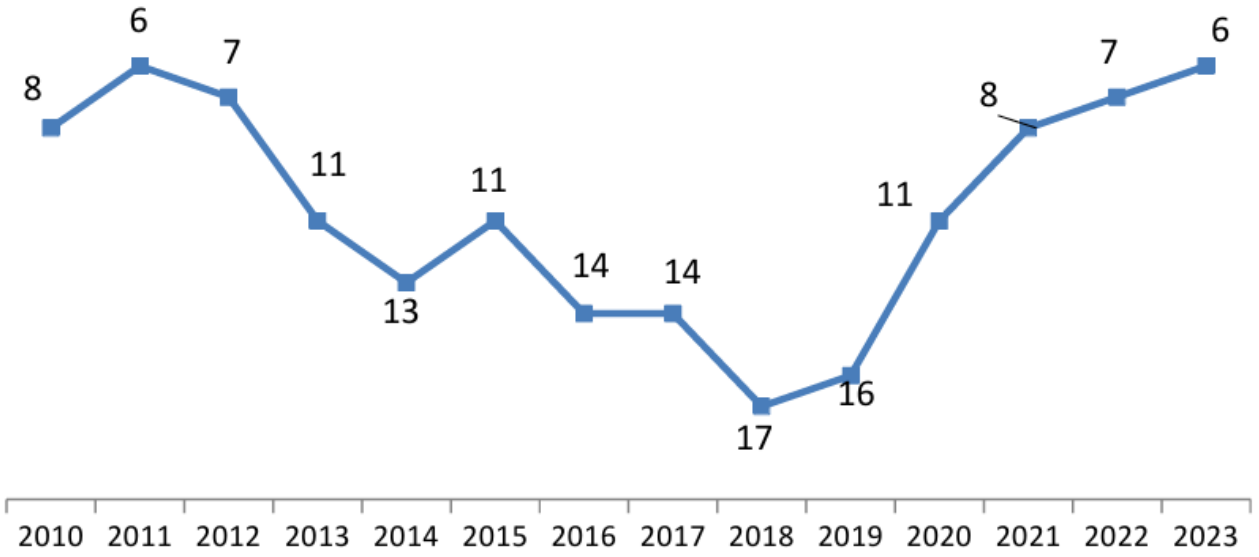
Contents

1. Taiwan at a glance

Thriving and vibrant economy



- In 2023, Taiwan ranked 6th among the 64 evaluated countries, marking its fifth consecutive year of improvement and its best performance since 2012.
- For the population over 20 million economies, Taiwan has maintained the top spot globally for three consecutive years.
- **Strong economic growth inevitably requires an abundant yet clean energy supply.**

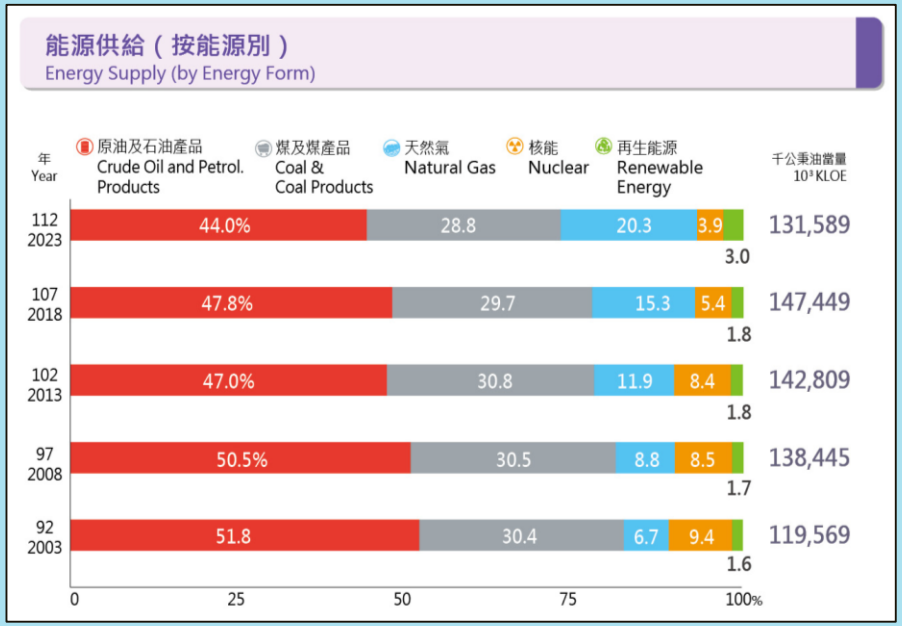
Source: 2023 IMD (International Institute for Management Development) World Competitiveness Yearbook

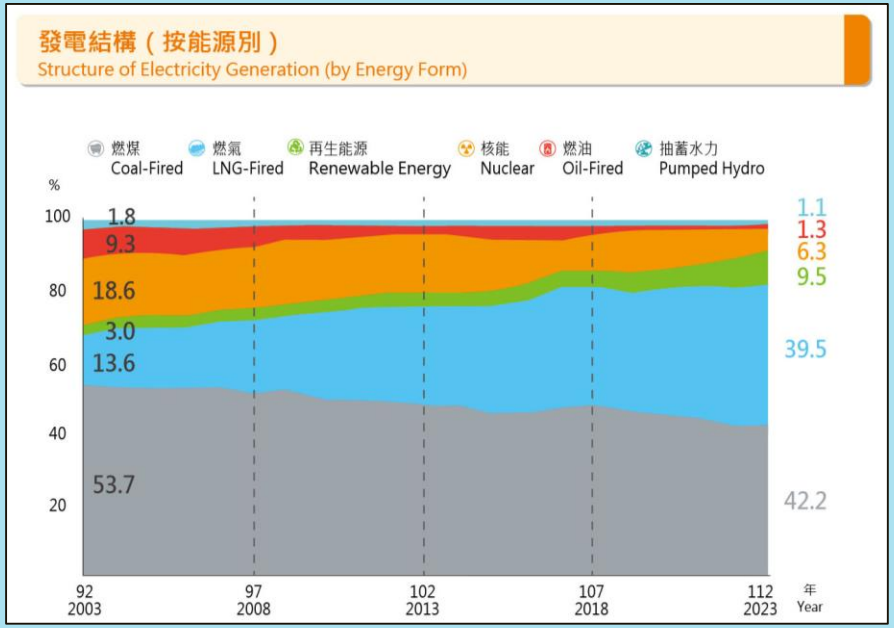
https://shorturl.at/83QWG
https://shorturl.at/jYIKW
https://shorturl.at/nFOHh

Increasing energy with a greener approach

2021 Emissions: ranked 21st globally.

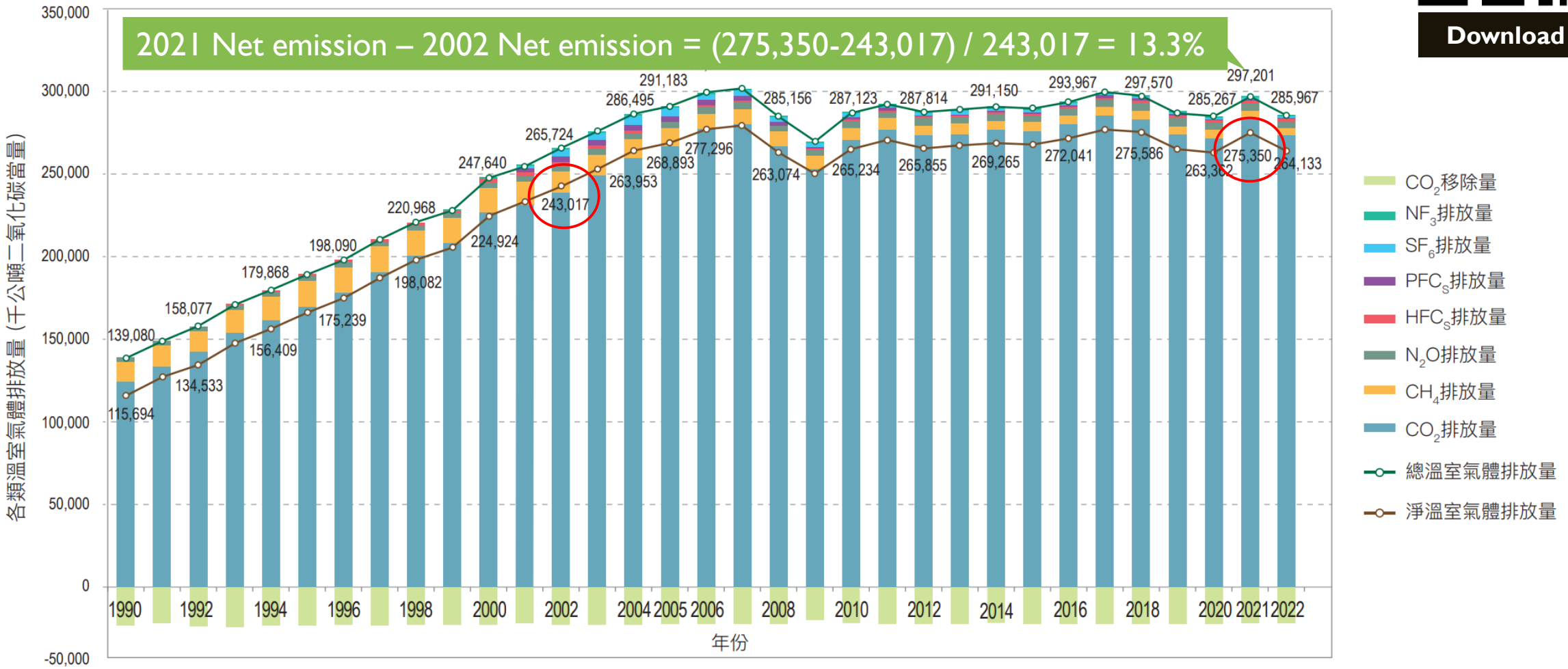
279 Mt	0.83 %	↑13.3 %
Energy-related CO2 emissions	of Global emissions	Since 2002





Increasing energy with a greener approach

Download

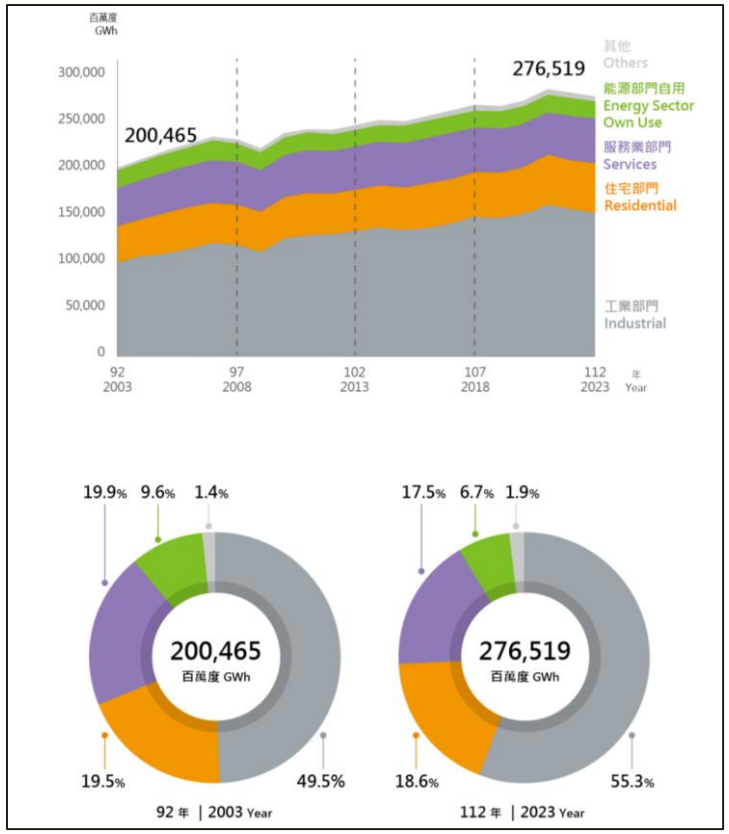


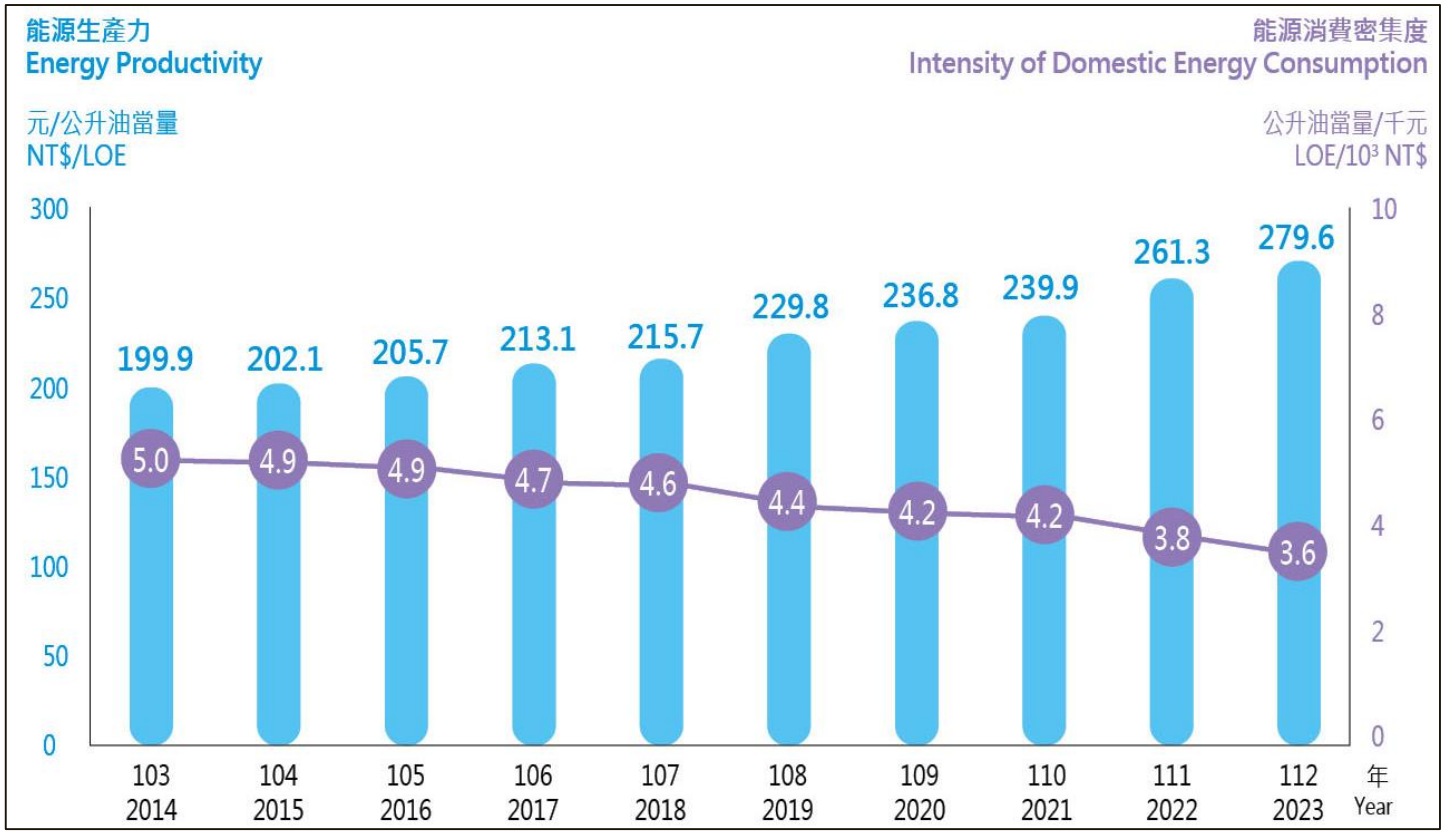
2024年中華民國國家溫室氣體排放清冊報告，第二章、溫室氣體排放趨勢，p.2-1，環境部氣候變遷署

1. Taiwan at a glance

Growth with sustainability

- Electricity consumption across different sectors increase over the years, despite some major economic downturns.
- **The intensity of energy consumption has improved by 28% (5.0 down to 3.6) over the last decade.**

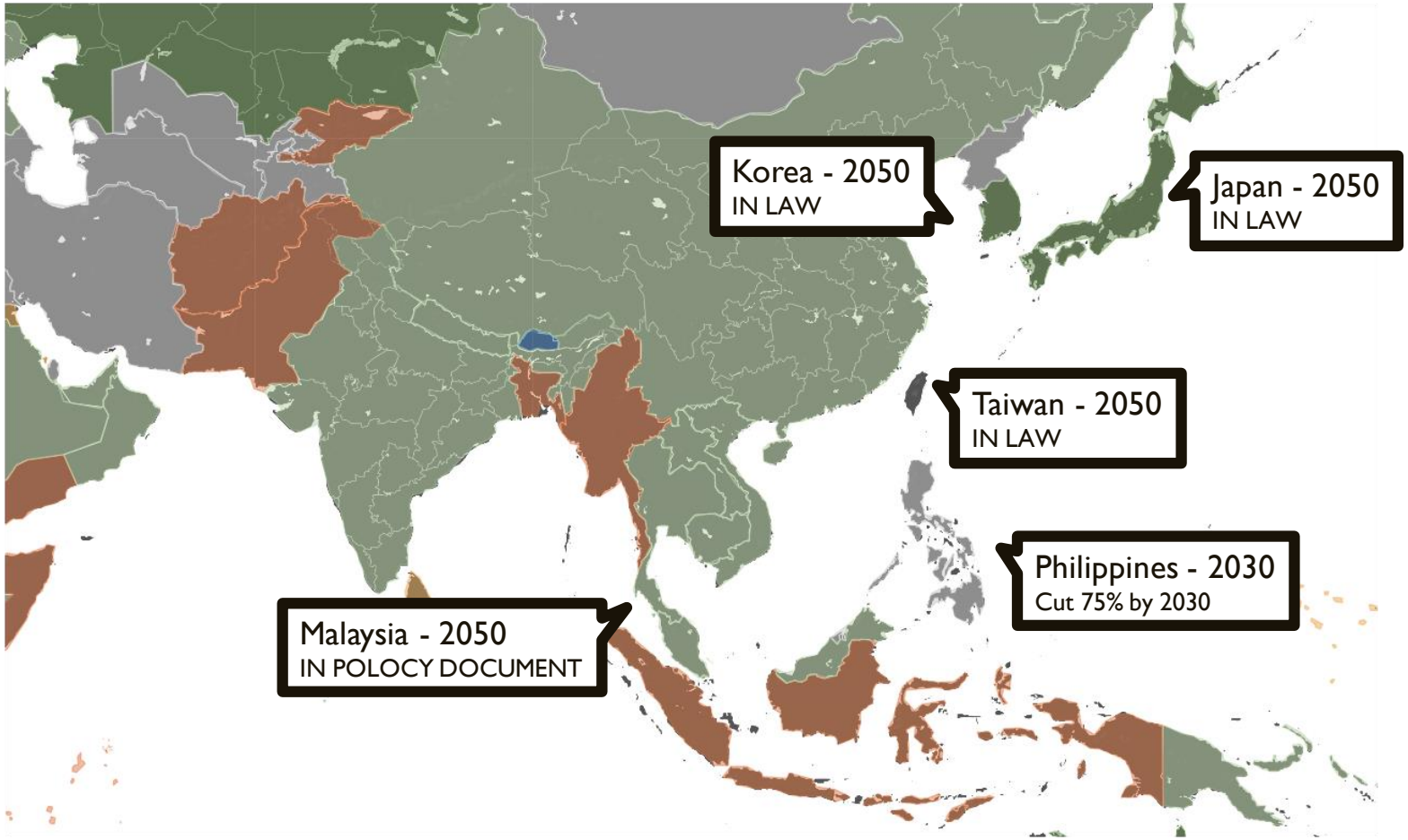




https://zerotracker.net/

2. Taiwan's Pathway to Net-Zero Emissions in 2050

Race to zero: turning vision into reality



Countries

147

Cities

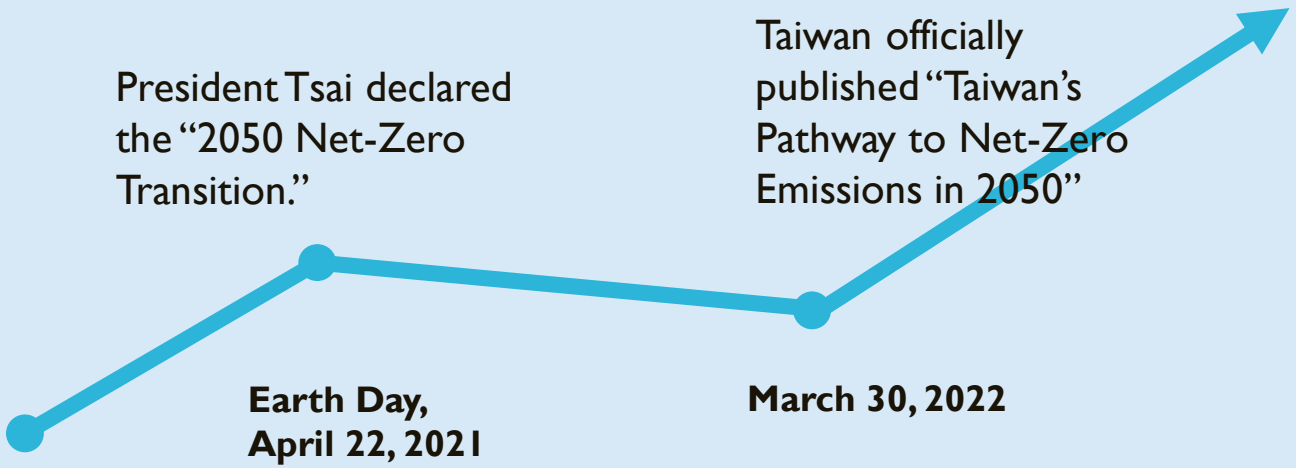
274

Out of 198 countries and 1,186 cities

"ZERO is already a measure of competitiveness."

2. Taiwan's Pathway to Net-Zero Emissions in 2050

In response to the global net-zero commitment



The pathway is based on the four major transformations of "energy, industry, life, and society" and the two major governance foundations of "technology research and development" and "climate legislation" and supplemented by "12 Key Strategies".

https://shorturl.at/jgmel

2. Taiwan's Pathway to Net-Zero Emissions in 2050

Milestones for each sector

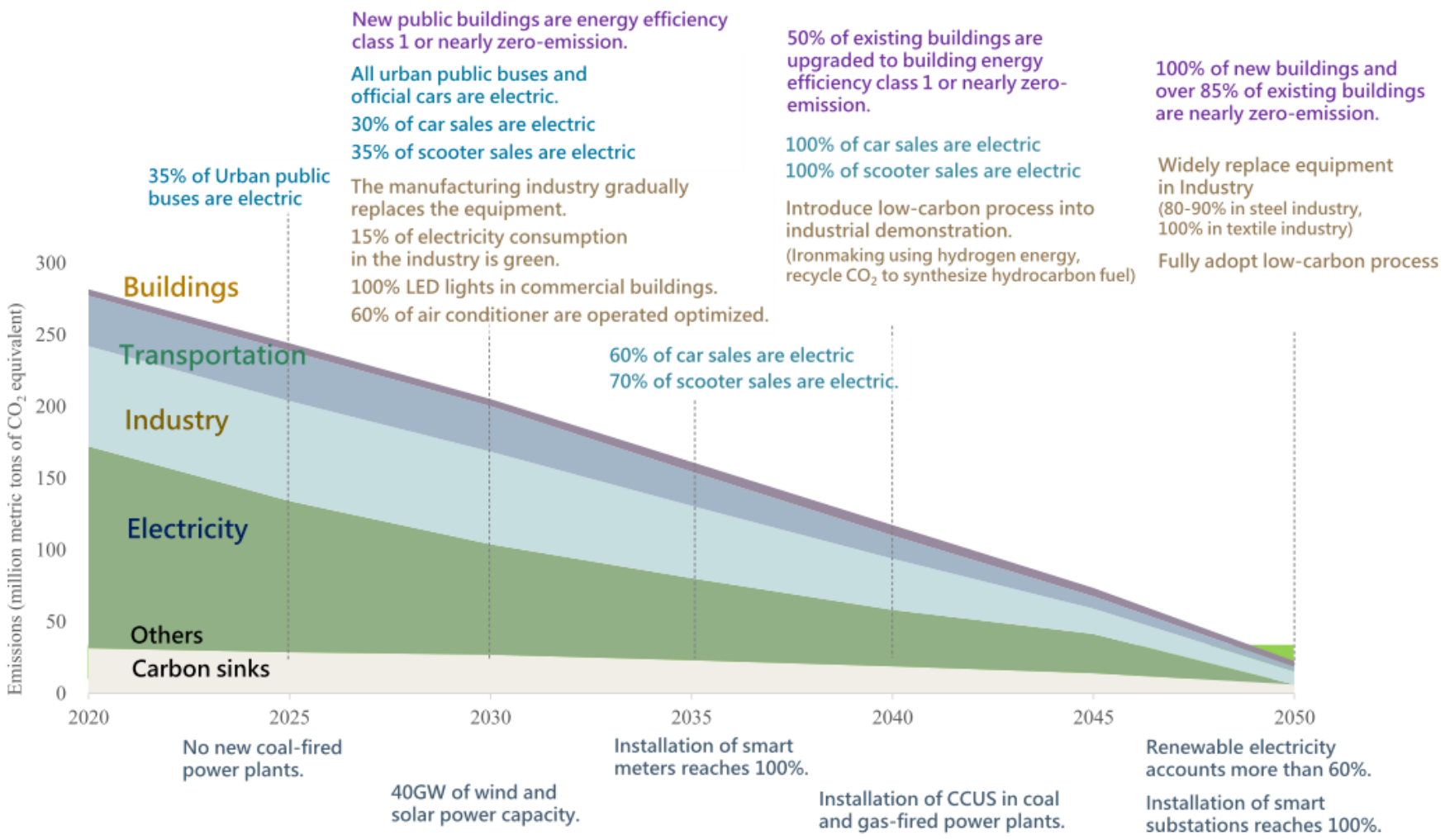
Buildings
Improving in exterior design, energy efficiency and appliance energy efficiency standards.

Transportation
Changing in travel behavior, reducing demand for transportation, and electro-mobility.

Industry
Improving in energy efficiency, fuel switching, circular economy, and innovative technologies.

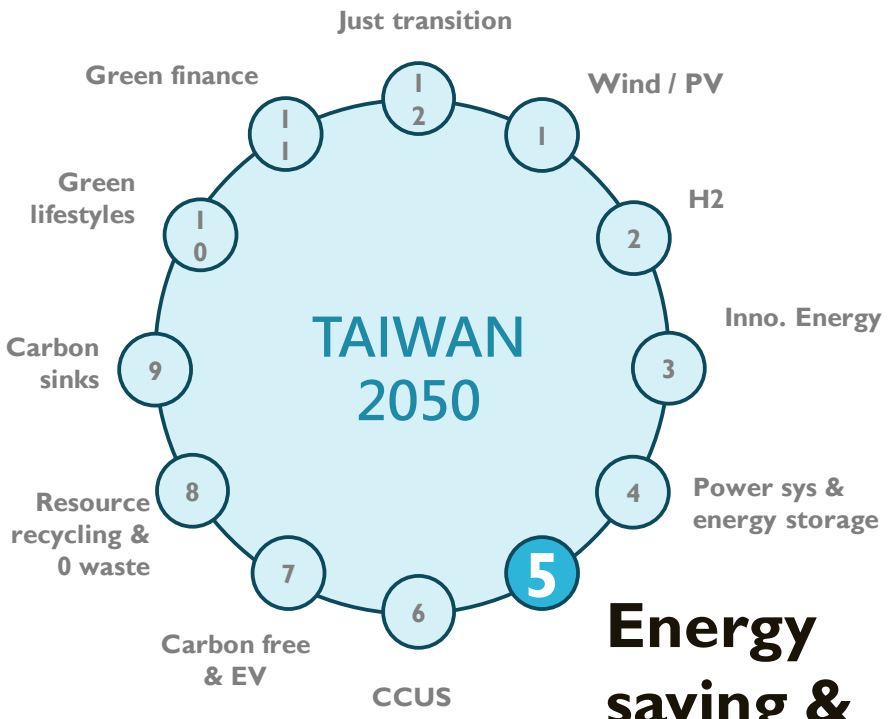
Electricity
Scaling up renewable energy, developing new energy technologies, energy storage, and power grid upgrade.

Negative emissions technologies
Demonstration by 2030.
At scale by 2050.



12 strategies where ESCO is to support No. 5

Cooperate with local governments and ESCO

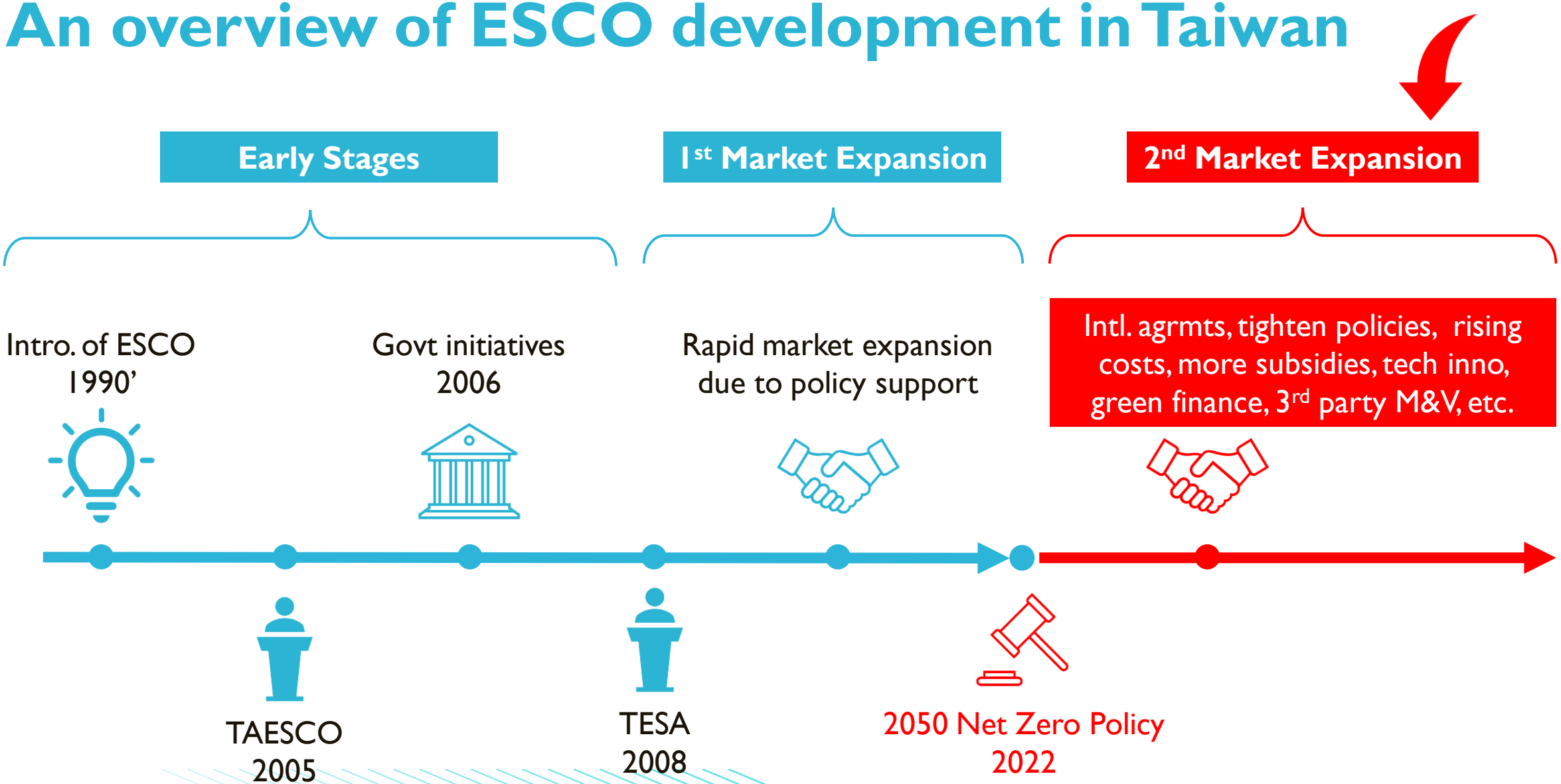


Energy saving & Efficiency

5. Energy saving & Efficiency

- **Industry**
  - Subsidize equipment replacement
  - 2030 60% of major users comply with ISO 50001
- **Comm.**
  - Subsidize equipment replacement
  - 2030 new public building to achieve LEVEL 1 or ZEB
- **Res.**
  - Subsidize appliances replacement
  - Envelope efficiency sees 10% boost
  - A/C and fridge MEPS reaches LEVEL
- **Trans.**
  - 2030 New Cars Boost Fuel Efficiency by 30%
- **RD**
  - 2030 low carbon electronic and steel mass production
  - 2030 Level 1 chillers increased by 15%
  - 2030 Increase power supply efficacy to 98%

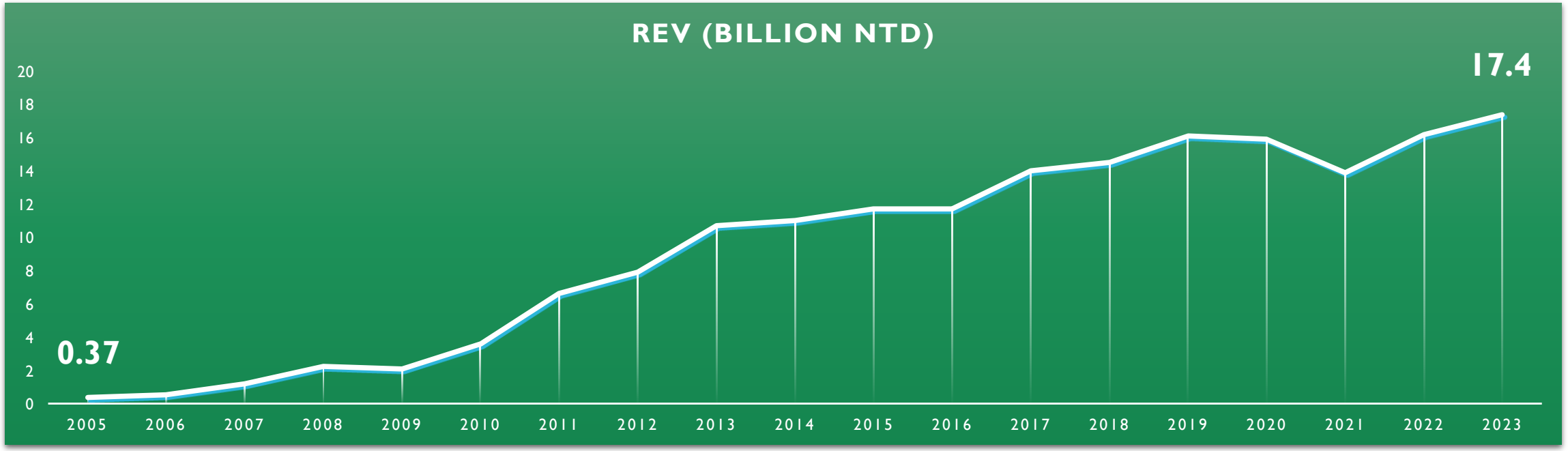
An overview of ESCO development in Taiwan



3. Transforming ESCO for the Net Zero future

Until 1st Market Expansion

17.4 B NTD	30%	386	78%	59%
in 2023	Pay by Saving	TAESCO members	SME	Manufacturers



Until 1st Market Expansion

Sector	Sub-sector	No. of applications	Saving (MWh)	Saving (Ton)	Saving (%)
Manufacturing Sector	Fabrics	27	456	24,574	32.6
	Metal	23	165	8,419	32.0
	Food Processing	13	100	5,487	27.4
	Biomed	16	172	8,658	33.8
	EE	83	1,673	85,341	30.0
	Chemicals	8	79	4,027	36.9
	Printing	4	20	100	45.0
	Plastics	32	197	9,826	35.2
	Electronic components	12	213	10,548	29.0
	Non-metal	11	62	3,096	25.3
	Others	28	354	17,814	32.1
	Sub-total	257	3,476	177,890	32.7
Commercial Sector	Sub-total	406	2,859	158,421	40.6
Total		663	6,335	336,311	37.9

What exactly is the 2nd Market Expansion

❶ Intl. Agreements such as RE 100 would be achieved easier with the First Fuel – Energy Efficiency.

 # Investor and Stakeholder Expectations

Investor Pressure

Being part of agreements like RE100 can make companies more attractive to ESG-focused funds.

Stakeholder Demands

Employees, consumers, and communities are raising their expectations.

 # Global Reputation

Brand Reputation

Marketing needs reputation to build trust and credibility, ensuring long-term success and brand loyalty.

Standards Leadership

Employees, consumers, and communities are raising their expectations.

What exactly is the 2nd Market Expansion

❶ Intl. Agreements such as RE 100 would be achieved easier with the First Fuel – Energy Efficiency.

 # Policy Alignment and Risk Mitigation

Policy Alignment

More countries and regions are adopting more stringent climate regulations.

Risk Mitigation

Complying with agreements like RE100, will get rid of rising energy costs, fossil fuels dependency and the impact of carbon levies.

 # Supply Chain Influence

Scope 3 Must go zero

RE100 isn't equal to zero emissions, as many companies shift carbon to their suppliers, resulting in Scope 3 emissions. ESCOs can help suppliers reduce these emissions, making Scope 3 closer to zero.

3. Transforming ESCO for the Net Zero future

What exactly is the 2nd Market Expansion

❷ Tighten policies to drive aggressive energy savings among users

 # Amendments to Energy Admin Act

Mandatory Data Disclosure

Taipower must regularly disclose sales data. Data must be shared under specific guidelines.

Enhanced Local Gvnt Oversight

Local gvnts must hire professional parties for investigations to ensure compliance.

 # New Saving Mandate for > 10,000 kW users

Cut 1% per year → cut 6% in 4 years

Contract	Number of Customer #	Consumption (GWh)	Annual target
801~10,000 kW	4,577	34,000	-1%
≧10,001 kW	320	123,600	**-1.5%**

1 GWh = 1 M kWh
100 GWh = 1億度電

What exactly is the 2nd Market Expansion

❸ Rising costs shorten the investment return

 # Energy prices inflation

Electricity

- Electricity (light) increases 4.0% in last 3 yrs
- Electricity (power) increases 25.3% in last 3 yrs

Fuels

- Unleaded gasoline 95 increases 7.2% in last 3 yrs
- Natural gas (fuel) increases 60.2% in last 3 yrs

 # Financial pressure on Taipower

~USD 12 billion deficit as of 2023

- Taipower, the state-owned utility, continuously faces accumulated deficits, **leading to rate hikes to cover costs.**

https://shorturl.at/ODYmy

3. Transforming ESCO for the Net Zero future

What exactly is the 2nd Market Expansion

❹ More subsidies and rebates are backing users to upgrade EE

Large

>800 kW, 4,800 users

157,300 GWh

- Add 10% green energy
- Cut 1~1.5% energy per year
- Energy manager
- Annual energy report
- Annual ESG report
- **More subsidies**

Medium

100~800 kW, 19,900 users

19,500 GWh

- **More subsidies**

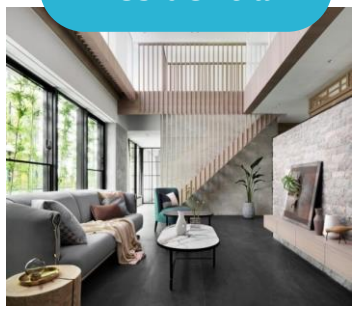
Small

<100 kW, 1.33 Million users

28,800 GWh

- **More subsidies**

Residential



13.57 Million households

51,700 GWh

- **More rebates**

ESCO, Equipment replacement, GHG reporting assessment, Investment Tax Credit Article 10-1 amendment

AC, fridge, gas stove, gas water heater, car-park LED

1 GWh = 1 M kWh
100 GWh = 1億度電

What exactly is the 2nd Market Expansion

❹ A list of subsidization and rebate projects

Particularly for ESCO

Target	Project	Ministry in Charge		Valid through
Industrial and Commercial	ESPC Demo & Promo Subsidization Project	MOEA	Energy Admin	1996~
Commercial	Systematic Energy Saving Subsidization Project	MOEA	Admin of Commerce	2023~
Commercial	Equip Replacement Subsidy	MOEA	Admin of Commerce	2023~
Corporations, Hospitals	Power & Utility Equip Subsidization Project	MOEA	Energy Admin	2016~
Residential	Home Appliances Rebates	MOEA	Energy Admin	2018~2026
Industrial and Commercial	Investment Tax Credit	MOEA		2025~2029
Industrial SME	Post-COVID Special Budget	MOEA	SME & Startup Admin	2023~
All sectors	Different names across Taiwan	Grants from central govt or local govnt budget		Occasional

Recently appeared

What exactly is the 2nd Market Expansion

❹ ESPC Demo & Promo Subsidization Project 節能績效保證專案示範推廣補助專案

Individual > 100 kW or Corp. >500 kW

- Corp.
- Hospital
- Public
- School

Annual performance > 10%
Signed by M&V engr.

Subsidy percentage depends on biz size and EE measures maturity

5 million Individual	**30~40%** SME
15 million Corp.	**20~30%** Non-SME

- Encourage to use advanced EE measures -

- Com sector central AC: water side < 0.75 kW/RT
- Com sector central AC: air side < 0.25 kW/RT
- Data center: PUE < 1.5
- Equipped with BEMS
- Install green energy and use on-site
- Chiller EE labeling grade 1
- Air compressor < 6.8 kW/CMM
- Install power controller
- Install temperature controller
- Low voltage squirrel cage induction motor 0.75 kW @ 1HP ~200 kW @ 270HP
- Efficient refrigeration systems
- AI-added manufacturing equipment or system

What exactly is the 2nd Market Expansion

❹ Systematic Energy Saving Subsidization Project 商業服務業系統節能補助專案

Combined capacity > 100 kW

Com.

Annual performance > 10%
Signed by M&V engr.

Subsidy scale

5 million **33%**

- Other important notices -

- Must conducted by ESCO
- Verified by 3-party M&V experts

What exactly is the 2nd Market Expansion

❺ Tech Innovations

 # Efficiency standards

Manufacturers must comply with new stds

- Up to 20% for energy-efficient chillers, air handling units (AHUs), and fan coil units (FCUs) over the last decade.
- LED price drops 90% with longer lifespan
- Global demands drive mass production, resulting in cheaper products

 # Artificial Intelligence

System approach needs AI

- Costs of AI development and deployment decrease dramatically.
- AI is well coupled with design phase and O&M phase. More accurate, prompt and facilitate post analysis 24/7.

IWA Smart Integrated Platform SIP

One Touch

Revit Software

COBie Info Exchange

Fast

BIM Information (3D Module Interface)

Intelligent Algorithms

Optimized

Building Thermal Environment

Energy Saving

Dynamic Energy Forecasting

Solution

Digital Twin Engine based on BIM 3D Technology

Extending the application of BIM from the design and construction phases to the operation and maintenance phases, integrating BIM with facility asset management systems to enhance operational efficiency.

Integrating building controls during the operational phase, such as lighting, fire protection, HVAC, networked devices, etc., to establish a Building Digital Twin, presenting real-time operational information.

IWA SBIM Platform

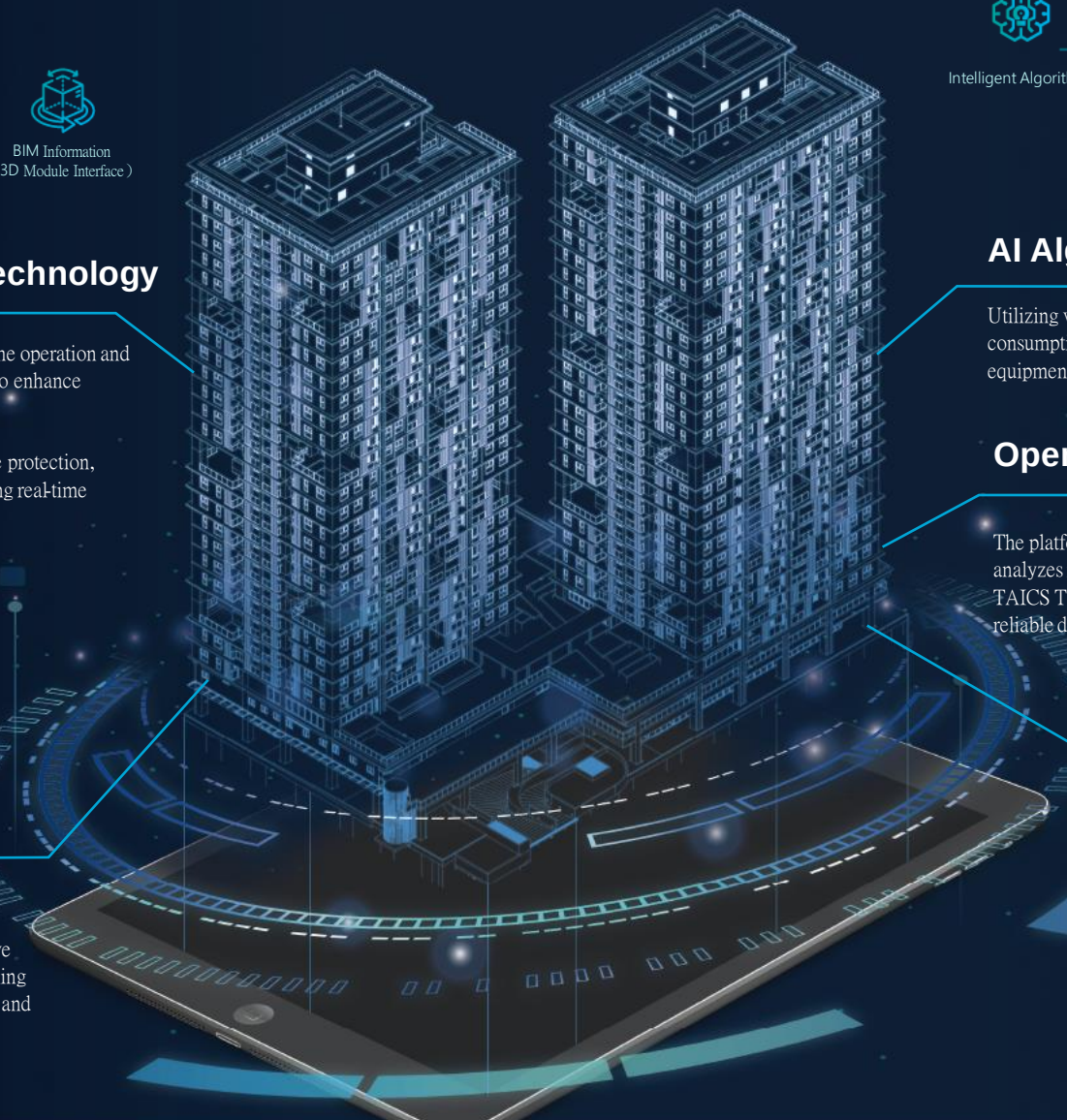
Facility Management

Property Management

Operations Management

Building Intelligent Automation and Lifecycle Management

Integrating HVAC, lighting, access control, surveillance, fire safety, power distribution, indoor air quality, plumbing, elevators, renewable energy, energy management, carbon emission management, and IoT devices for comprehensive lifecycle management. Automatically generating maintenance schedules, enabling integrated management of monitoring, control, recording, repair, maintenance, and optimization.



AI Algorithms

Utilizing various AI intelligent algorithms to predict the performance and energy consumption of various equipment, achieving high-efficiency operation of equipment.

Open Interface

The platform collects various types of building information, processes and analyzes it according to the TAICS data format standard (TAICS TS-0009), TAICS TS-0022, and international standard communication protocols. It provides reliable data for integration with third-party systems.

ESG Net Zero Sustainability

In line with ESG sustainable development goals, establish an enterprise intelligent carbon management system, providing energy-saving and emission-reduction solutions. Create a healthy and safe working environment and promote corporate data transformation based on data-driven governance.

https://shorturl.at/O0iYo
https://shorturl.at/idMYw

What exactly is the 2nd Market Expansion

❻ Green Finance

 # ESCO Project Loan

Credit Guarantee Funds

- Underwriting 80%→95%
- Remittance fee 1.5%→0.375%
- Loan limit 150 M→300 M NTD
- Interests 3%→ fixed

 # National Dvnt Funds

< NTD 100 million investment

National development funds are required to invest ESCO related to:

- Strategic MSE sector
- Strategic commercial sector
- Strategic industrial sector.

#Sustainable Economic Activities Guidelines

ESCO is officially included

- To guide financial institutes to evaluate values with the same metrics
- In 2022, ESCO is officially included in the Appendix .

What exactly is the 2nd Market Expansion

❼ The importance of 3rd Party M&V in the ESCO industry

 # Collaborative efforts

Joint forces start the way

- TESA cooperates with TAESCO to educate and certify M&V engineers.
- TAESCO forms a group of 3rd Party M&V engineers to examine project savings.

 # Incorporated with subsidies

Admin of Com ESCO subsidy

- > 100 kW users can be subsidized up to 33% (NTD 5 Million).
- Submit with M&V certificates.

 # Enabling green finance

Goodbye, green wash

- With accurate M&V, green finance becomes viable.
- Financial sectors gain confidence in the return of investment.

Bridging the Gap: Balancing ESCO Market Growth with Workforce Expertise

 # More market management

Empowering efficiency

- Need a platform to connect qualified ESCOs with the right clients
- Need more post-market risk management

 # Skill gaps

HR – your hidden success

- Short of qualified employees
- Education takes time
- Retaining existing employees

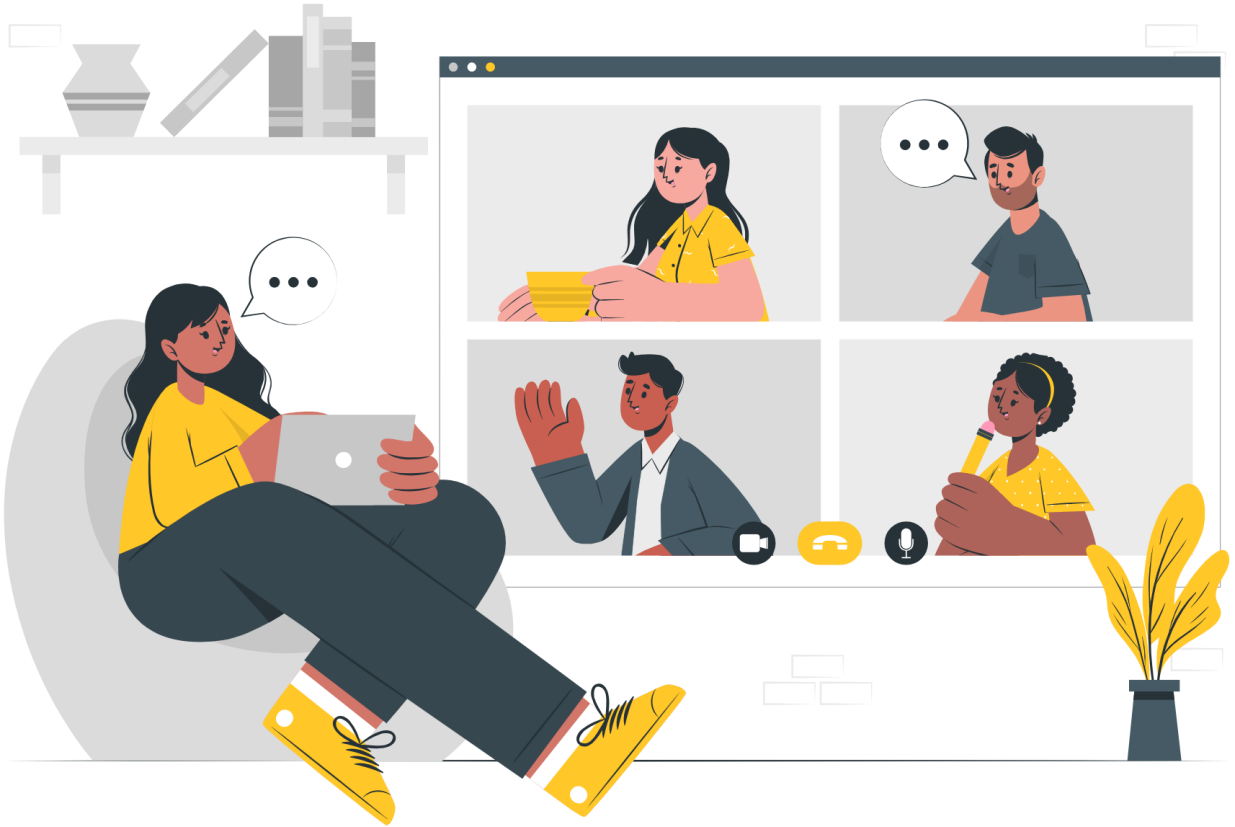
Aligning Regulatory Frameworks: Recognizing Energy Savings in a Changing Landscape

 # Need better coordination

Central government Ministries should work hand in hand

e.g.

- FSC links investment to ESCO
- MOI sets strict building codes
- Inconsistent definition of energy saving, causing confusion to clients
- Central gvnt needs a Cross-Agency Dialogue to communicate and create a more integrated regulatory framework



FSC金管會；MOI內政部

Empowering Local Governments: A Critical Role in the Net Zero Transition

 # A catalyst for net zero

Local gvnt knows details the best

- Local gvnts are the frontlines of the policy.
- Have a unique ability to engage communities and local stakeholders
- ESCOs at the local level not only contributes to environmental goals but also drives local economic development and job creation, benefiting communities directly.

 # Need more resources

Energy transition is NOT just energy affairs

- Many local governments lack the necessary resources, such as personnel and budgets.
- Central authorities together with TAESCO should consider to provide training, funding and technical assistance.
- Net zero future needs more than saving energy.

Thank you and comments

Dr. Wei-Da Tu
Vice President, Taiwan Association of Energy Service Companies (TAESCO)