

ECAP37

Reference Information and Discussion Topics

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1. EE&C Act Revision in Japan

- Revision Transition of Japan's EE&C Act
- Development Map on Revised EE&C Act & Regulations/Measures in Japan
- Comparison of Regulatory Target under EE&C Act
- Reason for Business operator-based regulation in Japan

2. Energy Manager System in Japan

- Points of Energy Management (EM) system in Japan
- Why Business Operators Submit Periodical Reports?
- Maps for EM related national qualification and training systems operated by ECCJ
- Follow-up lecture training after primary training / exam
- ASAEMAS AM Module Application to Lecture Training for CN

3. Investment Promotion Initiatives Towards CN in Japan

4. General Method for EE&C Promotion

[Reference] Energy Consumption of Industrial Sector by Country

5. Topics for Group Discussion

1. EE&C Act Revision in Japan

Revision Transition of Japan's EE&C Act (1)

Year	Main Revised Regulations	Background
1979	<p>Establishment (Act on the Rational Use of Energy)</p> <ul style="list-style-type: none"> ➤ Publication of EC Guideline ➤ Designation of Energy Management Factories ➤ Appointment of Energy Managers ➤ Obligation to Record Energy Usage Status 	<p>1973: First Oil Crisis 1979: Second Oil Crisis</p>
1993	<p>Revision-1</p> <ul style="list-style-type: none"> ➤ Formulation of Basic Policy ➤ Obligated Periodical Report for Designated Energy Management Factories for specific industries. 	<p>1992: Earth Summit/ UN Framework Convention on Climate Change</p>
1998	<p>Revision-2</p> <ul style="list-style-type: none"> ➤ Establishment of Type 2 Designated Energy Management Factories ➤ Obligation for Type 1 Designated Energy Management Factories to Submit Mid-long term plan ➤ Obligation for Type 2 Designated Energy Management Factories to Appoint Energy Managers/Record Energy Usage Status ➤ Establishment of Top Runner Program 	<p>1997: COP3, Adoption of Kyoto Protocol 1998: Framework to Promote Measures on Global Warming</p>
2002	<p>Revision-3</p> <ul style="list-style-type: none"> ➤ Expand the scope to all industries for Type 1 Designated Energy Management Factories ➤ Periodical report obligation for Type 2 Designated Energy Management Factories 	<p>2002: Ratification of Kyoto Protocol 2002: Establishment of the Basic Act on Energy Policy</p>

Revision Transition of Japan's EE&C Act (2)

Year	Main Revised Regulations	Background
2005	<p>Revision-4 <Unification of Regulatory Categories></p> <ul style="list-style-type: none"> ➤ Removal of Categories for heat and electricity, and regulations based on the combined energy consumption of fuel, heat and electricity 	<p>2005: Effective of Kyoto Protocol</p> <p>2005: Kyoto Protocol Target Achievement Plan</p>
2008	<p>Revision-5 <Business Operator-Based Regulation> (Regulatory System for each Business Operator)</p> <ul style="list-style-type: none"> ➤ “Designated Business Operators” and “Designated Chained Business Operators” ➤ They must appoint “Energy Management Supervision Officer” and “Energy Management Planning Promoter” 	<p>2008: Revised Kyoto Protocol Target Achievement Plan</p>
2013	<p>Revision-6</p> <ul style="list-style-type: none"> ➤ Promoting Electricity Demand Leveling - Peak Power Leveling Measures ➤ Expanding Top Runner Program to Building Materials, etc. 	<p>2011: Great East Japan Earthquake, Electricity supply and demand tightened</p>
2015	<p>Revision-7</p> <ul style="list-style-type: none"> ➤ Establishment of Building EE&C Act (Act on the Improvement of Energy Consumption Performance of Buildings) 	<p>Energy consumption of buildings increased significantly</p>

Revision Transition of Japan's EE&C Act (3)

Year	Main Revised Regulations	Background
2018	<p>Revision-8</p> <ul style="list-style-type: none"> ➤ Establishment of Certification system for Certified Managing and Supervising Business Operator ➤ Establishment of Certification system for Collaborative Energy Efficiency Plans 	<p>2015: Long-Term Energy Supply and Demand Outlook established</p> <p>2016: Effective of COP21 Paris Agreement</p>
2022	<p>Revision-9 <Renamed to “Act on Rationalizing Energy use and Shifting to Non-Fossil Energy”></p> <ul style="list-style-type: none"> ➤ Expanding the scope of rationalized energy use based on revised energy definition ➤ Measures for the Transition to Non-Fossil Energy ➤ Measures for Electricity Demand Optimization 	<p>2022: Sixth Basic Energy Plan Established</p> <p>(Accelerating demand side initiatives toward CN and establishing the comprehensive institutional framework)</p>

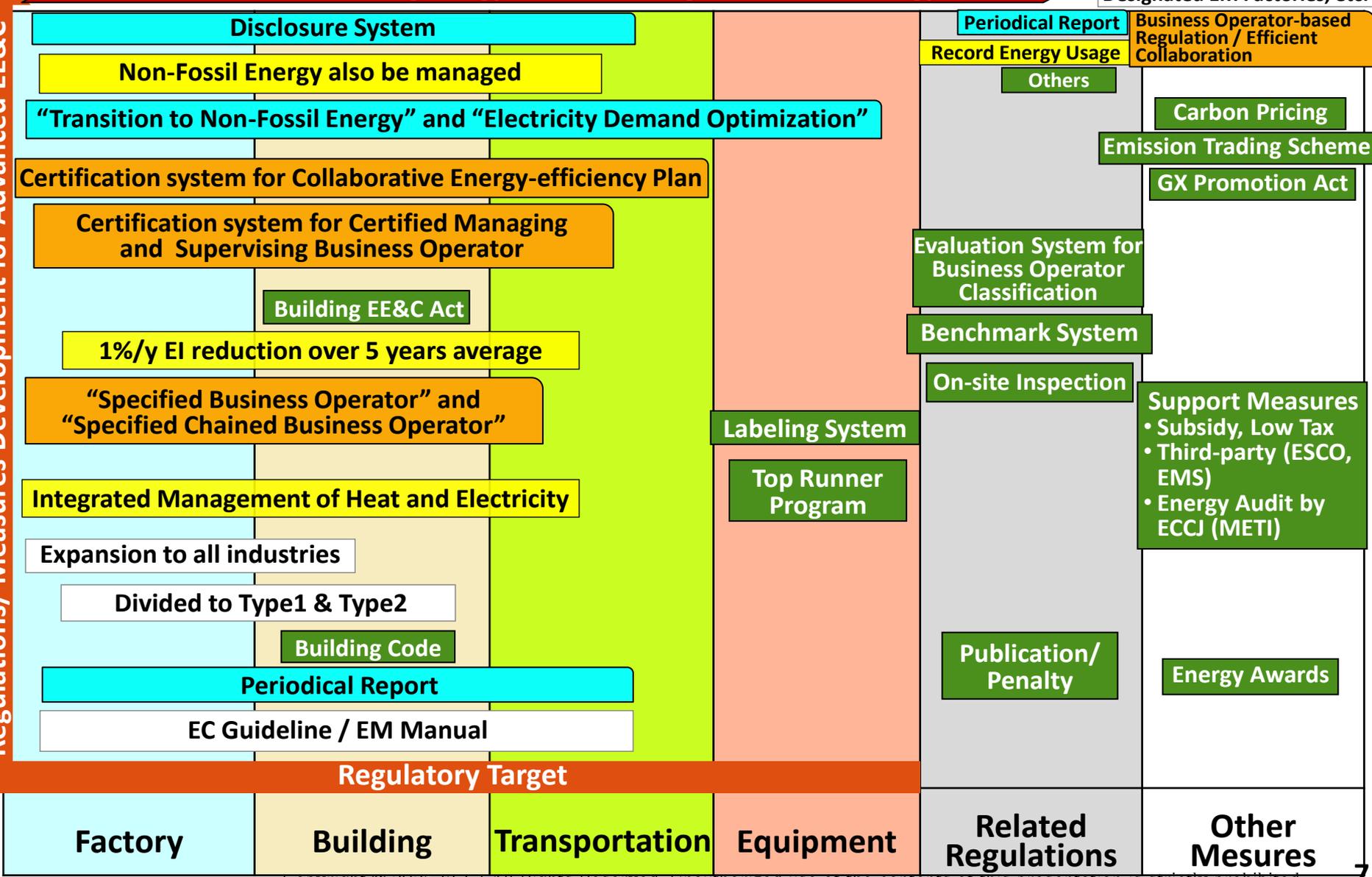
Disclosure System for Periodical Report:

- The voluntary disclosure system for Periodic Report was established with submitted from FY2024.
- Background is the growing focus on ESG (Environmental, Social, and Governance) investing and increasing demands for corporate sustainability information disclosure.

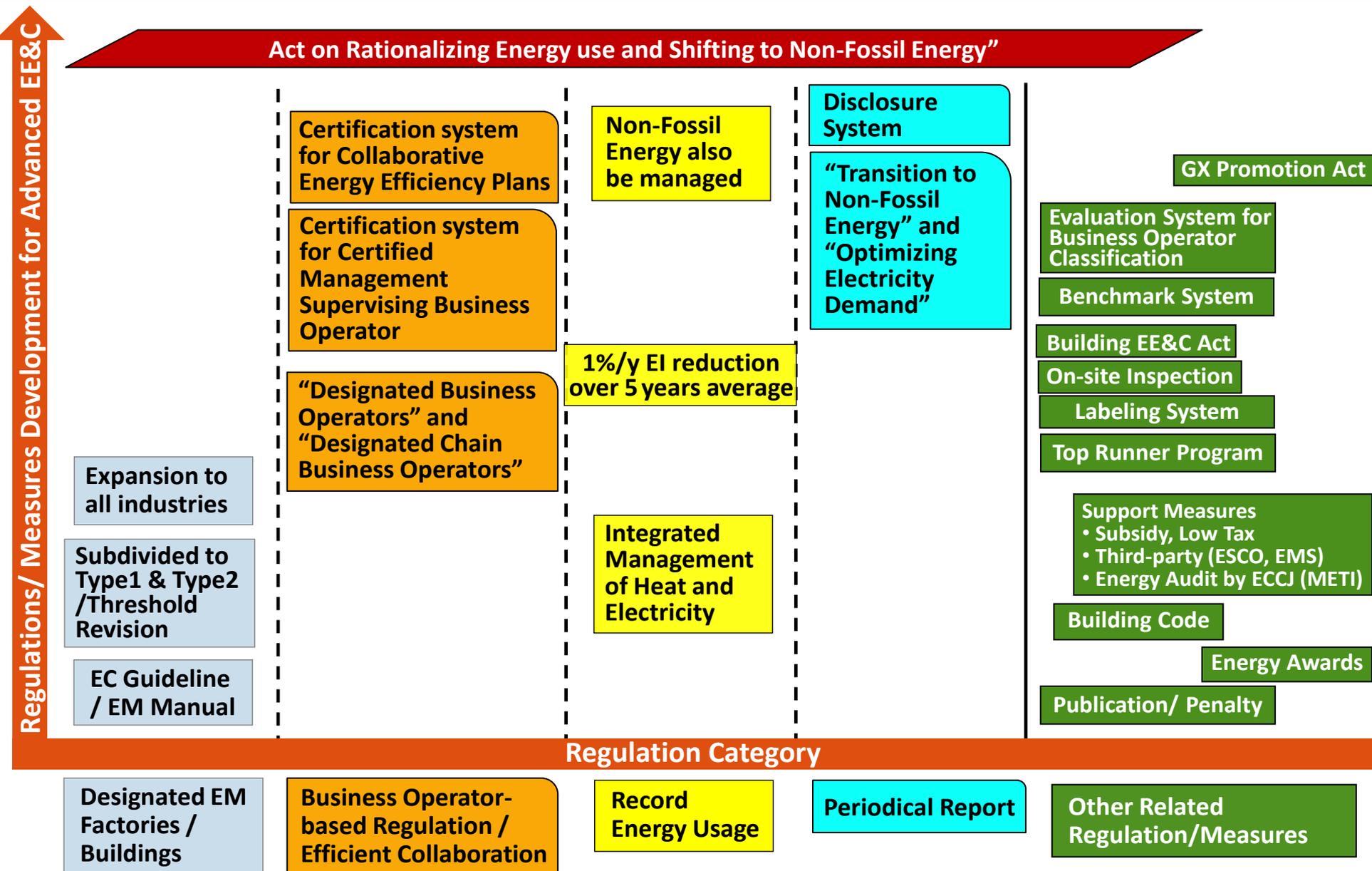
Development Map on Revised EE&C Act & Regulations/Measures by Regulatory Target in Japan

Act on Rationalizing Energy Use and Shifting to Non-Fossil Energy

Regulations/ Measures Development for Advanced EE&C



Development Map on Revised EE&C Act & Regulations/Measures by Regulation Type in Japan



Comparison of Regulatory Target under EE&C Act

Perspective	Business operator-based regulation	Factory/Building-based regulations
Overall Optimization	Optimize company-wide investment allocation and improvement measures	Optimized individually at each Factory/Building, resulting in company-wide inefficiency
Flexibility	Individual shortfalls can be covered by the whole	Mandatory targets at each site → No flexibility for adjustments
Top Management Involvement	Easy to implement as a business strategy	- Tendency to leave matters to the site - Top management involvement is weak
Fairness	Regulations can be tailored to the actual scale of operations	- Large companies can avoid regulations by fragmenting their operations. - SMEs is at disadvantage.
Business Operator Burden	Reporting all at once is efficient.	Each site requires reporting, resulting in a significant total burden
Administrative Burden	Efficiently track each operator	Need to manage each site nationwide individually is overwhelming

Reason for Business operator-based regulation in Japan

1. Overall optimization of EE&C actions/measures

By tracking energy usage across the entire company rather than by individual factory/building, combine energy-inefficient sites with high-performing ones to develop an optimal company-wide EE&C plan by businesses operator.

2. Promote voluntary initiatives by Business Operator

By making the entire business entity subject to regulation, top management will take responsibility for their company's EE&C and find it easier to position EE&C as part of their business strategy.

3. Fairness and Rationality of Regulation

Many business operators consume large amounts of energy overall, even if individual facilities are small. Therefore, regulating business operator-basis rather than individual factory/building would result in fairer regulations that better reflect reality.

4. Government/Administrative Efficiency

- More efficient for government to track and guide energy usage for business operator-base than for each individual factory/building.
- Reducing administrative burdens such as reporting, auditing, and guidance

2. Energy Management System in Japan

Points of Energy Management (EM) system in Japan

A. System on EM Guideline and Manual

The Act* requires business operators to adjust EC* Guideline and to make EM* Manual and Operation Manual.

B. EM work and Obligation based on the Act

The Act requires business operators to submit periodic reports and mid-long term EC plan on energy efficiency to the government that evaluate them.

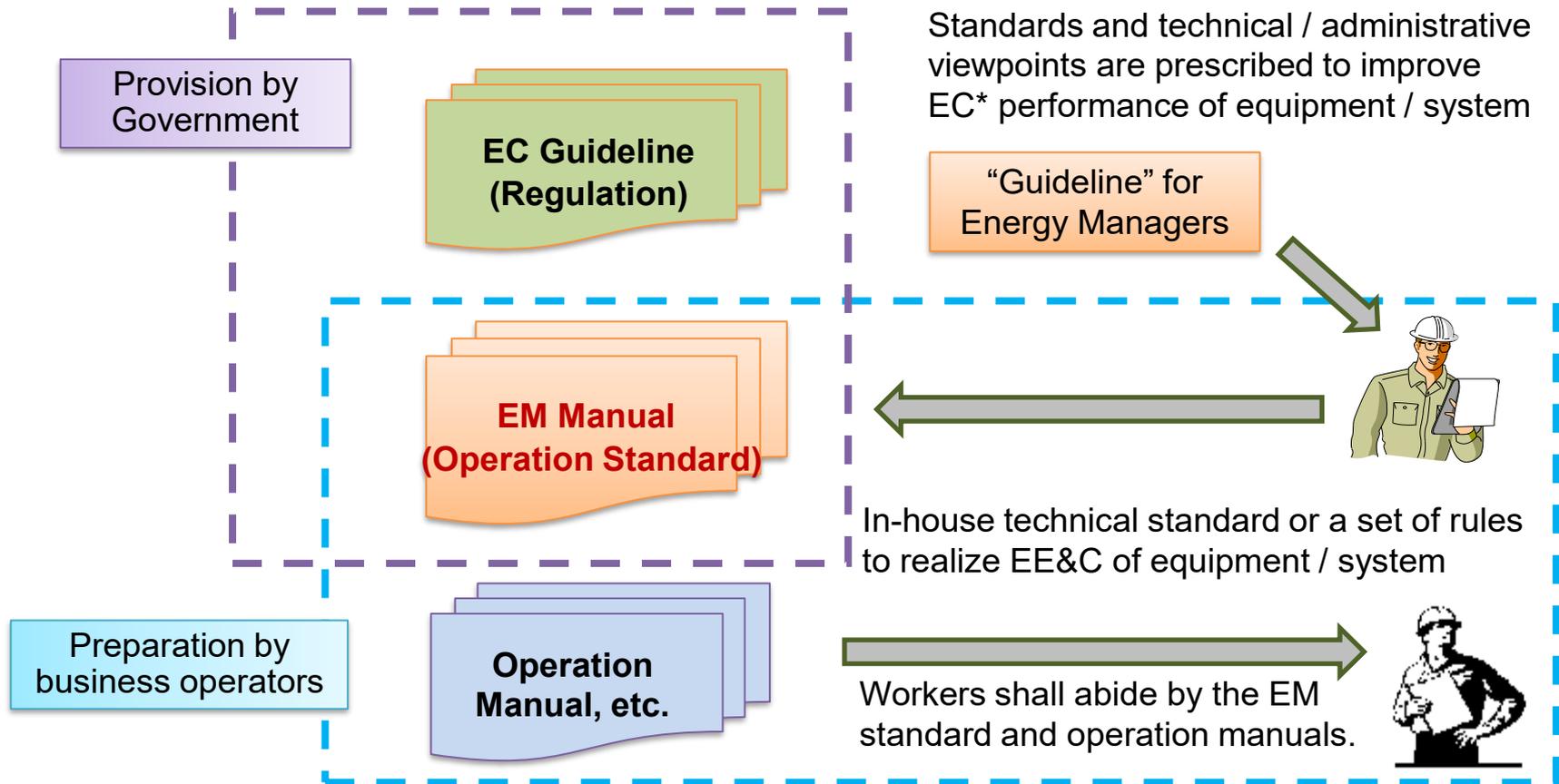
C. Structure on Designated Factories and Energy Managers

The Act requires business operators to designate EM Supervision Officer, EM Planning Promoter and Energy Manager.

* the Act : Act on the Rational Use Energy

EM: energy management EE&C: energy efficiency & conservation EC: energy conservation

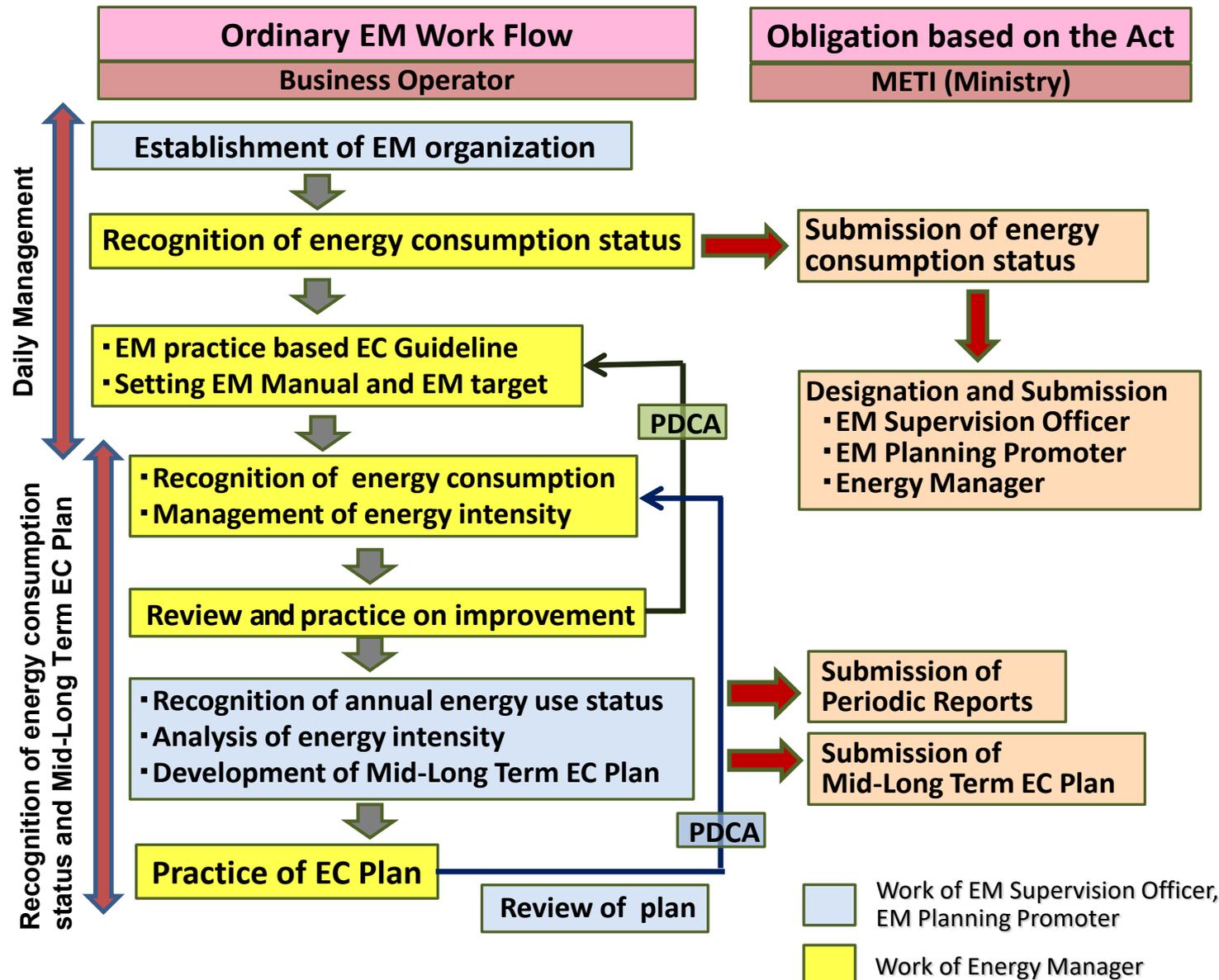
A. System on EC Guideline and EM Manual



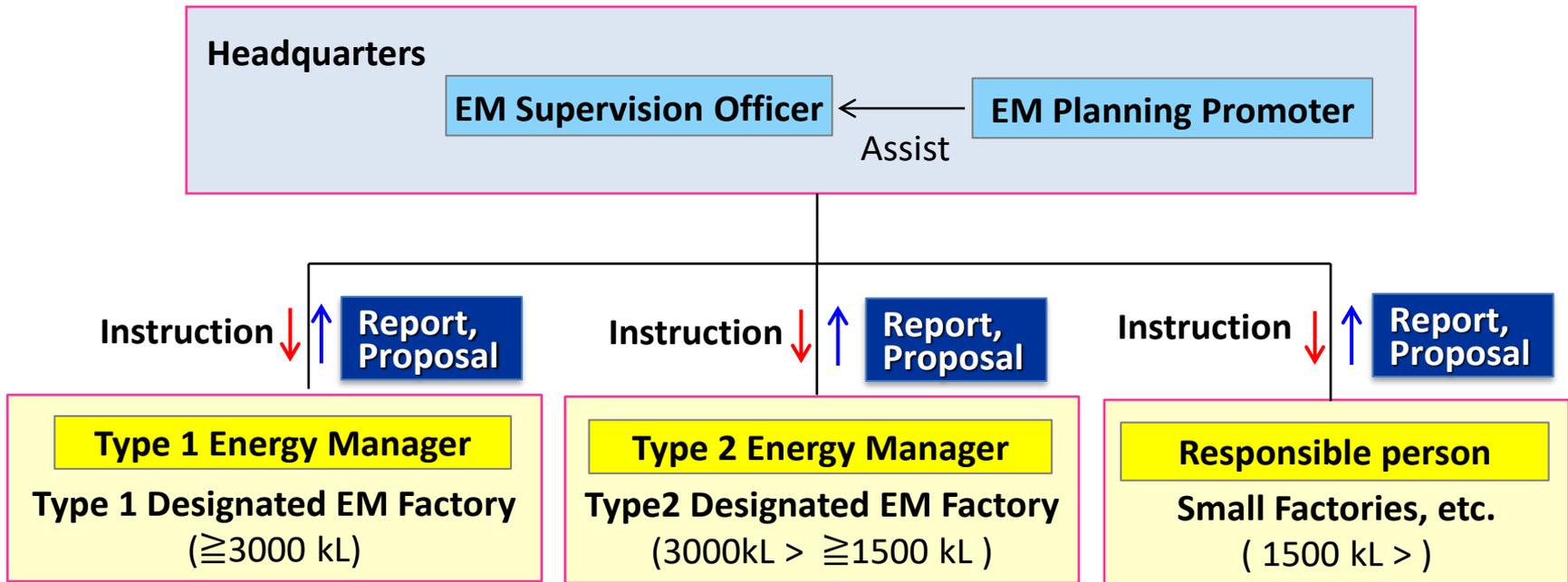
* the Act : Act on the Rational Use Energy

EM: energy management EE&C: energy efficiency & conservation EC: energy conservation

B. EM work and Obligation based on the Act



C. Structure on Designated Factories and Energy Managers



Periodical Report Information Disclosure System - Disclosure Sheet [Submission for FY2024 (FY2023

Continued version

When viewing this disclosure sheet, please refer to the "Guidelines for the Disclosure System of Periodic Report Information" website

RYOBI LIMITED

* indicates optional disclosure items

Japan Standard Industrial Classification	code	Item name
Middle classification	twenty three	Non-ferrous metal manufacturing industry
Subclassification (Main business)	2353	Aluminum and aluminum alloy die-casting manufacturing industry
Energy Management Manager	[Position] Executive Officer, General Manager of Administration Division [Name] Koji Urakami	

Stock code	5851
Corporate number	8240001034478

Total energy consumption	1,012,898 (1,100,800) GJ	26,133 (28,401) t-CO ₂
Previous year energy		26,979 t-CO ₂
Total usage		
Non-fossil energy	140,235 GJ	3,818 t-CO ₂
Total usage amount*		
Adjusted greenhouse gas emissions (emissions)		57,492 t-CO ₂

(Certified emission reductions used to calculate adjusted greenhouse gas emissions)

type*	Total amount *
-	-
-	-
-	-
-	-
-	-

(Conversion to non-fossil energy sources)

Non-fossil electricity ratio	Electricity used by the entire business
Goal (FY2030)	36.0%
Actual figures for the last five fiscal years	2019 year, 2020 year, 2021 year, 2022 year, 2023 year
	19.7%
Target industry	-
Estimate (FY2030)	-
Goal (FY2030)	-
Actual figures for the last five fiscal years	2019 year, 2020 year, 2021 year, 2022 year, 2023 year
Target industry	-
Estimate (FY2030)	-
Goal (FY2030)	-
Actual figures for the last five fiscal years	2019 year, 2020 year, 2021 year, 2022 year, 2023 year

In the main business Energy consumption intensity (FY2023 results)	0.3185 (0.3419)	Unit denominator [Production weight 1 (t)]
Main business Composition ratio	46.6 (46.0)	%
For the entire business Energy consumption intensity compared to the previous year	2019 year, 2020 year, 2021 year, 2022 year, 2023 year	
	103.7, 96.7, 99.3, 104.0	
For the entire business Average change in intensity over five years (%)	100.9	

*The main business is not necessarily determined by the amount of energy consumption, but is determined by each business number listed in the appendix of the Japan Standard Industrial Classification (Optimization of electricity demand)

In the main business Electricity demand optimization evaluation unit (FY2023 results)*	0.3346 (0.3635)	Unit denominator [Production weight 1 (t)]
Number of days for DR implementation*	9	
For the entire business Electricity demand optimization evaluation basic unit compared to the previous year	2019 year, 2020 year, 2021 year, 2022 year, 2023 year	
	104.3, 96.3, 99.4, 103.9	
For the entire business Average change in intensity over five years	100.9	

[Status of benchmark indicators (rationalization)]

Benchmark Classification	-	-
Target level	-	-
Benchmark indicator status	-	-
Benchmark Classification	-	-
Target level	-	-
Benchmark indicator status	-	-
Benchmark Classification	-	-
Target level	-	-
Benchmark indicator status	-	-
Benchmark Classification	-	-
Target level	-	-
Benchmark indicator status	-	-

[Outline of the initiative: Initiatives taking into consideration industry circumstances, etc. (qualitative matters)]

(Free comment section)

1. Matters concerning the rationalization of energy use

Over the past four years, we have been conducting thorough energy-saving activities, such as taking measures to prevent heat dissipation and air leaks from aluminum melting furnaces and holding furnaces, and reducing standby power consumption. Regarding heat dissipation and air leak countermeasures, we use a viewer to conduct regular inspections, identifying and addressing defects that are difficult for humans to detect. We have also been working to visualize energy usage, enabling us to understand usage in real time, which has led to an improvement in energy usage efficiency. However, orders have decreased due to the impact of the COVID-19 pandemic and the semiconductor shortage, and last year we had to reduce the production facilities at our headquarters and Hiroshima factory due to earthquake-proofing construction work, which resulted in a significant decrease in production volume. As a result, the basic unit worsened, and we were unable to improve. Going forward, we will continue to implement thorough energy conservation activities, proactively invest in highly energy-efficient equipment, and promote the rationalization of energy use.

2. Matters related to the transition to non-fossil energy

We will promote the shift to non-fossil energy by planning measures such as installing solar power generation facilities and switching to an electricity provider with a high ratio of non-fossil energy.

[Reference information]

<Industry characteristics>

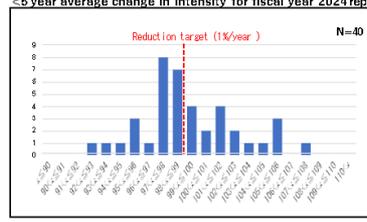
The non-ferrous metals manufacturing industry processes ores (rough ore, concentrate), scrap metal, and other materials to perform non-ferrous metal smelting and refining; manufactures non-ferrous metal alloys; performs rolling, drawing, and extrusion; and produces castings, forgings, and other basic products. It also includes the manufacture of electric wires and cables, as well as the production of nuclear fuel. The non-ferrous metal manufacturing industry accounted for 2.1% of Japan's industrial CO₂ emissions in fiscal year 2022. The Japan Mining Association has formulated a "Carbon Neutral (CN) Action Plan," setting a target to "reduce CO₂ emissions by 30% from fiscal year 2013 levels to 2.78 million t-CO₂ by fiscal year 2030." To achieve carbon neutrality, the association is focusing on three key initiatives: ① Developing technologies to promote non-ferrous metal recycling using energy sources that contribute to decarbonization, such as bio-based and waste plastic materials, ② Developing thermoelectric elements and energy storage materials to achieve thorough energy savings at smelters and other facilities, ③ Establishing and disseminating Material Flow Analysis (MFA) and Life Cycle Assessment (LCA) databases with a focus on non-ferrous metal recycling.

<Aggregate values by industry, based on data from regular reports>

Note: Aggregated for industry carbon dioxide with an energy consumption share of 0.01% or more of the total and with 10 or more businesses

		FY2024 Report (FY2023 Results)		
		Average	Median	Maximum
2353 Aluminum and aluminum alloy die-casting				
Total energy consumption	M	5,309	2,805	48,386
Total non-fossil energy consumption	M	1,069	357	15,473
Adjusted greenhouse gas emissions	t-CO ₂	11,044	5,749	92,643
DR implementation	times	11.8	0.0	250

<5 year average change in intensity for fiscal year 2024 report (FY2023 results)>



Sample

[Outline of the initiative: Towards carbon neutrality]

(Free comment section)

1. Free description section (Regarding the company's unique efforts to contribute to the realization of carbon neutrality, and R&D efforts related to innovative technologies)

We have set climate change as one of our material issues and aim to achieve carbon neutrality by 2050. As a milestone, we aim to achieve this by CO₂ emissions by 47% compared to 2018 levels and are taking the following measures:

- Organization
 - Our company and group companies (eight companies in Japan, six companies in five countries overseas) to promote activities toward carbon neutrality. The committee is chaired by the Representative Director and President, with directors and executive officers serving as vice-chairmen, and division chiefs, general managers, plant managers, and group company presidents serving as division chairs. Meetings are held twice a year to formulate basic policies for environmental issues, including climate change, draw up measures and specific action plans, review implementation status, and implement the PDCA cycle. We have also obtained ISO 14001 certification and have built, maintained, and operated an environmental management system.
- Details of the initiative
 - A. Thorough energy-saving activities
 - Heat dissipation measures for aluminum melting furnaces and holding furnaces
 - Air leakage prevention
 - Switching to equipment with high energy-saving effects
 - B. Low-carbon energy transition
 - Fuel for aluminum melting furnace changed from heavy oil A to LNG
 - Converting engine forklifts (diesel, gasoline) to battery forklifts
 - Changed the LPG absorption hot and cold water generator used for heating and cooling to a heat pump (electric power)
 - C. Switching to non-fossil energy
 - Introduction of solar power generation equipment
 - Increasing the capacity of hydroelectric power generation facilities: Group company Ikuho Co., Ltd. uses water from the river that flows near the factory to generate hydroelectric power, accounting for 40-50% of the company's electricity consumption. As the facilities are aging, the company is working to improve their power generation capacity by repairing them.
 - D. Decarbonization of aluminum melting furnace fuel
 - NEDO Green Innovation Fund project "Decarbonization of Thermal Processes in the Manufacturing Sector" and are working to establish technology to use hydrogen in melting furnaces. Led by Sanken Sangyo Co., Ltd., we are collaborating with three other companies, including our company, and two national universities.
- FY2023 Supplementary Energy Conservation Subsidy (III, Equipment-Based Subsidy)
 - The air conditioning system at the Hiroshima East Plant in Fuchu City, Hiroshima Prefecture, was upgraded to more efficient equipment at a cost of 62.6 million yen (including 20.86 million yen in subsidies). This upgrade is expected to save 75,025 kiloliters of crude oil equivalent annually and reduce energy costs by 2.6 million yen per year.

2. Related Links

- Information disclosure based on TCFD recommendations : <http://www.ryobi-ri.co.jp/csr/c/cfd.htm>
- Integrated Report 2024 : <http://www.ryobi-ri.co.jp/ir/do/c/mgr/ated2024.pdf>
- Environmental Data : <http://www.ryobi-ri.co.jp/csr/data.htm>

1,670 business operators are disclosed on METI website

Why Business Operators Submit Periodical Reports?

1. Legal Compliance

- **Obligation Violation → Warning → Order → Penalty**
- **No Submit or False Statement will be Significant Risk**
- **Maintaining Credibility with Government**

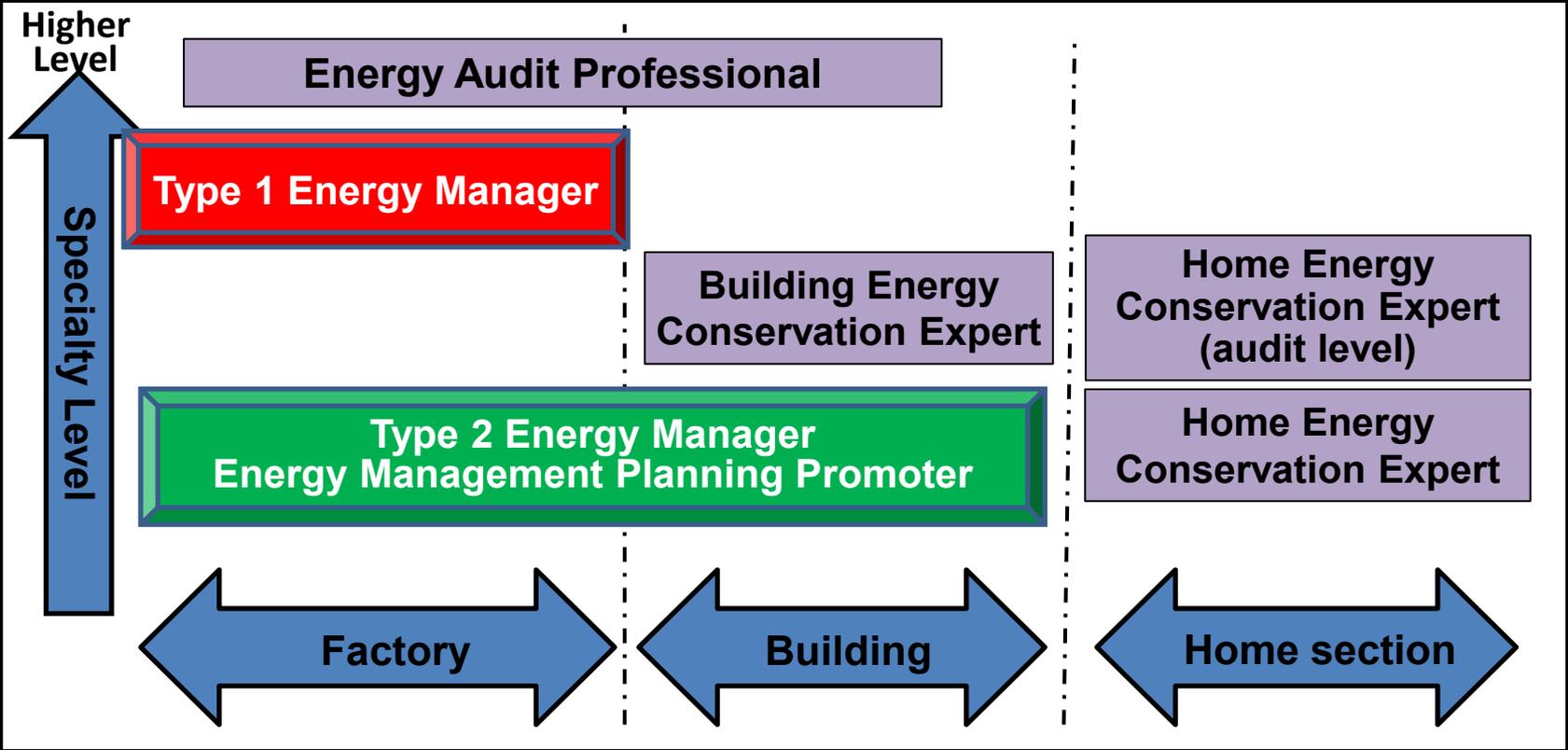
2. Business Benefit

- **Energy Cost Reduction**
- **Identifying Waste and Improvement Production Activities**
- **Enhancing Energy Conservation Awareness within the Company**
- **Prerequisites for Utilizing Subsidies and Incentive Programs**

3. Social Responsibility

- **ESG and CSR Initiatives**
- **Contributing to Decarbonized Society**
- **Ensuring Trust by Business Partners and Shareholders**
- **Avoiding Reputation Risk**

Maps for energy management related national qualification and training systems operated by ECCJ



Certified by National Exam

Certified by National Lecture Training Program

ECCJ's certification

Including Follow-up lecture training

Follow-up Lecture Training after Primary Training / Exam

Type 1 Energy Manager

- No need to take further training after getting certification
- The exam is hard. Further self-study after passing is expected.

“Type 2 Energy Manager” and “EM Planning Promoter”

- Appointed manager is needed to attend “Follow-up lecture training” to get the updated information every 3 years after their primary training (legal obligation)
- Follow-up lecture training is more practical and higher level than primary lecture training covering “energy managing viewpoints for various facility and equipment”, “efficiency best practices”, and “changing situation of relevant laws”, mini-test, etc.
 - * There is an opinion that the time for the training (1day online) is not enough judging from the wide variety of the subject and sector coverage.

Follow-up Lecture Training in ASEAN Countries

Philippines < Recertification of Energy Manager >

Common Competencies

- Updates on the EEC Act and Other Related Issuances
- Introduction to Level 2 Energy Audit

Core Competencies

- Introduction to the Energy Conserving Design for Buildings
- Advanced Mechanical System
- Advanced Electrical System
- Advanced Building Envelope
- Sustainability, Environmental, and Water Systems Design
- IOT and Data Analytic

The Certification shall be valid for 3 years. After which, recertification will be processed after the CEM completes a number of professional development units similar to PRC or through specialized or advanced training from RTI. The recertification will be valid for the next 3 years and continuing qualifications shall be based on the TR of the DOE.

Source: AJEEP Inception Meeting 2025

Singapore < Continuing Professional Development (CPD) Framework >

- Since 1 Jul 2015, a CPD framework was introduced to reinforce the need for lifelong learning and to provide a means for SCEMs to systematically maintain and enhance their competency to carry out their duties as energy manager.
- Under the framework, SCEMs will have to attain at least 16 Professional Development Units (PDUs) per year for renewal (min 12 structured PDUs).

Structured Activities (1 PDU/ hr participation)	Unstructured Activities (1PDU/2 hrs participation, capped at 4PDUs per year))
Formal Study and Training Activities	Participation (Informal in-house training and discussion)
Presentations (excl. regular lectures)	Contributions e.g., publishing papers/ articles on energy
Professional Practice	Online learning
Participation (Technical Committees)	

Source: AJEEP Inception Meeting 2025

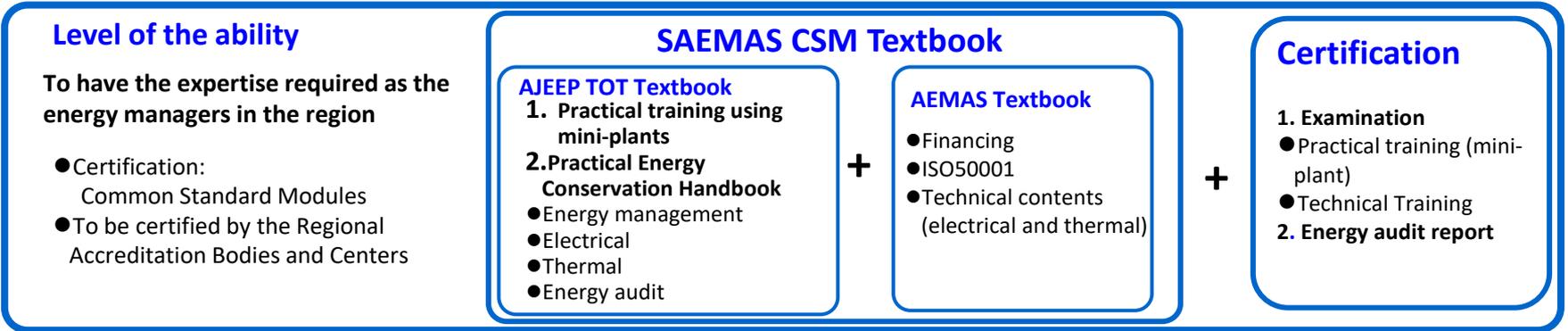
Other Renewal Certification system - Indonesia, Malaysia, etc.

ASAEMAS AM Module Application to Lecture Training for CN

SAEMAS : Sustainable ASEAN Energy Management Certification Scheme AM: Advanced Module

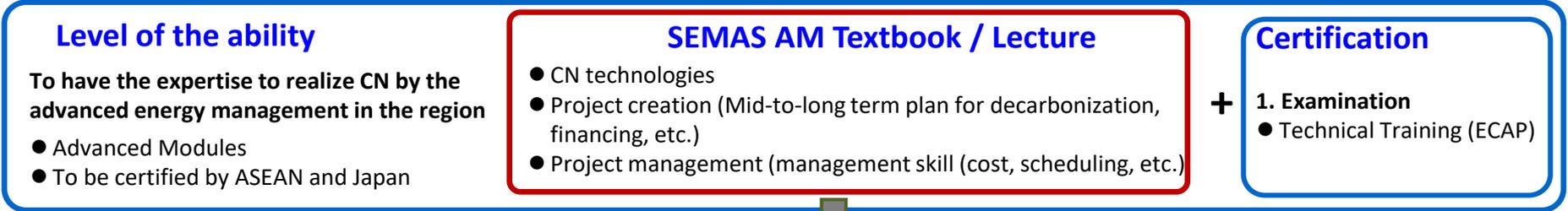
1. ASEAN EMP (SAEMAS CSM-EM) : Certified based on the Common Standard Modules

To establish cross-regional Energy Manager Qualification to create qualified energy managers who can work across borders within ASEAN



2. ASEAN S-EMP(SAEMAS AM-EM): certified based on the Advanced Modules (Qualification EMP)

To develop and create experts in CN field and in managing CN-related projects (project formation and management)



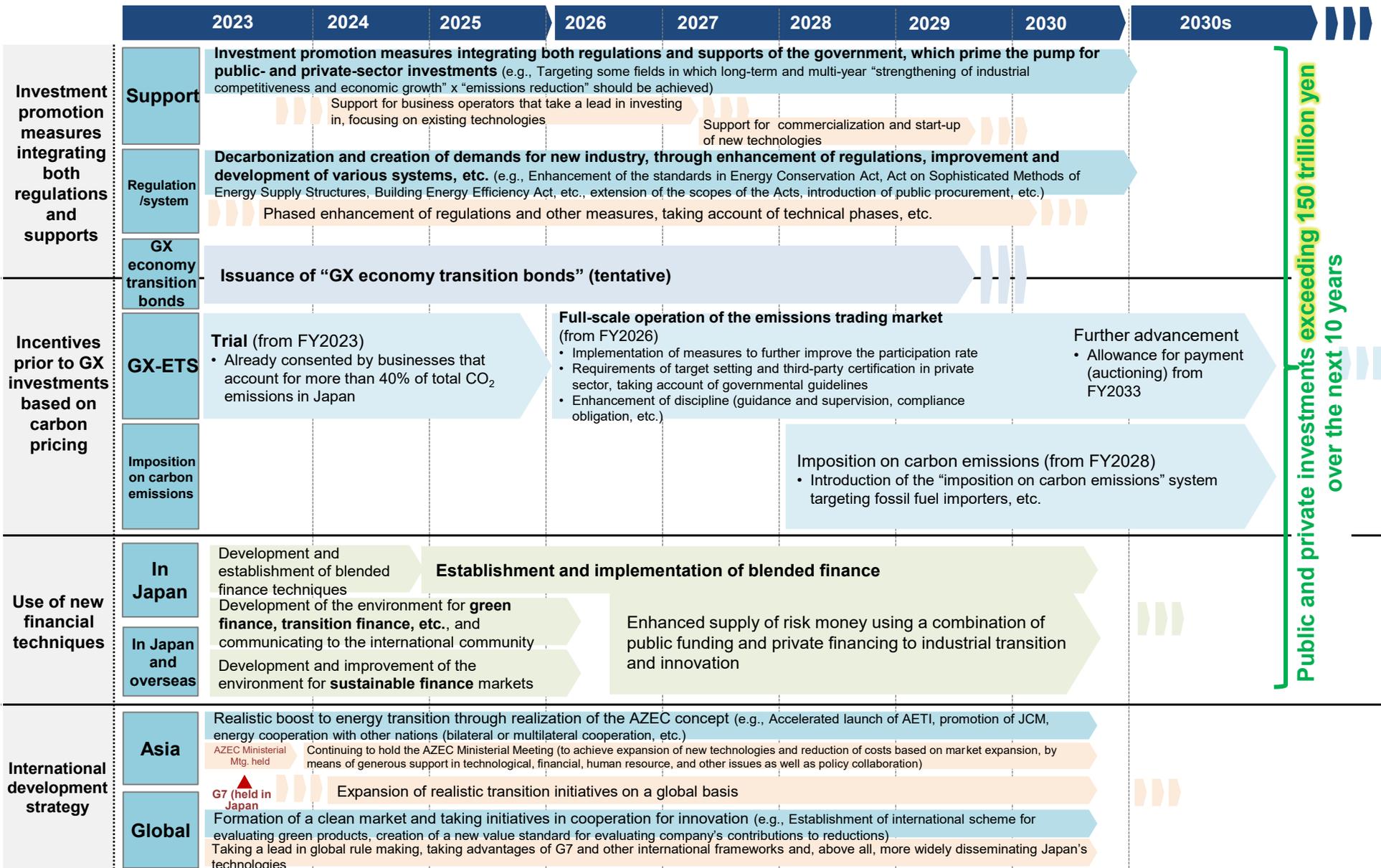
Module ↓

- CN Policy
- CN Management
- Advanced EE&C Technologies
- CN Technologies (Thermal Power Generation, Power Network, Hydrogen, Carbon Recycling (CCUS), Renewable Energy, Transportation)
- CN Diagnosis for Factory

3. Investment Promotion Initiatives Towards CN in Japan

1. Overall picture of the roadmap for the next decade

2050



Source: CAS (Cabinet Secretariat)

2. Policies in Developed Countries for Achieving GX

- To achieve both the emissions reduction (e.g., carbon neutrality by 2050) and the improvement in economic growth and industrial competitiveness, it is important to deal with this issue, taking account of energy environments and economic security situations varying among nations.

<“Carbon pricing” effective for reducing emissions>

Europe is leading in the emissions trading system (excess emission allowances are allocated for free to some high-emitting industries).

On the other hand, the U.S. has not introduced carbon pricing (CP) in principle.

<“Investment promotion measures” effective for economic growth>

In the U.S., on the premise of federal commitment for multiple years, investment support measures that are not only for initial investments but also proportional to production volumes are implemented.

In Europe, more specifics on the Green Deal Industrial Plan and others are discussed.

- In Japan, in view of the situation of the country, the “growth-oriented carbon pricing concept”, in which “carbon pricing” and “investment promotion measures” based on the GX economy transition bonds are effectively combined in an optimal way, is the tool for achieving GX.
- Japan started trial implementation of the emissions trading system with the coverage at the same level as in Europe, plus it stated, in advance, the “timing to introduce carbon pricing and the plan to raise the standard of the scheme in the future”.
- Further, using the future government revenues from carbon pricing and taking “investment promotion measures” based on the GX economy transition bonds on a local basis, thereby accelerating the corporate GX investments and initiatives taken by companies.

3. GX Policy Comparison

- Japan will **implement new policies at the world level**:
 1. Promotion in private-sector transition finance through **world-first issuance of “transition bonds” by a country**
 2. **Further development of the emissions trading system**; and
 3. **Implementation of investment promotion measures worth about 20 trillion yen** (including investment promotion measures proportional to production volumes)

Carbon pricing

Investment promotion measures (supported by government)

U.S.

- **No carbon pricing in principle** (only partial implementation at state level)

- **Large-scale support measures** (worth about 50 trillion yen) taken by the federal government for multiple years
- **Tax breaks on investment spending “proportional to production volumes”**, and other measures

EU

- **Leading in the emissions trading system (ETS)** (excess emission allowances are allocated for free to some high-emitting industries)
- **Applicable emissions reduction targets set by nations**

- **Public- and private-sector target for investments** (worth a trillion euro) in decarbonization (**working on specifics** of the Green Deal Industrial Plan and others)

Japan

- **Started trial implementation of ETS with the coverage at the same level as in Europe, plus stated imposition on fossil fuel.**
→ Acceleration of GX investments
- **In the emissions trading of the GX League, reduction targets are set by companies themselves.** → Facilitating originality and ingenuity of companies as well as creation of innovations

- **Multi-year leading investment support based on the GX economy transition bonds**, in addition to existing measures such as FIT
- **National investment promotion measures worth 20 trillion yen to realize GX investments over 150 trillion yen** by public and private sectors



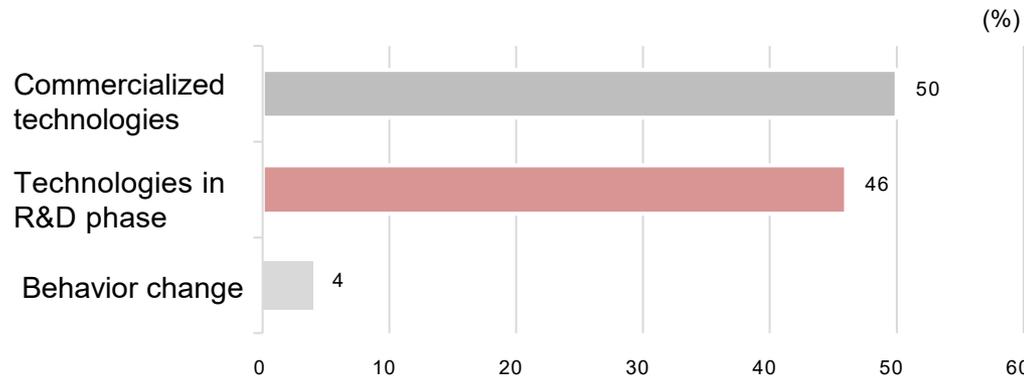
New policies at the world level

1. **World-first issuance of “transition bonds” by a country**
→ **In Japan and overseas, enhancement of transition finance** effective for emissions reduction in high-emitting industries and others
2. **Advancement in the emissions trading system** in light of experiences of other nations
3. **More specifics on the investment promotion measures worth 20 trillion yen** (including investment promotion measures proportional to production volumes)

4. GX measure combined “carbon pricing” and “investment promotion measures”

- It is essential to utilize existing technologies for implementation of the GX at an early date. Meanwhile, it is not possible to achieve carbon neutrality (CN) with only existing technologies.
→ The keys for GX are: **1. development and establishment of new technologies, and 2. acceleration of social implementation.**
- Japan has the potential for **world-class GX-related technology seeds**. Thus, Japan intends to **accelerate the research and development** of the technology seeds and establish the technologies, so as to utilize them to **move onto a commercialization phase earlier.**
- In addition, the established new technologies bring about emission reduction effects, while it is likely to require **higher costs as compared to existing technologies**. To deal with this issue, with the use of **“carbon pricing” (CP)** which covers the cost gap and **“investment promotion measures”** which take the effect of CP in advance, implementation of the new technologies should be promoted through market mechanisms.
Social implementation of new technologies is accelerated by means of:
 - i) clarification of the vision for future introduction of CP and price raising;
 - ii) **“investment promotion measures”** which take the effect of CP in advance using the GX economy transition bonds. = [Growth-oriented CP concept]

World's reduction technologies toward achieving decarbonization



To achieve CN, research and development for establishing new technologies are essential.

5. Approaches to determining the “investment promotion measures” utilizing objective indicators and expert knowledge

- Details of the “investment promotion measures” worth 20 trillion yen based on the GX economy transition bonds should be determined in accordance with the following five approaches, utilizing objective indicators and expert knowledge.

Approaches to determining the “investment promotion measures”

1. Should be in line with the basic principles including: **it is truly difficult for the private sector to solely make investment decisions**; and contributing to achievement of **enhancing of industrial competitiveness and economic growth** as well as **reducing emissions**.
2. Focus on **high-emitting sectors**.
3. Improve and finalize the **“Sectorial Investment Strategy (Roadmap)”** and determine the “investment promotion measures” in line with the strategy.
4. Utilize analysis on the **emissions reduction effect based on, for example, marginal abatement cost analysis** and the **economic impact based on investment income analysis** taking account of market trends.
5. **Determine** details of the investments **at the GX Implementation Council** while **making use of expert knowledge**.

6. Basic principles of the “investment promotion measures”

- For the “investment promotion measures” based on the GX economy transition bonds, the following requirements are set forth in the “GX Promotion Strategy”. The measures are to be implemented in line with the requirements.
- Additionally, it is important to consider details of the “investment promotion measures”, taking account of not only the fact that **international certification and reporting based on the framework of the GX economy transition bonds** will be required but also a **winning formula based on the analysis on different sectors and goods**.

[Basic Conditions]

- I. On the basic premise that companies will have a commitment in management innovations including methods of funding, the measures are **applicable to business in which it is truly difficult for private-sector companies to solely make investment decisions** due to technological innovativeness, nature of business, etc.
- II. The businesses will contribute to achievement of not only **enhancing of industrial competitiveness and economic growth but also reducing emissions**. Priorities are set on the businesses comprehensively taking account of their market size, scale of reductions, necessity of domestic supply essential for achieving GX, etc., and the **support should be provided in decreasing order of priority**.
- III. The **measures should be taken integrally with regulatory/institutional actions** that lead to a mechanism to change behaviors of business investment and demand sides.
- IV. The measures are applicable to businesses* **contributing to expansion of human and material investments in Japan**, and those that are not effective in domestic emission reductions, such as a capital investment not open to overseas, and those effective only to achieving targets such as credits are **not covered by the support program**.

[Types] * Including investments that facilitate resource circulation and value circulation in domestic economy such as a market limited to domestic demands

Enhancing of industrial competitiveness and economic growth

- A** Investments in growth, having **technological innovativeness** or **business innovativeness** and looking at acquiring demands from abroad and expanding domestic demands
- or
- B** Investments in growth, contributing to not only **reductions of fossil fuel and energy but also improvement of profitability (e.g., merger, restructure, or markup)**
- or
- C** **Domestic demand measures in the early stage of introduction of major goods** for which **national-level market** is expected to be created (supply-side investment will also follow)

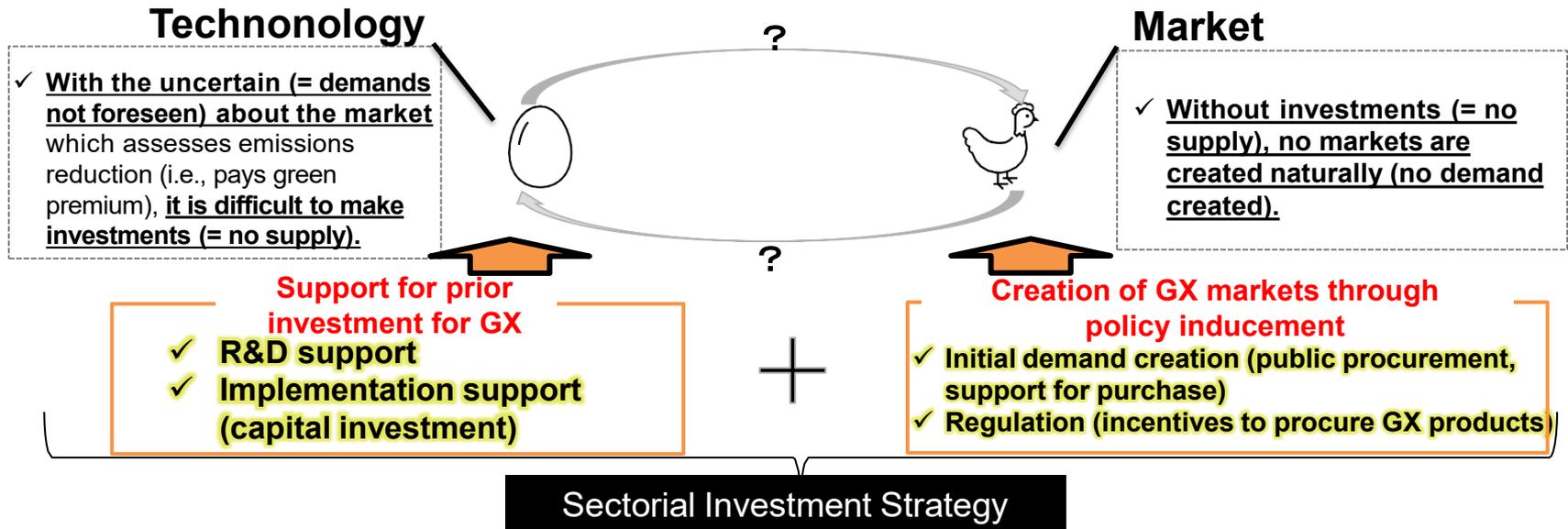
Emissions reduction

1. **Investments in research and development** contributing to future **reductions in Japan** through technological innovations
- or
2. **Capital investments**, etc., having technically high reduction effects and **directly contributing to emissions reduction in Japan**
- or
3. **Domestic demand measures in the early stage of introduction of major goods that are in demand nationwide** and are expected to produce long-term and high reduction effects



7. “Sectorial Investment Strategy” toward achieving GX in industry

- The **manufacturing industry will continue to be essential** for supporting economical growth in Japan. For global progress in GX, it is necessary to **swiftly launch a GX supply chain capable of covering the growing GX market** as well as to **create markets for new GX sectors**.
- To make such efforts, in **iron, chemical, and other materials sectors** that are key to reduce CO₂ emissions in particular, the following issues arise.
 - The new supply chain for creating GX products (green steel/chemical, etc.) requires **innovation in production processes**. The innovation requires large-scale research and development and large capital investments, resulting in higher product costs.
 - As the performance of the materials included in the GX products with higher costs remains the same, sales prospect of the products is unclear **unless there is a market to assess them, therefore, it is difficult for investors to make investments on them**.
 - * **“Chicken or egg” situation** (There is little demand without supply, and little supply is provided without demand.)
- Further, in some industrial sectors contributing to emissions reduction in a use stage, it is also necessary to increase investments toward **achieving both gain in global market and emissions reduction**.
- To this end, the **prior investment support measures are implemented integrally with the “regulations/systems” for creating markets, so as to create a favorable demand-supply cycle**. → **Aim of the sectorial investment strategy**
- In the sectors to which the strategy is applied, the **investment promotion measures are taken intensively** to a group of leading companies that **promptly develop ambitious investment plans** for both the emissions reduction and enhancing of industrial competitiveness, thereby boosting GX entirely in Japan.



8. “Sectorial Investment Strategy” toward achieving GX in industry

<Reviews on investment promotion measures>

- Select an effective policy, taking account of: [1] state of the competition with major countries in policy making (so-called technical maturity); and [2] characteristics of emissions varying among industries. In this step, the policy should be combined with other ones (regulations/systems) from the viewpoint of [3] creation of GX markets.
- For example, in some industries where emissions are generated in a manufacturing stage but not in a use stage (high-emitting industries such as steel industry), while [1] competition is intensifying among all players in public and private sectors for establishing and implementing alternative means to reduce emissions in the manufacturing stage, [2] intensive support for R&D and implementation for emissions reduction in the manufacturing stage is offered. In addition, it is important to [3] take some initiatives to create markets including provision of incentives for green material procurement.
- In some industries where low emissions are generated in the manufacturing stage and that contribute to reduction of emissions in the use stage (so-called industries contributing to emissions reduction), [1] large-scale investment support is offered in view of the situation where development of national and regional supply chains by major countries is in progress (economic security). [2] Support to investments is intensively offered in the context of contributing to GX not only in Japan but also globally. In addition, [3] demand boosting measures for creation and expansion of relevant markets are also combined.
- Impact of emissions reduction in Japan led by governmental policies and of the enhancing of industrial competitiveness, and commitment of companies in the investments should be on the basic premise.

<Example of viewpoints in the review>

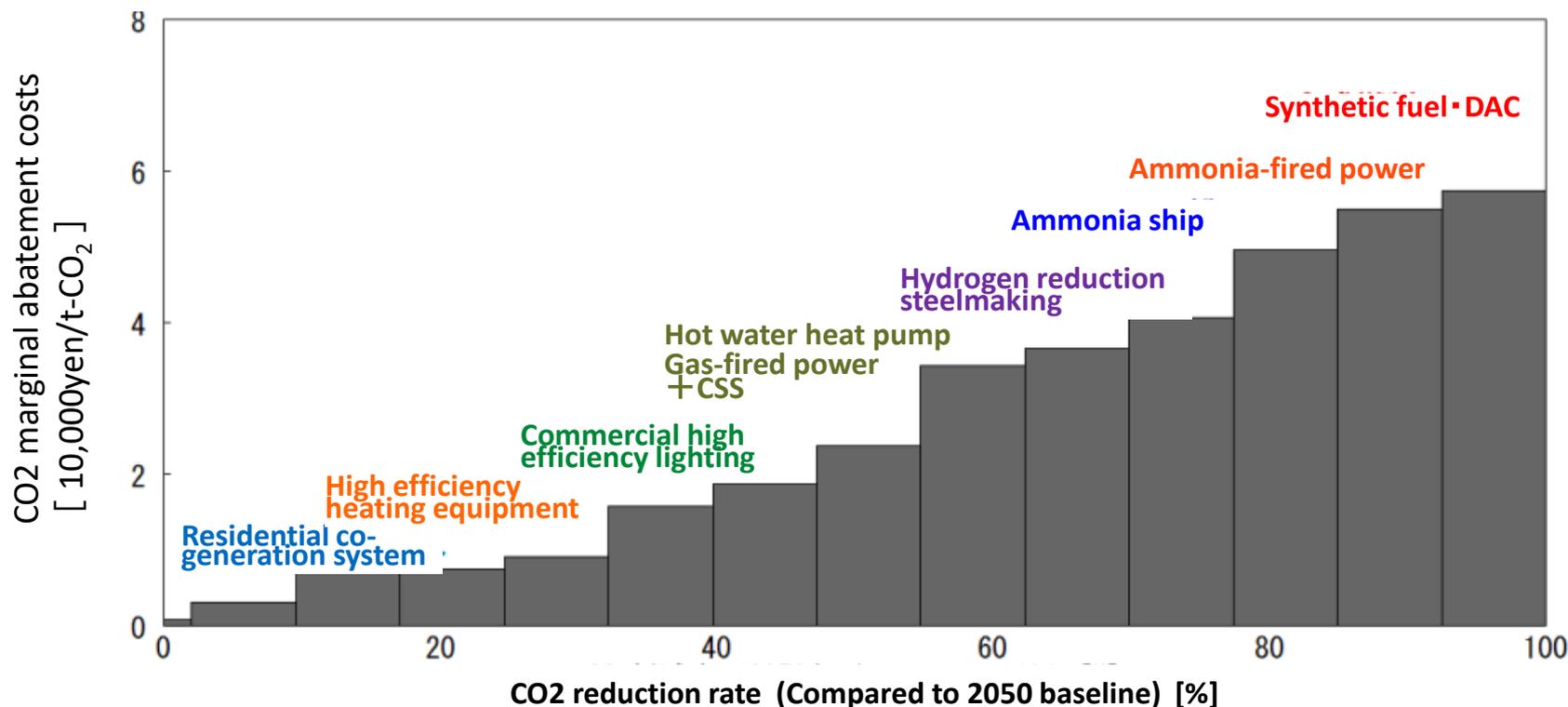
	[1] Competition with major countries in policy making	[2] Emission sources (CP is directly effective)	Investment promotion measures	[3] Viewpoint of creation of GX market
High-emitting industries (Hard to Abate)	<p>R&D</p> <p>Implementation</p> <p>Market expansion</p> <p>Competition in R&D and implementation for establishment of alternative means at an early date</p>	Manufacturing stage	<p>Support for R&D and implementation to reduce emissions in the manufacturing stage</p> <p>* Continued until the effect of introducing CP is fully exerted.</p>	<p>Visualization of GX values, designing incentives for procurement, and regulations</p> <p>* In the natural stance, final consumers do not evaluate emissions reduction in the manufacturing process of procured products.</p>
Industries contributing to emissions reduction (Enabling)	<p>R&D</p> <p>Implementation</p> <p>Market expansion</p> <p>Competition in capital investment and locations for market expansion</p>	Use stage (Electric power and other types of energy are consumed in the stage of using products)	<p>Support for implementation and R&D for the purpose of achieving global contribution to reductions (Avoided Emissions) in the middle of international investment competition</p>	<p>Demand boosting (purchase support)</p> <p>* In particular, continued until the effect of introducing CP is fully exerted.</p>

Basic premise

Impact of [emissions reduction] and [enhancing of competitiveness in view of the age of GX] in Japan + **commitment** of companies in **investments**

[Reference] Effectivity analysis of GX method (Marginal abatement costs, etc.)

Consider the implementing means by using data including marginal abatement costs, etc. for each sector and technology.



- *The technologies in the graph are typical examples introduced additionally when there is a slight increase in the CO2 reduction rate.
- *The technologies that determine marginal abatement costs are not necessarily uniquely determined and are influenced by multiple factors.
- * The shape and other aspects of the marginal abatement cost curve vary depending on assumptions.

Source: The Institute of Energy Economics, Japan

Energy Conservation Committee #37Nov 2022, ANRE/METI

4. EE&C Mechanism in General

EE&C Mechanism in General

Needs

- **Energy security**
High energy price/ Shortage of energy supply
- **Economic development**
Reduction of energy cost
- **Global warming issue**
Reduction of carbon dioxide emission
- **Safety**
Safe security regarding nuclear power station etc.



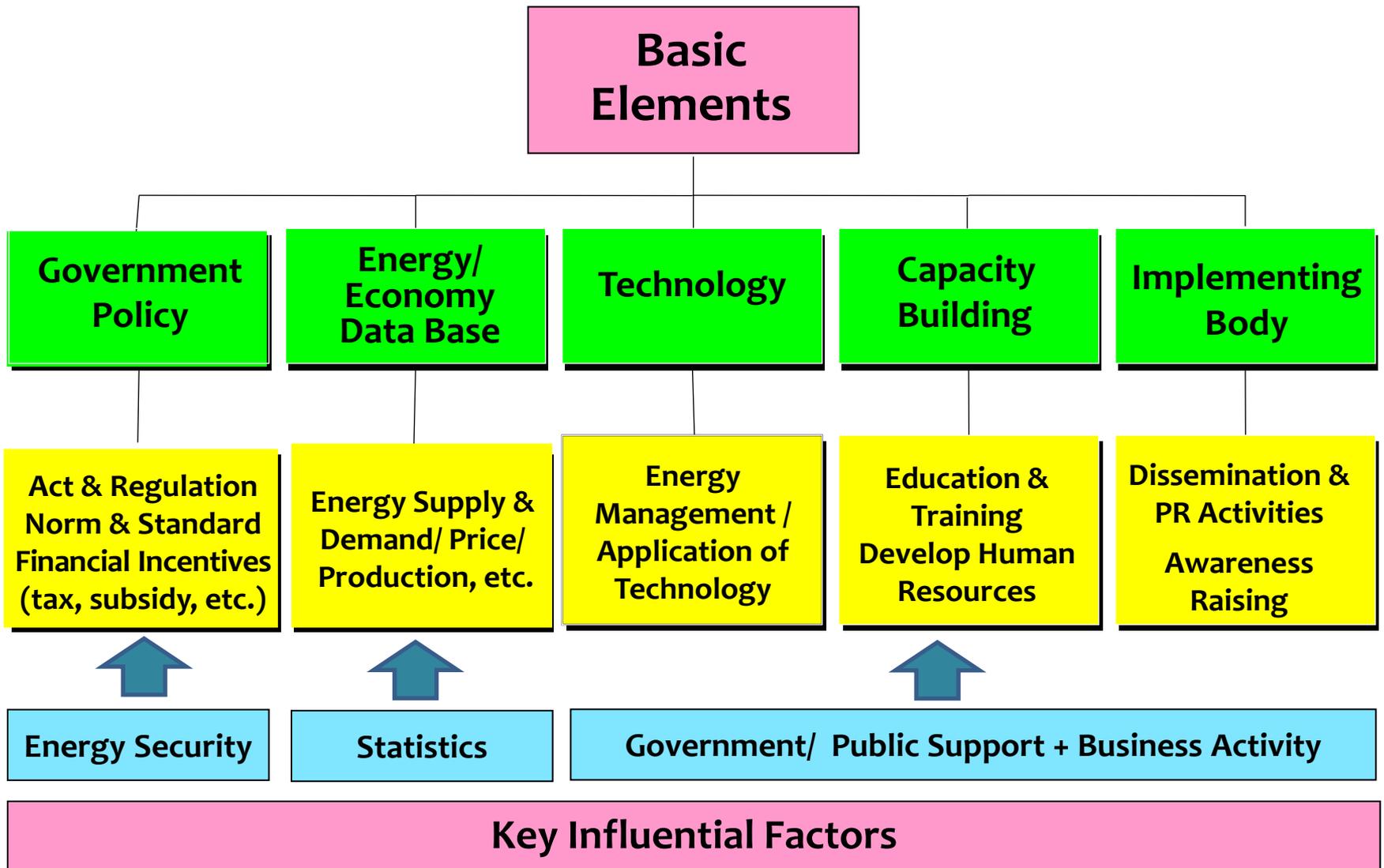
Actions

Government	Private Sector
EE&C policy Greenhouse gas reduction policy	Energy cost reduction policy Eco- friendly policy
EE&C Act * / regulation	Energy management system
Provision of support system	Daily EE&C activities
Education & training	No/low/medium/large investment
People awareness raising	Observance of Government Policy
Information provision	In-house training
Others	Others

* EE&C Act : Act on Rationalizing Energy Use

Act on Rationalizing Energy use and Shifting to Non-fossil Energy (Japan's Act name)

Basic Elements and Key Influential Factors required for EE&C Promotion

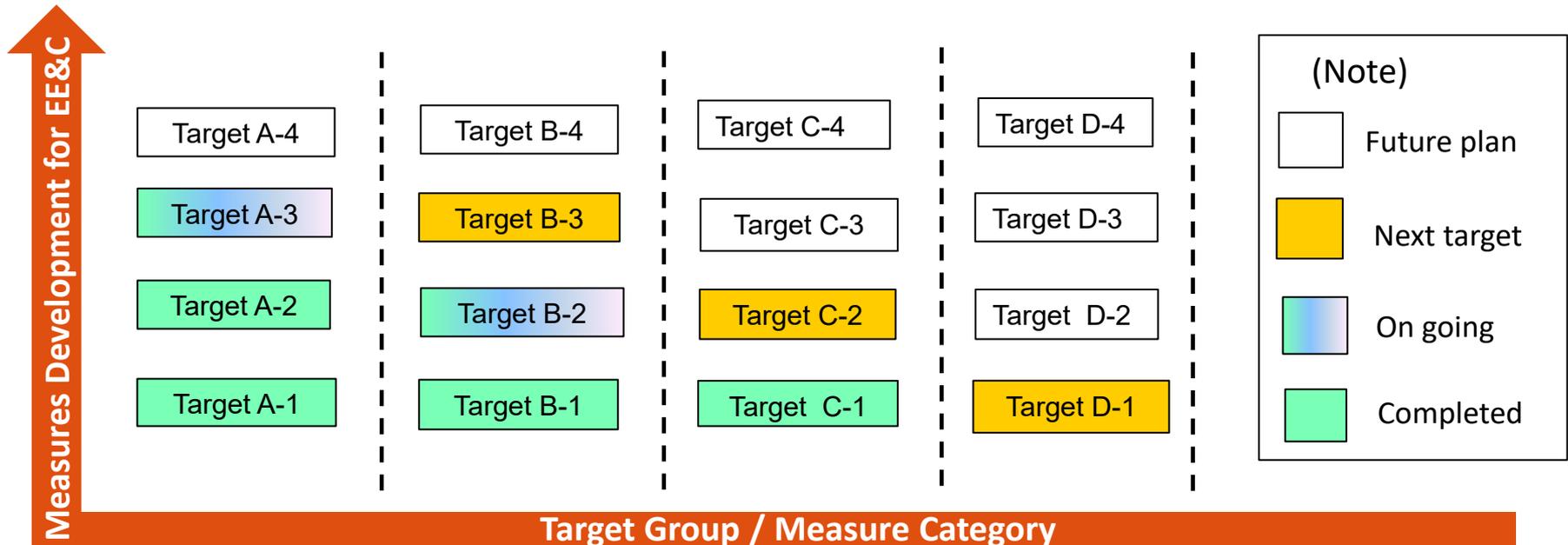


Basic Approach for New Plan

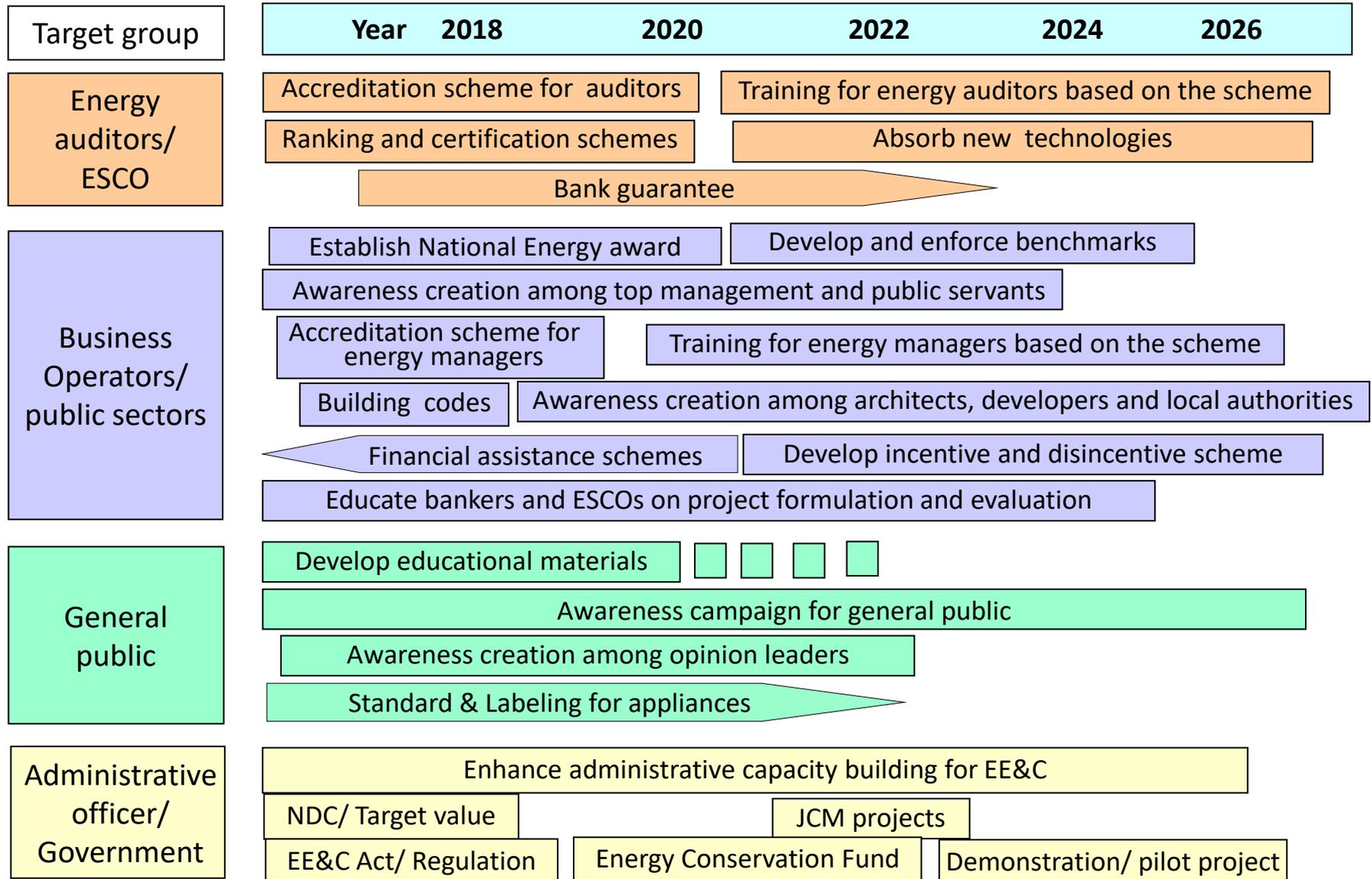
1. Energy is used by anybody at any place.
2. Therefore, various aspects and actions affect EE&C.
3. The five basic elements in the previous slide may enhance and promote EE&C.
4. It may not be practical to develop all the basic elements at one time.
 - Barriers for EE&C promotion in the country
 - Possible measures for EE&C promotion in the country
5. It will be recommended to prioritize subjects to target based on the current situation.
6. **Development Map** as shown former slide may be helpful for making clear the necessary steps for developing Advanced EE&C towards CN.

Advanced EE&C Requires Step-by-Step Development

- Identification of the country's current position by using the development map for more advanced EE&C
 - Green colored boxes are already implemented
 - Green gradation boxes are under planning
 - Yellow boxes are next target
 - White boxes are future plan
- Indication of possible policies to be proposed in the country by coloring yellow in the required boxes
 - Discussion, suggestion and advice are needed in your country.



Road Map for EE&C Improvement in a certain Country



[Reference] Example for EE&C policies/measures

1. EE&C Policy (general)
2. Energy or EE&C Master Plan
3. EE&C Act
4. EE&C Regulation (general)
5. EE&C Regulation for;
Industry, Building, Transportation, and/or Equipment
6. Awareness for EE&C Promotion
7. EE&C Technology Information
8. Energy Management System
9. Capacity Building on EE&C
10. Energy Audit
11. Electrification/ Electricity Saving

[Reference] Potential Barriers for EE&C Promotion

1. Absence of clear **Top policy**
2. Insufficient **Human Resources** with capability
3. Lack of **Technology Information** available
4. Shortage of **Fund** (financial support)
5. Underdeveloped **Energy Management System**
(Lack of Norm, Target, Benchmark of Energy Intensity, etc.)
6. Lack of **Awareness / Motivation**
7. Lack of Responsible **Organization**
8. Others (Cultural factors, etc.)

[Reference] Possible Measures for EE&C Promotion

1. Preparation of Clear Policy/Program
2. Capacity building
(education & training: technical & managerial)
3. Measures for introduction of Basic and New Technology
4. Measures for Financial Support
5. Establishment of EE&C Acts & Regulations
(incl. Norm, Target, Benchmark, etc.)
6. Supply of Information
(technical, economical, financial, etc.)
7. Others

[Reference] Energy Consumption of Industrial Sector by Country

Unit : TJ

Source : IEA Energy Balance 2022

Country	Mining and quarrying	Construction	Iron and steel incl BF/BOF	Chemical and petrochemical, refinery	Non-ferrous metals	Non-metallic minerals	Transport equipment	Machinery	Food and tobacco	Paper, pulp and printing	Wood and wood products	Textile and leather	Industry not elsewhere specified	Total
Brunei Darussalam	0	0	0	7,032	0	0	0	0	0	0	0	0	6,018	13,050
Cambodia	0	0	0	0	0	20,977	0	0	0	0	0	0	80,677	101,654
Indonesia	17,932	4,805	433,749	120,661	591,396	160,342	0	990	13,727	163,228	0	21,163	1,334,757	2,862,750
Lao PDR	0	0	0	0	0	0	0	0	0	0	0	0	41,856	41,856
Malaysia	0	0	18,446	0	0	0	0	0	0	0	0	0	797,623	816,068
Myanmar	0	0	1,884	3,705	70	10,470	207	137	371	36	0	223	49,626	66,728
Philippines	25,299	32,590	28,047	12,819	0	47,402	0	21,029	97,565	12,737	885	5,039	12,489	295,899
Singapore	0	2,079	0	133,205	0	0	0	0	0	0	0	0	159,856	295,139
Thailand	567	3,755	64,540	151,620	739	378,787	0	101,061	270,869	25,989	12,715	41,624	268,048	1,320,313
Viet Nam	51,524	26,930	348,373	99,052	43	475,719	7,923	53,464	161,885	38,190	74,143	171,959	95,309	1,604,512
Japan	10,897	92,177	775,371	751,730	83,996	304,478	127,551	312,712	212,944	330,943	18,759	27,096	101,879	3,150,532

Unit : %

Country	Mining and quarrying	Construction	Iron and steel incl BF/BOF	Chemical and petrochemical, refinery	Non-ferrous metals	Non-metallic minerals	Transport equipment	Machinery	Food and tobacco	Paper, pulp and printing	Wood and wood products	Textile and leather	Industry not elsewhere specified	Total
Brunei Darussalam	0.0%	0.0%	0.0%	53.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	46.1%	100.0%
Cambodia	0.0%	0.0%	0.0%	0.0%	0.0%	20.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	79.4%	100.0%
Indonesia	0.6%	0.2%	15.2%	4.2%	20.7%	5.6%	0.0%	0.0%	0.5%	5.7%	0.0%	0.7%	46.6%	100.0%
Lao P DR	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
Malaysia	0.0%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	97.7%	100.0%
Myanmar	0.0%	0.0%	2.8%	5.6%	0.1%	15.7%	0.3%	0.2%	0.6%	0.1%	0.0%	0.3%	74.4%	100.0%
Philippines	8.5%	11.0%	9.5%	4.3%	0.0%	16.0%	0.0%	7.1%	33.0%	4.3%	0.3%	1.7%	4.2%	100.0%
Singapore	0.0%	0.7%	0.0%	45.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	54.2%	100.0%
Thailand	0.0%	0.3%	4.9%	11.5%	0.1%	28.7%	0.0%	7.7%	20.5%	2.0%	1.0%	3.2%	20.3%	100.0%
Viet Nam	3.2%	1.7%	21.7%	6.2%	0.0%	29.6%	0.5%	3.3%	10.1%	2.4%	4.6%	10.7%	5.9%	100.0%
Japan	0.3%	2.9%	24.6%	23.9%	2.7%	9.7%	4.0%	9.9%	6.8%	10.5%	0.6%	0.9%	3.2%	100.0%

5. Discussion Topics

Topics for Group Discussion

● Reporting System

Periodical Report/Mid-Long term Plan Report/Energy Audit Report, etc.
Periodical Report Disclosure System / Online Reporting System

● Measures for Shifting to Non-fossil Energy

● Measures for Optimizing Electricity Demand

● EC Guideline/EM Manual

● Business Operator - based Regulatory system

Appointment “Energy management supervision officer” / “energy management planning promoter” of “Specified business operator” / “specified chained business operator”

● Certification System for Certified Managing and Supervising Business Operator / Certification system for Collaborative Energy-Efficiency Plan

● Benchmark System (Industrial Top Runner Program)

● Evaluation System for Business Operators Classification (SABC Evaluation)

● Top Runner Program for Equipment / Labeling System

● “On-site Inspection”, “Field Survey of Factories / Penal provisions

● Measures for CN other than EE&C Act

Investment Promotion Measures for CN Technologies/Carbon Pricing(CP)/Emissions Trading System(ETS), etc.

● Support System / Subsidy

● Follow-up Lecture Training for Energy Manager

● Energy Award for Industrial Business Operators, etc.

● Public Transportation

Group Discussion

Choose the Group

	Cambodia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
Group A Leader :	<input type="checkbox"/>							
Group B Leader :	<input type="checkbox"/>							

Group Discussion



Leader will advise or discuss within the group on your ideas of new policy / measures and obligatory reporting systems towards CN in your country.

Each participant will present the draft action plans after discussion

Group Discussion

Grouping

	Cambodia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
Group A Leader : Philippines	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Group B Leader : Singapore	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Group Discussion



Leader will advise or discuss within the group on your ideas of new policy / measures and obligatory reporting systems towards CN in your country.

Each participant will present the draft action plans after discussion

Thank you for your kind attention

