The APEC Symposium on Promoting Energy Efficiency and Energy Management System

The Key to an Energy Resilient APEC:

Energy Efficiency and Energy Management

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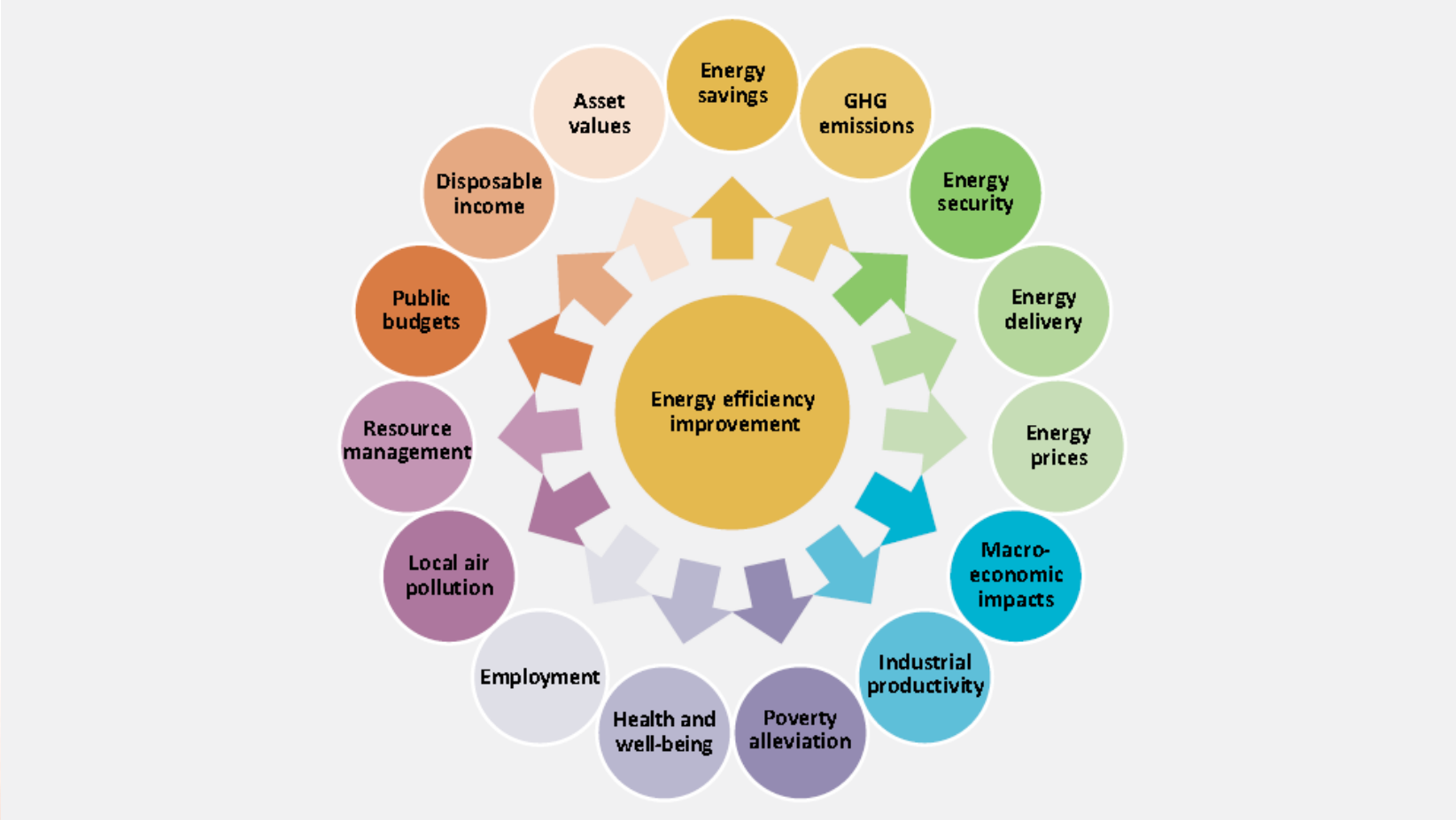
Multiple benefits of energy efficiency

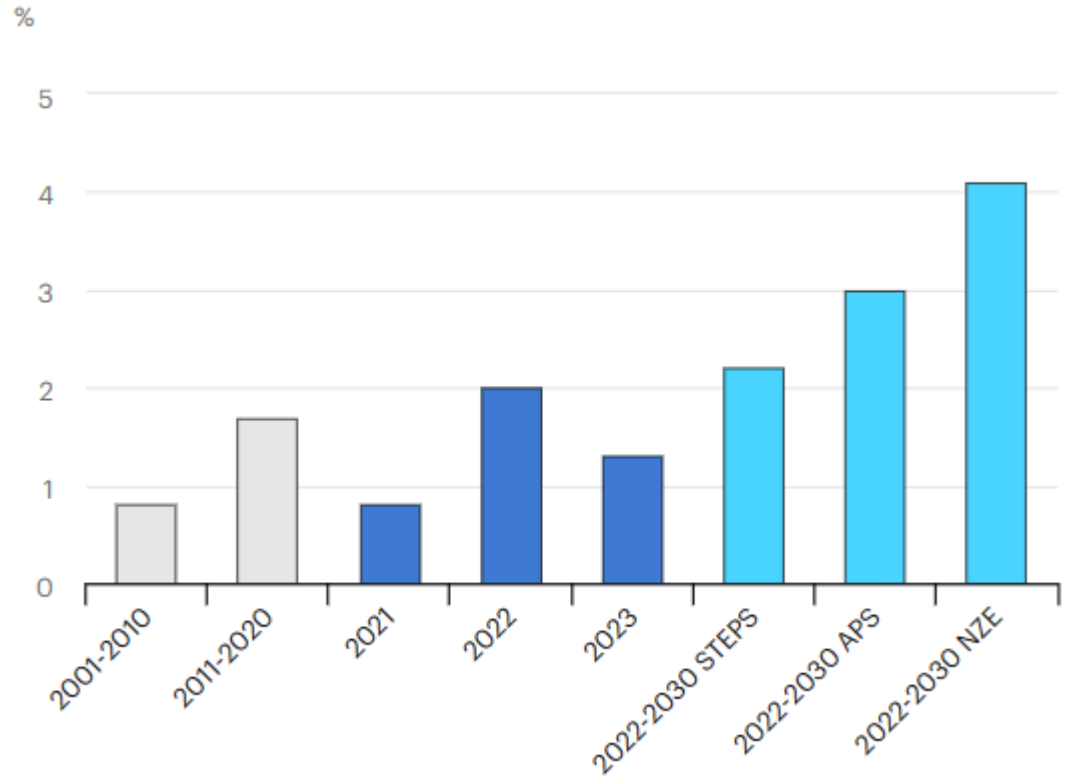


Source: International Energy Agency

Global overview

- **Steadyfast**: Global focus on energy efficiency remains steadyfast.
- **Slowdown**:The estimated 2023 rate of progress in energy intensity is set to fall back to below longer-term trends, to 1.3% from a 2% in 2022. which largely reflects an increase in energy demand of 1.7% in 2023, compared with 1.3% in 2022.
- **Trend:** the global trend of continously increasing in EE will not be changed.

（Note: Energy intensity is defined as the amount of primary energy used to produce a given amount of economic output or GDP）



Annual primary energy intensity improvement, 2001-2023, and by scenario, 2022-2030

(Source: International Energy Agency)

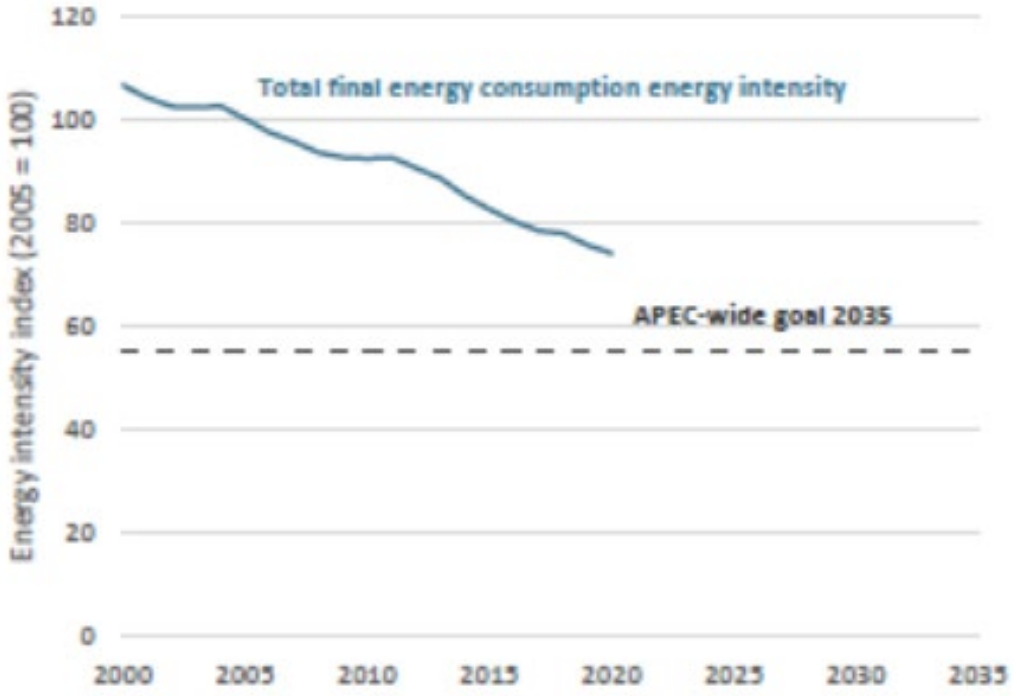
Importance of energy cooperation in APEC region

- APEC economies represent over 38 percent of the global population and 56 percent of global economic activity, with strong economic trade ties throughout the world.
- The role APEC plays in the global energy market is indispensable. It accounts for 56 percent of world energy demand, 58 percent of world energy supply, and 68 percent of world electricity generation. APEC accounts for 60 percent of global CO2 emissions.

(Source: APEC Energy Demand and Supply Outlook (8th Edition), by APERC)

Importance of energy cooperation in APEC region

- APEC energy goals,
  - ➢ to improve energy intensity by at least 45 percent by 2035 compared to 2005 levels;
  - ➢ to double the share of modern renewables in the energy mix by 2030, relative to the numbers from 2010.
- As of 2020,APEC-wide final energy intensity has improved 26% leaving an additional 19% improvement needed to meet the goal.



APEC total final energy consumption intensity index,2000-2020
(Source: APEC EGADA)

EE(energy efficiency) in key sectors and areas

- Industry
- Transport
- Buildings
- Regulations and standards
- …

EE activities in key sectors and areas

➢ Industry

- Using high efficient equipment.
  - ✓ Widely deployment+efficient operation
- Accelerating system integration and optimization
  - ✓ 1+1>2
- Expanding engagement in energy management activities.
  - ✓ PDCA
- Integrating with the emerging tech such as IoT, AI, etc
  - ✓ Data and information empower the efficiency

EE activities in key sectors and areas

➢ Transport

- Green transportation system
  - ✓ Vehicles – Deploying more green vehicles and developing electrified railways.
  - ✓ Infrastructure – Building up the charging and swap battery networks, hydrogen refilling stations.
- Decarbonization and efficiency of the existing transport system
  - ✓ Improving the EE standards for fossil-fuel vehicle
- Smart transportation system
  - ✓ Integrating with the emerging tech such as IoT, AI, etc

EE activities in key sectors and areas

➢ Buildings

- Improving the green building codes.
- Optimize the energy supply in building.
  - ✓ Distributed energy resources (Renewable energy such as solar energy, biomass, heat pump, geothermal energy,etc.)
  - ✓ Integrated District Energy System, IDES (power, heating and cooling,etc.)
- Accelerating construction of low energy consumption buildings.
- Promoting energy-saving retrofitting for the existing buildings.

EE activities in key sectors and areas

➢ Regulations and standards

- Laws and supporting policies.
  - ✓ Laws for EE&C
  - ✓ Supporting policies for EE&C related finance, tax and pricing
- Standards.
  - ✓ Minimum energy performance standards (MEPS)
  - ✓ Energy management system standards (EnMS)
  - ✓ Supporting energy conservation standards for MEPS and EnMS
  - ✓ Standards for EE&C market mechanism

International standards for EnMS and energy savings

- ISO/TC301 (***Energy management*** and energy savings)

  - The ISO 50001 (EnMS) system is based on a process of monitoring, targeting and implementing energy saving measures in a cycle of continuous improvement.
  - As of 2023, 23 ISO standards released, 6 ISO standards under development.
  - In 2022, the number of ISO 50001 certificates issued worldwide grew by almost 30% to 28000.

(Sources: ISO Survey 2022 of certifications, www.iso.org)

International standards for EnMS and energy savings

- ISO/TC301 (***Energy management*** and energy savings)

Source: www.iso.org

Intention	Standard title
General requirements	ISO 50001:2018 Energy management systems — Requirements with guidance for use
Energy audits	ISO 50002:2014 Energy audits — Requirements with guidance for use
Energy audits	ISO 50003:2021 Energy management systems — Requirements for bodies providing audit and certification of energy management systems
Implementation of EnMS	ISO 50004:2020 Energy management systems — Guidance for the implementation, maintenance and improvement of an ISO 50001 energy management system
Implementation of EnMS	ISO 50005:2021 Energy management systems — Guidelines for a phased implementation
Implementation of EnMS	ISO 50009:2021 Energy management systems — Guidance for implementing a common energy management system in multiple organizations
Implementation of EnMS	ISO/PAS 50010:2023 Energy management and energy savings — Guidance for net zero energy in operations using an ISO 50001 energy management system
Performance of EnMS	ISO 50006:2023 Energy management systems — Evaluating energy performance using energy performance indicators and energy baselines
Performance of EnMS	ISO/TS 50011:2023 Energy management systems — Assessing energy management using ISO 50001:2018

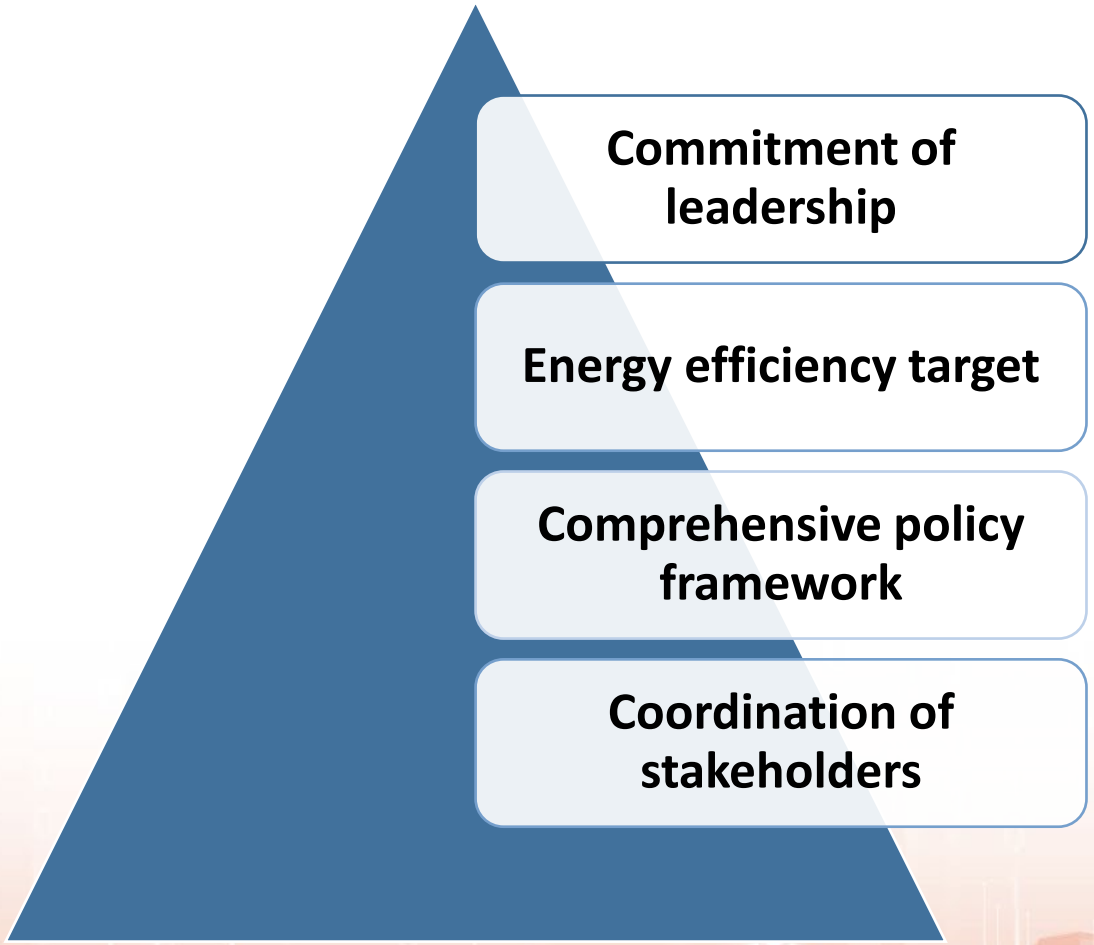
International standards for EnMS and energy savings

- ISO/TC301 (Energy management and ***energy savings***)

Source: www.iso.org

Intention	Standard title
Terms	ISO/IEC 13273-1:2015 Energy efficiency and renewable energy sources — Common international terminology — Part 1: Energy efficiency
Terms	ISO/IEC 13273-2:2015 Energy efficiency and renewable energy sources — Common international terminology — Part 2: Renewable energy sources
General methods	ISO 17743:2016 Energy savings — Definition of a methodological framework applicable to calculation and reporting on energy savings
General methods	ISO 50046:2019 General methods for predicting energy savings
Region level	ISO 17742:2015 Energy efficiency and savings calculation for countries, regions and cities
Region level	ISO 50049:2020 Calculation methods for energy efficiency and energy consumption variations at country, region and city levels
Organization level	ISO 50047:2016 Energy savings — Determination of energy savings in organizations
Project level	ISO 17741:2016 General technical rules for measurement, calculation and verification of energy savings of projects
Energy performance	ISO/TS 50008:2018 Energy management and energy savings — Building energy data management for energy performance — Guidance for a systemic data exchange approach
Energy performance	ISO 50015:2014 Energy management systems — Measurement and verification of energy performance of organizations — General principles and guidance
Energy performance	ISO 50021:2019 Energy management and energy savings — General guidelines for selecting energy savings evaluators
Energy performance	ISO 50045:2019 Technical guidelines for the evaluation of energy savings of thermal power plants
Financial performance	ISO/TS 50044:2019 Energy saving projects (EnSPs) — Guidelines for economic and financial evaluation
Energy Services	ISO 50007:2017 Energy services — Guidelines for the assessment and improvement of the energy service to users

Key to success



Suggestions

- Efficiency
  - Energy efficiency → coordinated improvement in EE and emission reduction
  - Individual equipment efficiency → System efficiency improvement
  - Rated/designed efficiency →Operational efficiency improvement
- Integration
  - Technology integration: energy technologies, energy tech + non energy tech
  - Energy integration: clean and renewables energy mix
  - System integration: energy systems, energy sys + non energy sys

Suggestions

- Policy
  - Cost-effective evaluation of policies
  - Continuous improvement of the policy portfolio (regulations and standards)
- Capacity building
  - Basic data and database
  - International collaboration

THANK YOU

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