

# APEC Energy Reduction Goal

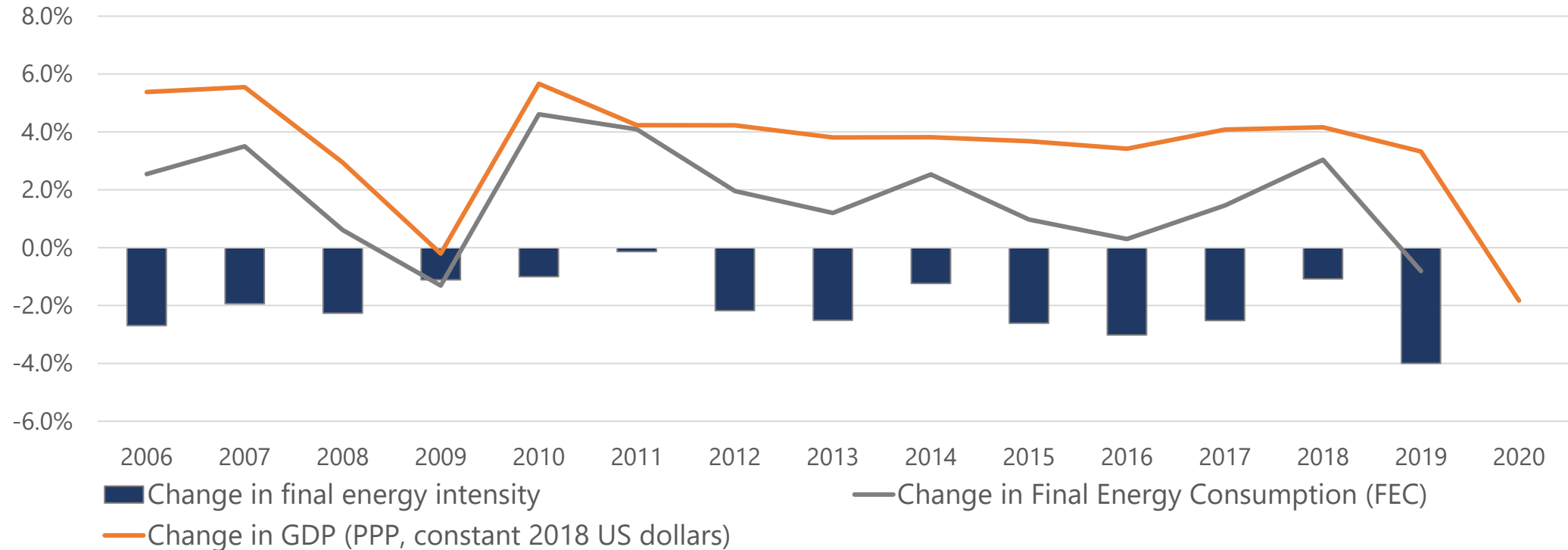
**EGEEC 58**

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# Energy intensity – Historical change in APEC final energy (As of 2005)



Sources: APEC statistics (EGEDA), WB, DGBAS (CT) and APERC analysis.

- Final energy intensity has declined every year; 2019 has the biggest reduction since 2005.
- Final energy intensity fell 25.1% between 2005 and 2019.

# Change of the main indicators in 2019 compared to 2005

- Population ↑10%
- GDP ↑ 70%
- TFEC ↑ 27%



**Energy intensity ↓25%**

The basic rule for Energy intensity reduction:  
the growth of the TFEC should be lower than the growth of GDP.

Contribution to the TFEC increase:

- Industry 34%
- Transport 35% (*Road transport is responsible for 80% of the increase of the TFEC in Transport*)
- Buildings 23%

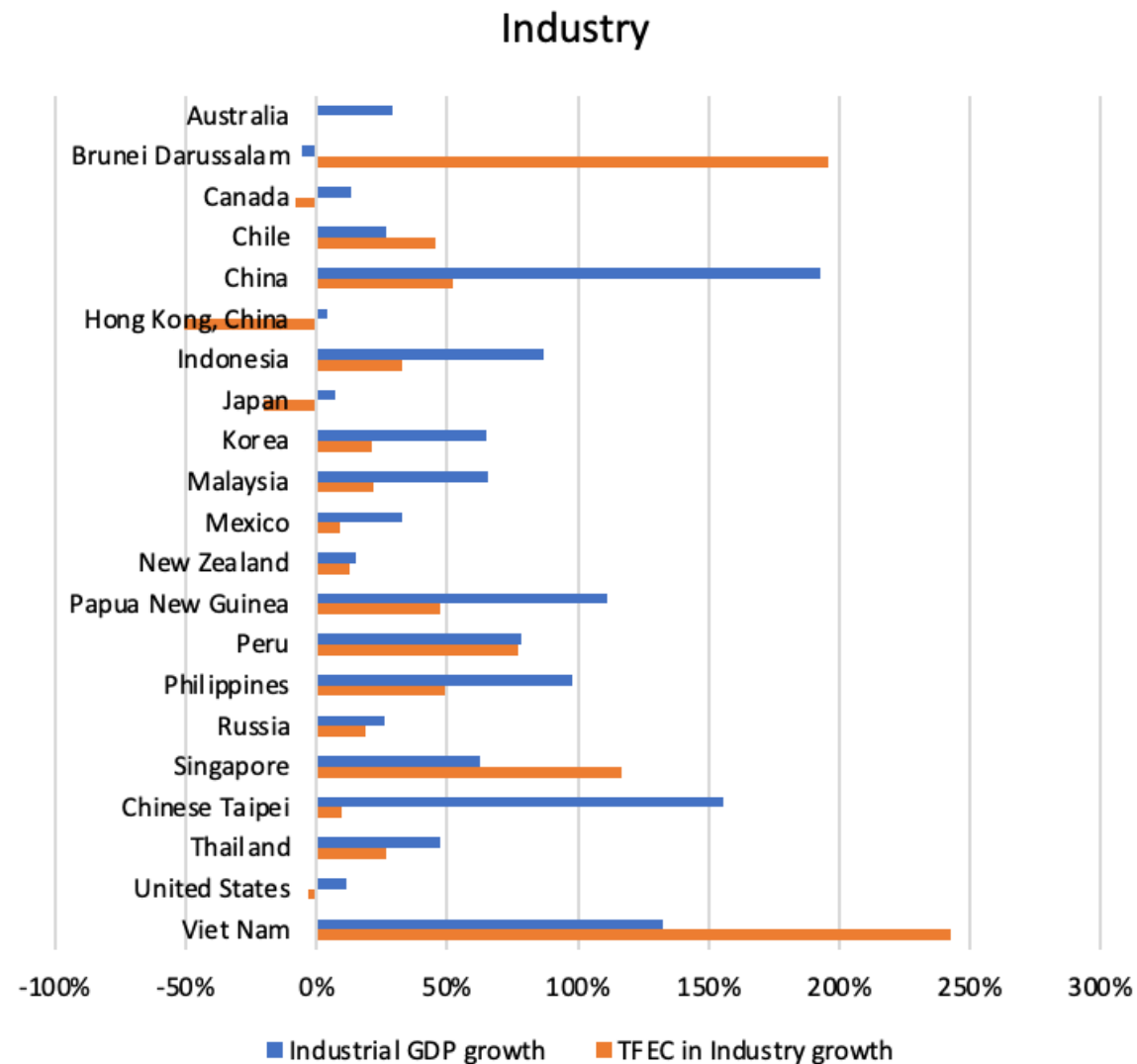
Comparison of TFEC growth rates in 4 subsectors (Industry, Road, Services and Residential) with the growth rates of the related economic indicators:

- Industry vs industrial GDP
- Road transport vs GDP per capita
- Commercial buildings vs non-industrial GDP
- Residential buildings vs Population

# Industry

17 economies where the growth of energy consumption in Industry was lower than the growth of industrial GDP:

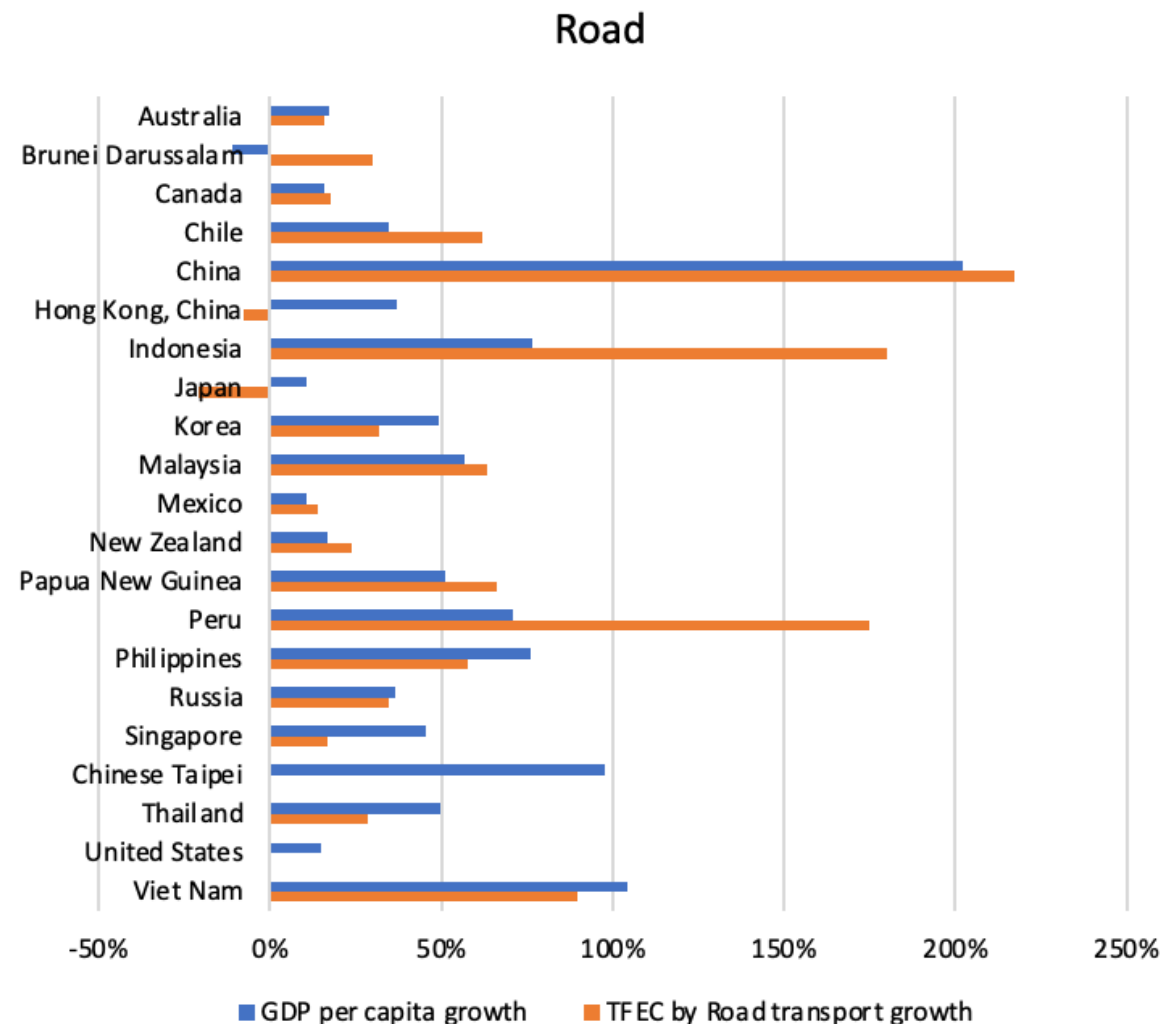
- Australia
- Canada
- China
- Hong Kong, China
- Indonesia
- Japan
- Korea
- Malaysia
- Mexico
- New Zealand
- Papua New Guinea
- Peru
- Philippines
- Russia
- Chinese Taipei
- Thailand
- United States



# Road transport

11 economies where the growth of energy consumption in Road transport was lower than the growth of GDP per capita:

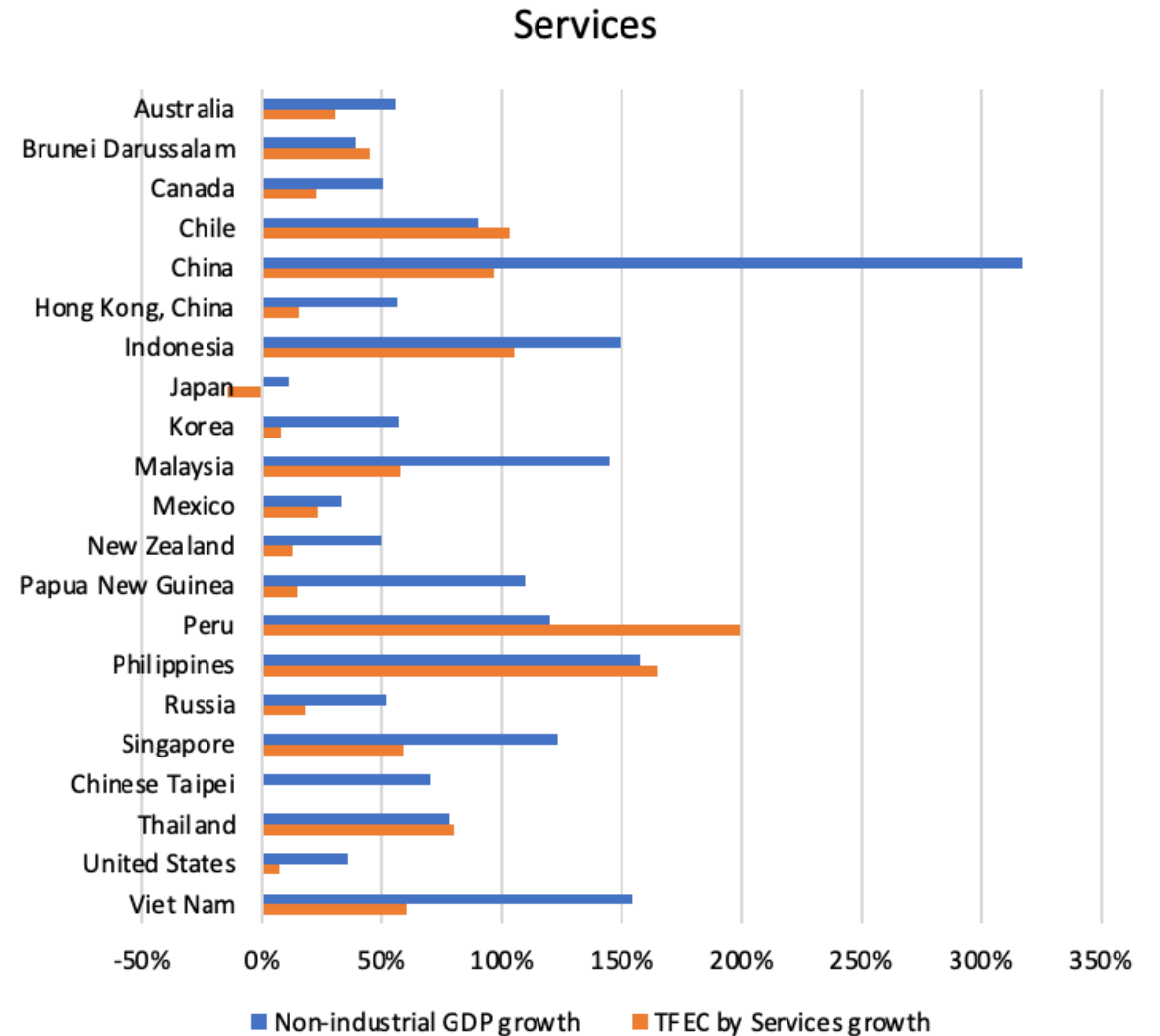
- Australia
- Hong Kong, China
- Japan
- Korea
- Philippines
- Russia
- Singapore
- Chinese Taipei
- Thailand
- United States
- Viet Nam



# Commercial buildings

16 economies where the growth of energy consumption in commercial buildings was lower than the growth of non-industrial GDP:

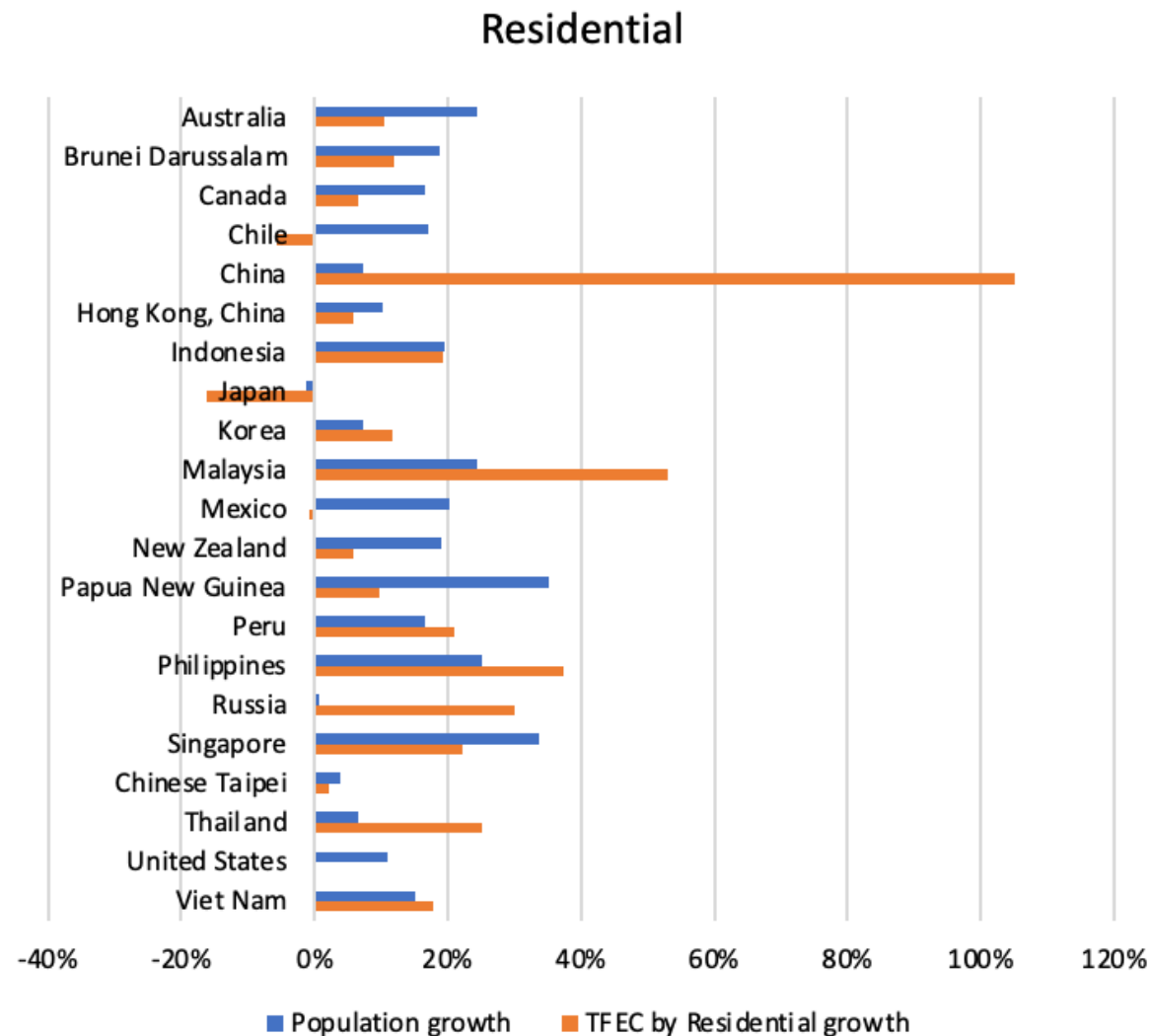
- Australia
- Canada
- China
- Hong Kong, China
- Indonesia
- Japan
- Korea
- Malaysia
- Mexico
- New Zealand
- Papua New Guinea
- Russia
- Singapore
- Chinese Taipei
- United States
- Viet Nam



# Residential buildings

13 economies where the growth of energy consumption in Residential buildings was lower than the growth of Population:

- Australia
- Brunei Darussalam
- Canada
- Chile
- Hong Kong, China
- Indonesia
- Japan
- Mexico
- New Zealand
- Papua New Guinea
- Singapore
- Chinese Taipei
- United States



# Some takeaways

There are only 5 economies in which the growth of the energy consumption in all subsectors was lower than the growth of the related indicator:

- Australia
- Hong Kong, China
- Japan
- Chinese Taipei
- The United States

GDP per Capita (2019)	Economy	Industry	Road	Commercial	Residential
99713	Singapore	Dark Blue	Light Blue	Light Blue	Light Blue
64054	United States	Light Blue	Light Blue	Light Blue	Light Blue
63612	Brunei Darussalam	Dark Blue	Dark Blue	Dark Blue	Light Blue
61305	Hong Kong, China	Light Blue	Light Blue	Light Blue	Light Blue
57967	Chinese Taipei	Light Blue	Light Blue	Light Blue	Light Blue
50820	Australia	Light Blue	Light Blue	Light Blue	Light Blue
50078	Canada	Light Blue	Dark Blue	Light Blue	Light Blue
44760	New Zealand	Light Blue	Dark Blue	Light Blue	Light Blue
43923	Korea	Light Blue	Light Blue	Light Blue	Dark Blue
42682	Japan	Light Blue	Light Blue	Light Blue	Light Blue
29055	Malaysia	Light Blue	Dark Blue	Light Blue	Dark Blue
28155	Russia	Light Blue	Light Blue	Light Blue	Dark Blue
25744	Chile	Dark Blue	Dark Blue	Dark Blue	Light Blue
20247	Mexico	Light Blue	Dark Blue	Light Blue	Light Blue
18910	Thailand	Light Blue	Light Blue	Dark Blue	Dark Blue
16509	China	Light Blue	Dark Blue	Light Blue	Dark Blue
13161	Peru	Light Blue	Dark Blue	Dark Blue	Dark Blue
12100	Indonesia	Light Blue	Dark Blue	Light Blue	Light Blue
9125	Philippines	Light Blue	Light Blue	Dark Blue	Dark Blue
8237	Viet Nam	Dark Blue	Light Blue	Light Blue	Dark Blue
4461	Papua New Guinea	Light Blue	Dark Blue	Light Blue	Light Blue
	Total APEC	4	10	5	8

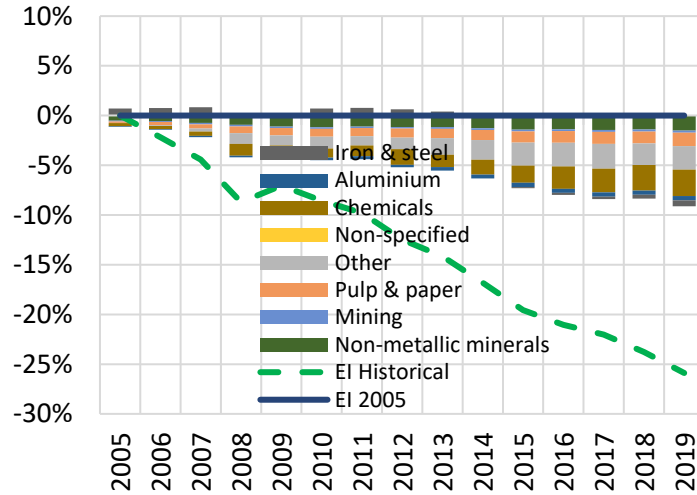
“Light blue” – the growth of the energy consumption in a subsector was lower than the growth of the related indicator.

“Dark blue” - the growth of the energy consumption in a subsector was higher than the growth of the related indicator.

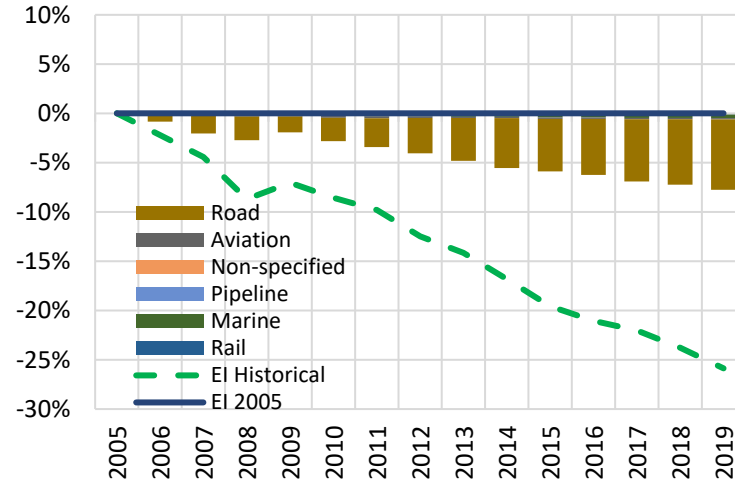


# Case in Japan

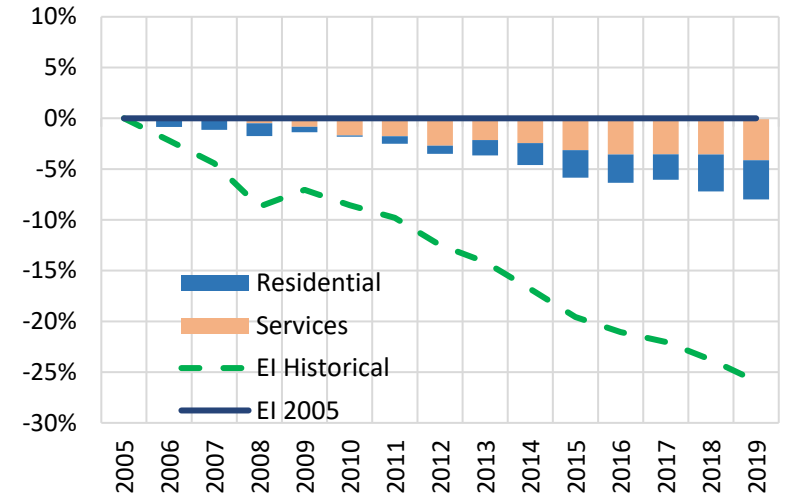
< Industry >



< Transport >

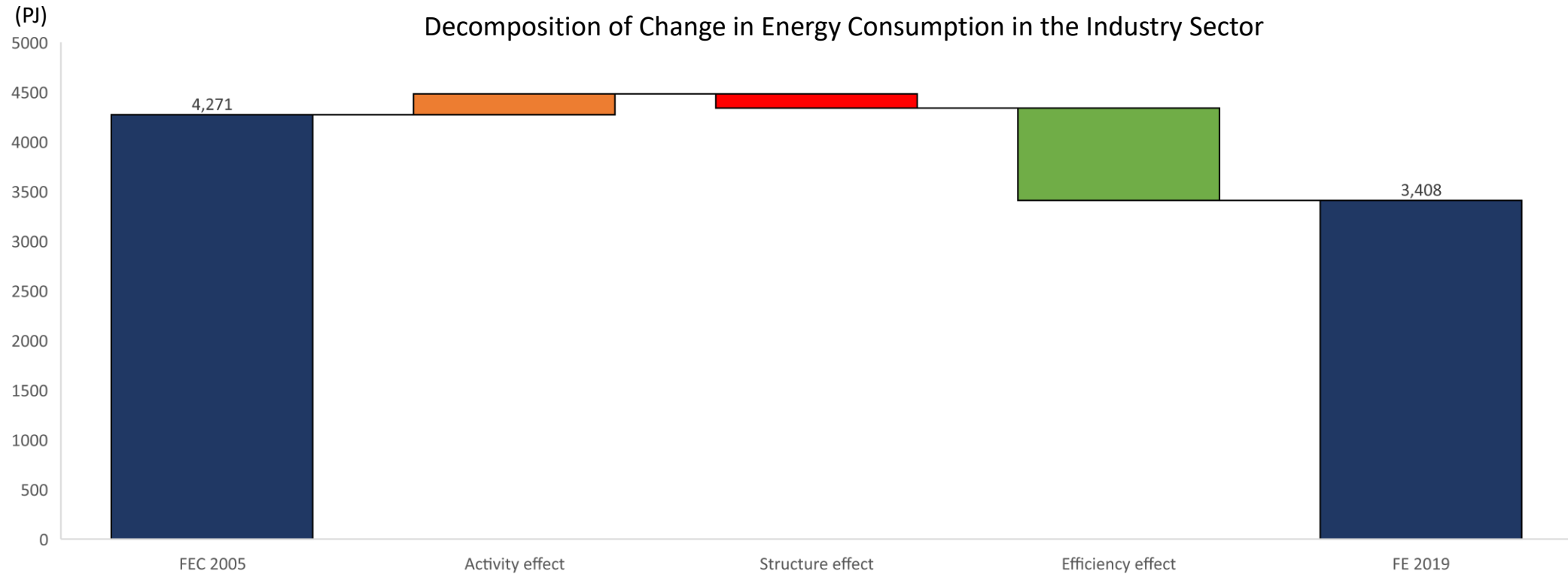


< Buildings >



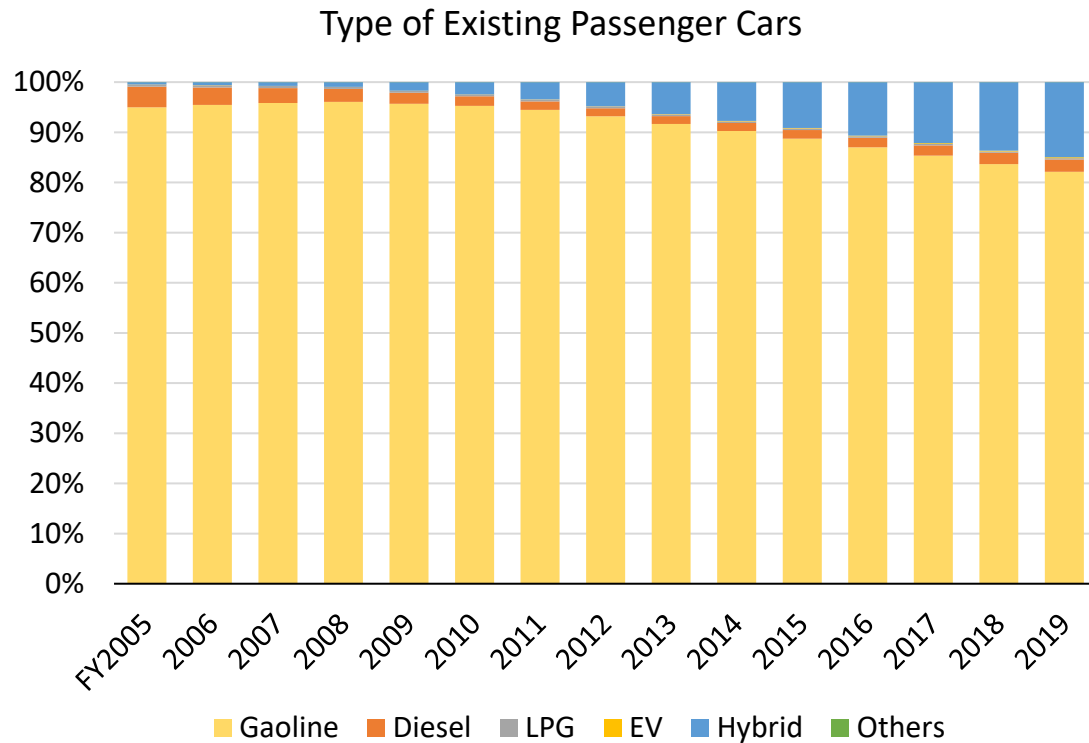
- (Industry) The progress of energy conservation has mainly contributed to the reduction of energy consumption in the manufacturing industry, which accounts for the largest portion of Japan's energy consumption.
- (Transport) Energy consumption is reduced by improving fuel efficiency of automobiles and increasing market share of low fuel economy vehicles such as compact cars and hybrid cars.
- (Buildings) Energy consumption has been mainly suppressed the progress of heat insulation and various energy saving measures represented by "Warm Biz" for commercial buildings and heightened awareness of energy conservation such as power saving by the people after the Great East Japan Earthquake.

# Case in Japan (Industry Sector)

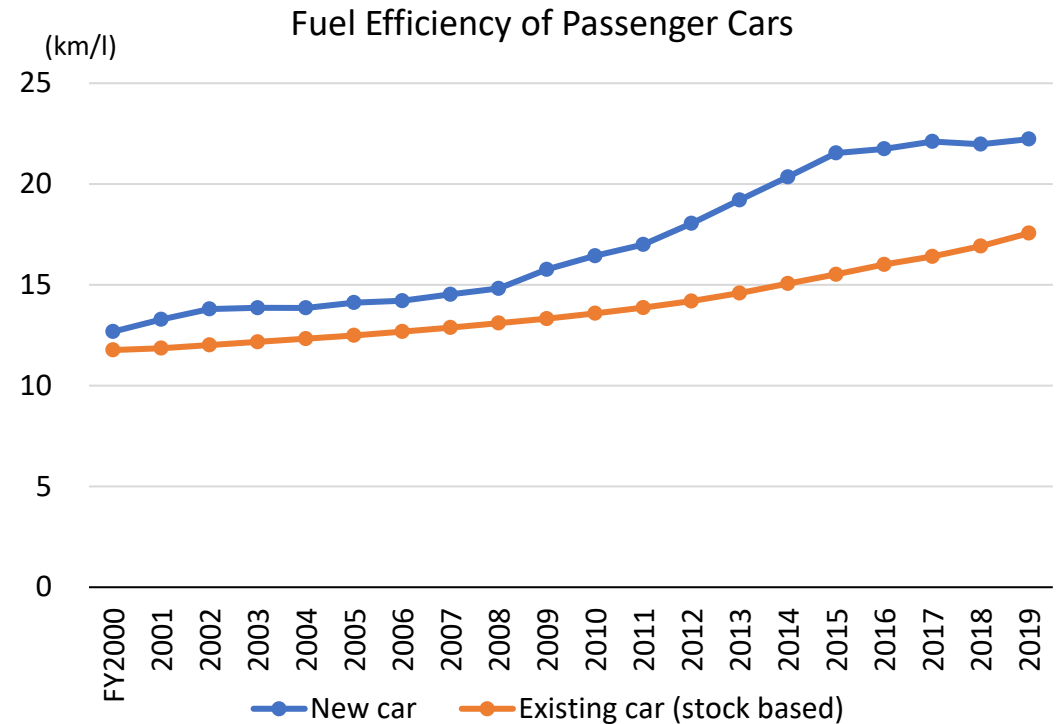


- While real GDP for the industry sector increased slightly (0.8%) between 2005 and 2019, the energy consumption decreased 20% during the same period.
- In the industry sector, efficiency improvement contributed most to the overall energy consumption reduction.
- After 2011, energy conservation effort especially in chemical sector contributed to the energy consumption reduction in the overall manufacturing sector.

# Case in Japan (Transport Sector)



Source: METI



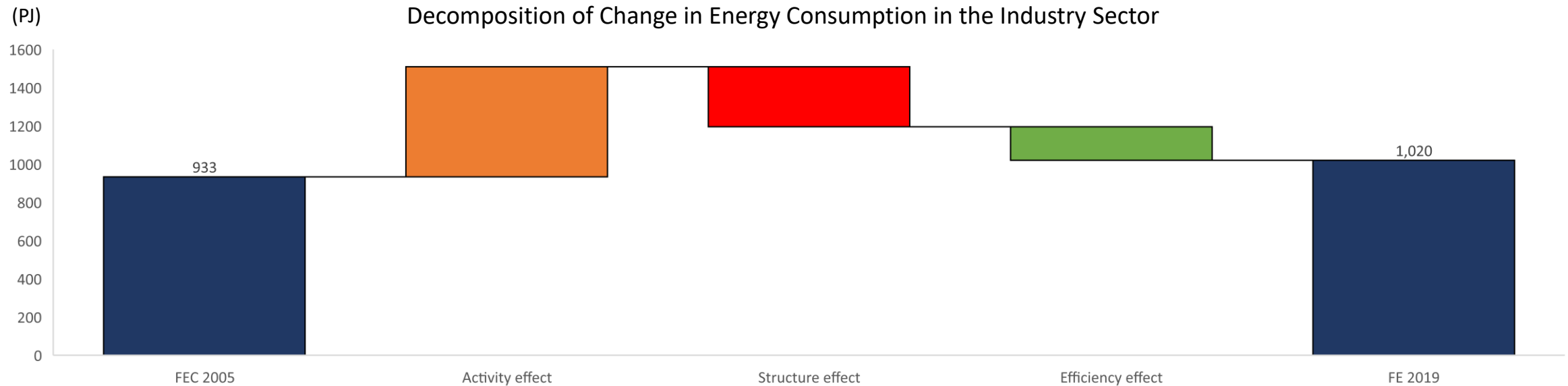
Source: METI, IEEJ

- After the 2000s, lower transportation volume and improvement in transport efficiency contributed to energy consumption reduction in the overall transport sector.
- In the passenger transportation sector, energy consumption peaked in FY2002 and decreased thereafter due to the increase in the share of compact car and hybrid car and energy efficiency improvement for passenger cars.
- The Top Runner Program is applied for passenger vehicles and freight cars.

# Case in Japan (Buildings Sector)

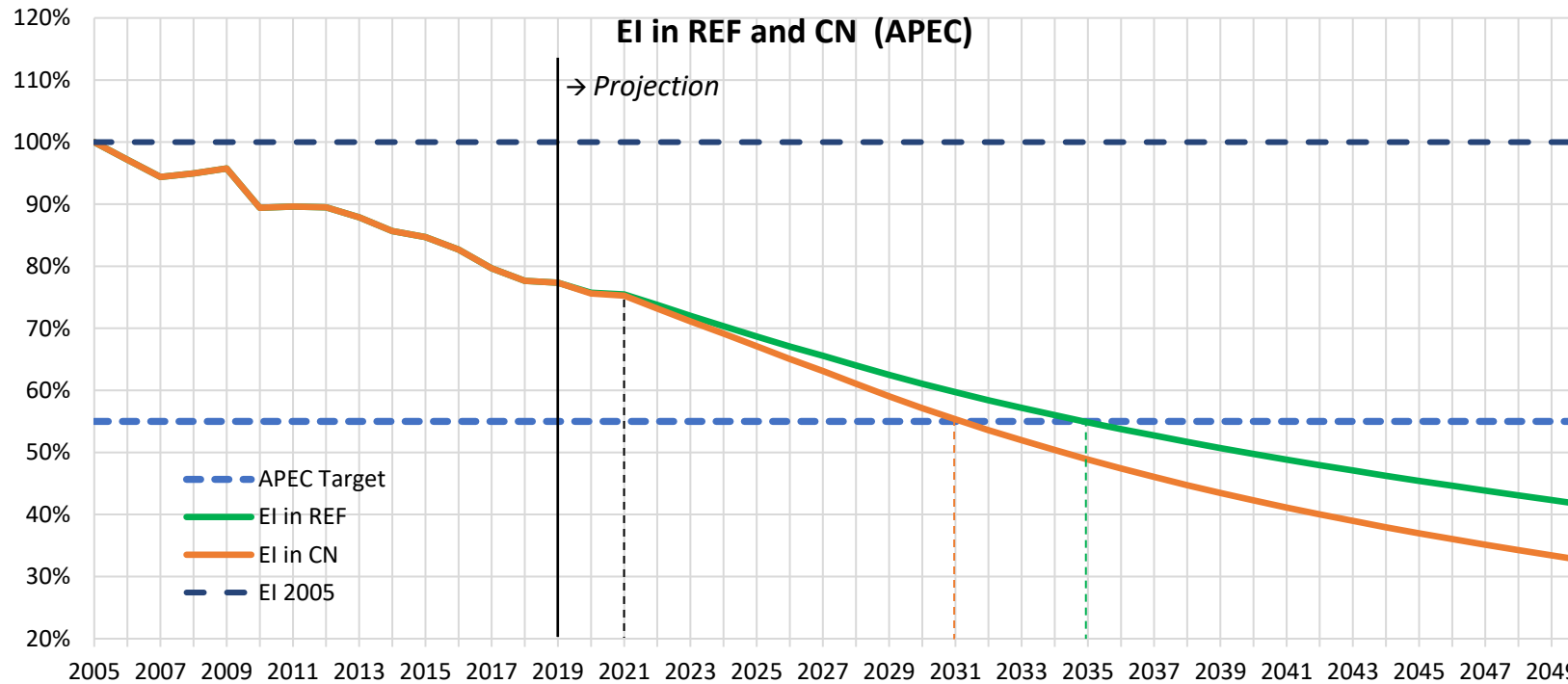
- After the late 2000s, the spread of air-conditioning equipment came to an end, and the energy efficiency of appliances improved.
- Energy consumption intensity for heating improved, thanks to the heat insulation measures of buildings advancement and energy saving measures such as “Warm Biz”.
  - Warm Biz: From November to March, setting the room temperature less than 20°C and wearing warm clothes.
  - Cool Biz: From June to September, setting the room temperature at 28°C and wearing cool clothes even in business situations.
- The “Top Runner Program” contributed to the energy efficiency improvement of home appliances.
  - The Top Runner Program: Introducing energy consumption efficiency standards (e.g., air-conditioner, light, refrigerator, microwave). Producers should produce products that have the same or higher efficiency standards as the settled standards. Producers that cannot meet the standards will receive penalties by the government.

# Case in Chinese Taipei (Decomposition of changes in energy use, Industrial sector)



- Using LMDI decomposition analysis, we separated the factors of energy use change for Chinese Taipei. The structural effect stood out as a key reason for Chinese Taipei's industrial energy intensity improvement.
  - (Structural effect) This was caused by a shift from energy intensive (PJ/GDP) traditional industries to the development of much less energy intensive electrical and electronic industries. Growth in GDP in the electrical industries was near 5-fold, compared to a 20% increase in GDP for all other industrial sectors.
  - (Activity effect) Increase in industry GDP causes an increase in energy use.
  - (Efficiency effect) Improvements in efficiency across all sectors decreased total energy use.

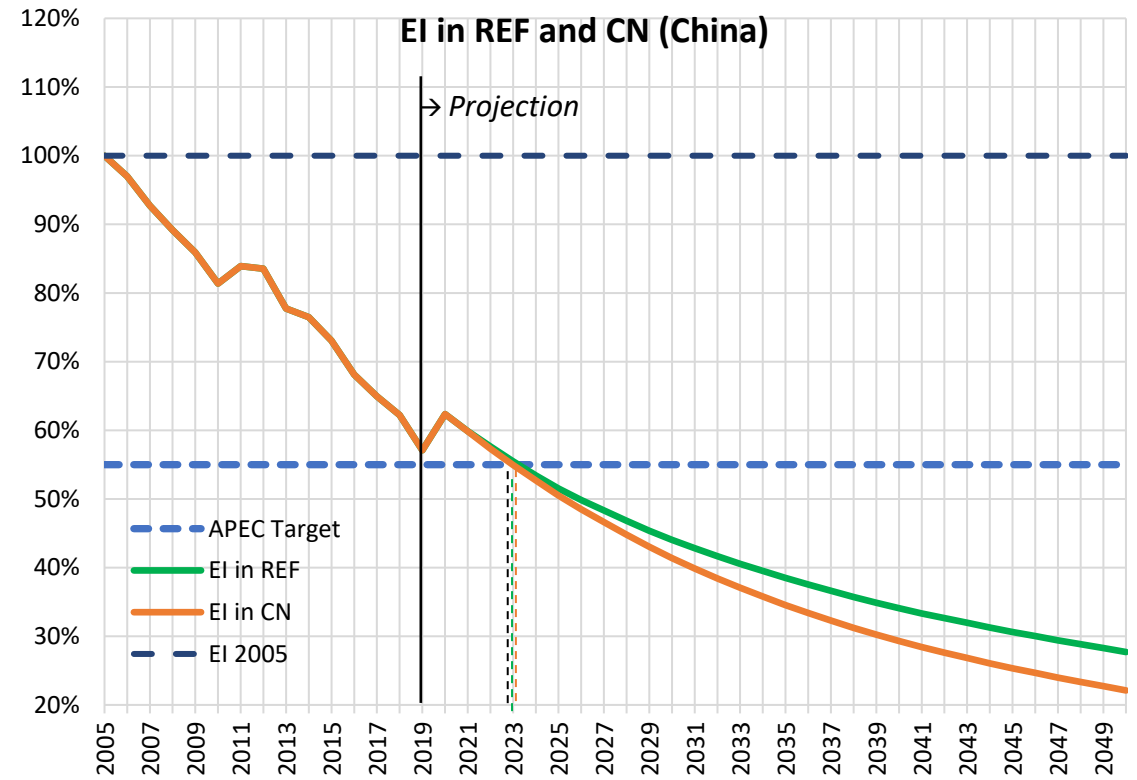
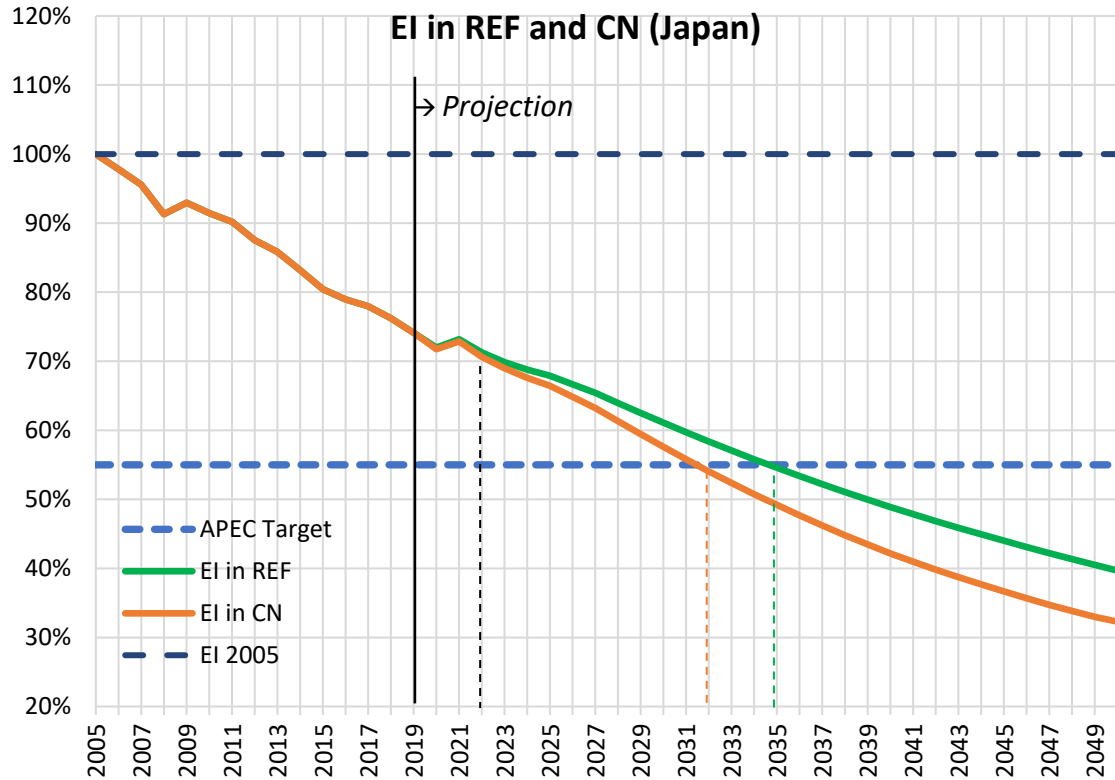
# APEC EI target achievement and two scenarios in 8<sup>th</sup> edition (1)



Source: APERC analysis

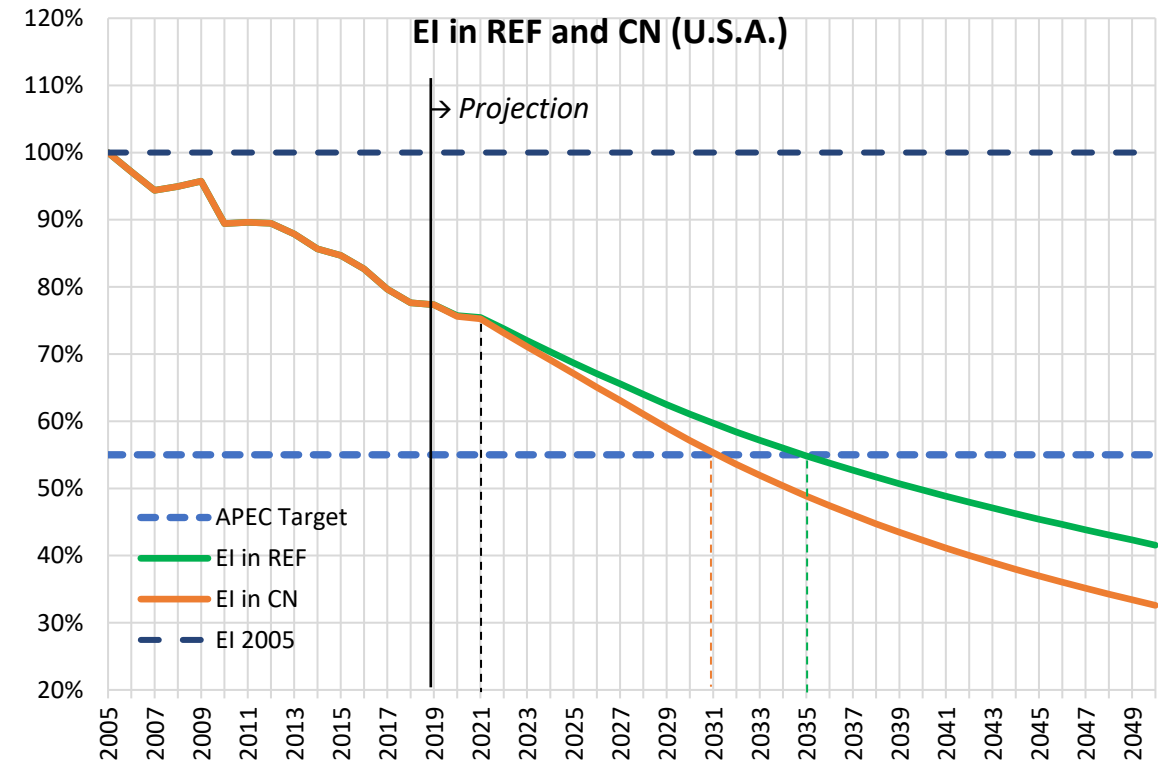
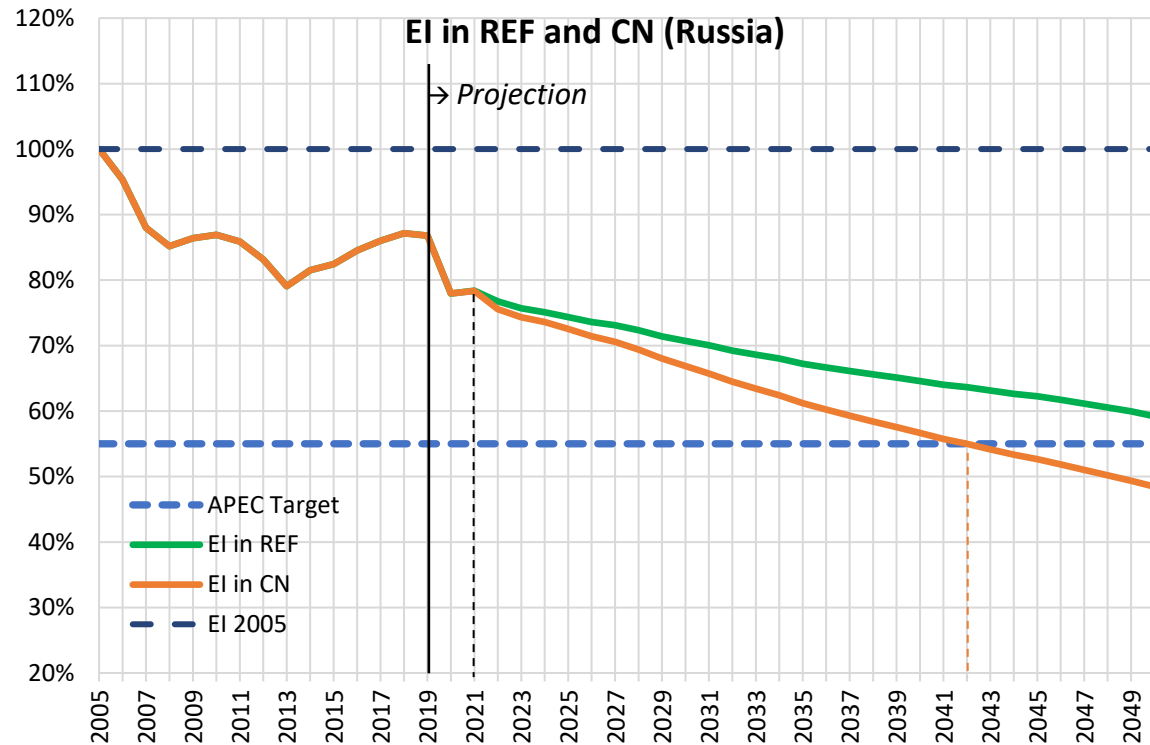
- APERC is preparing APEC Energy Outlook 8<sup>th</sup> edition assuming two different energy pathways.
- In the 8<sup>th</sup> edition draft results, APEC is expected to achieve the energy intensity goal in line with or ahead of 2035 target:
  - 2035 in the Reference scenario / 2031 in the Carbon Neutrality Scenario

# APEC EI target achievement and two scenarios in 8<sup>th</sup> edition (2)



- (Japan) 2035 in the Reference scenario / 2032 in the Carbon Neutrality Scenario
- (China) 2023 in the Reference scenario / 2023 in the Carbon Neutrality Scenario

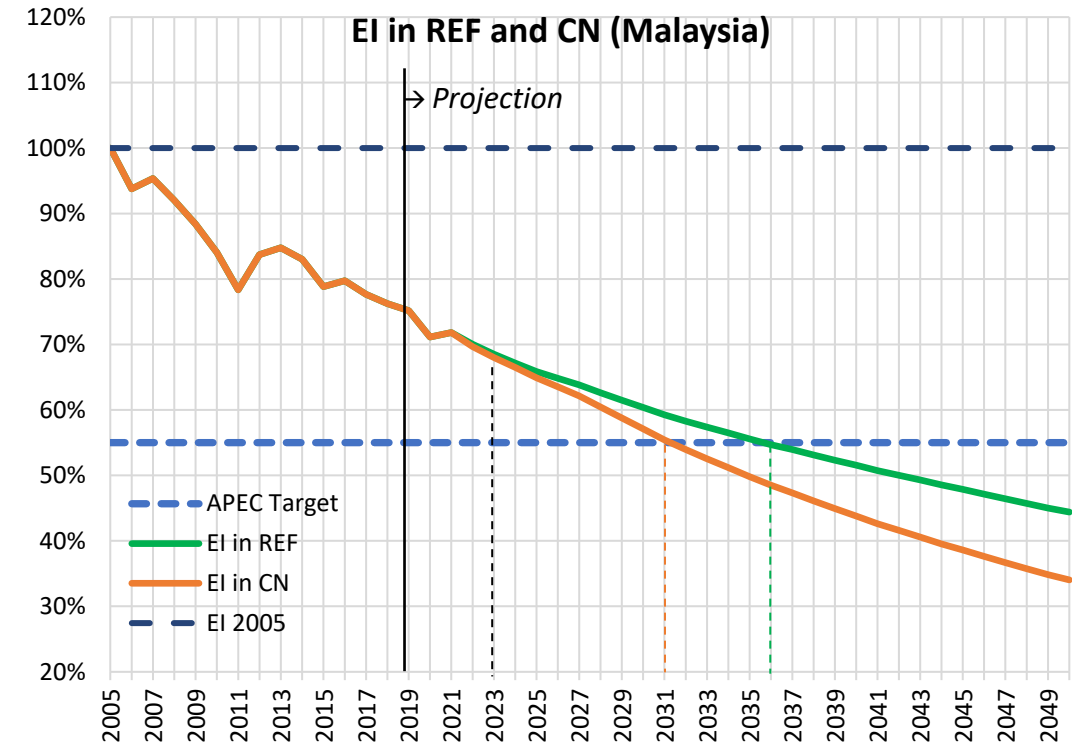
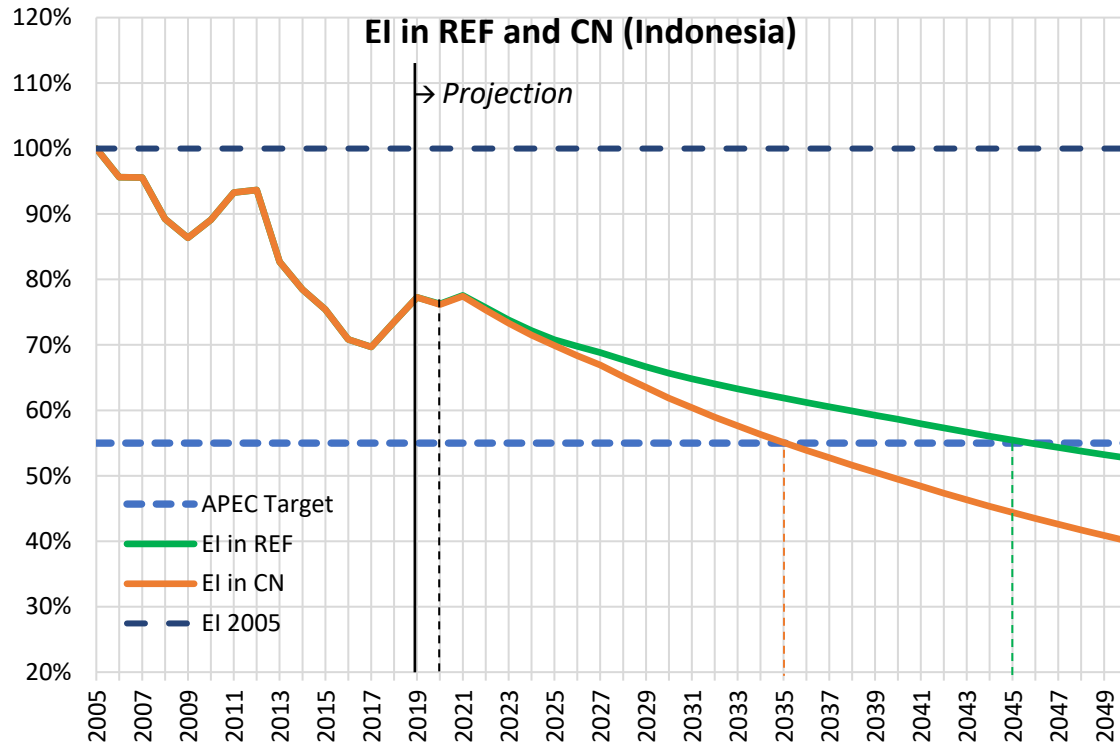
# APEC EI target achievement and two scenarios in 8<sup>th</sup> edition (3)



- (Russia) After 2050 in the Reference scenario / 2042 in the Carbon Neutrality Scenario
- (U.S.A.) 2035 in the Reference scenario / 2031 in the Carbon Neutrality Scenario



# APEC EI target achievement and two scenarios in 8<sup>th</sup> edition (4)



- (Indonesia) 2045 in the Reference scenario / 2035 in the Carbon Neutrality Scenario
- (Malaysia) 2036 in the Reference scenario / 2031 in the Carbon Neutrality Scenario

# Conclusion and Summary

- Although energy intensity in APEC has been generally declining year-on-year, energy consumption trends in each subsector and drivers of energy intensity improvement vary widely across economies.
- To reduce energy intensity, growth in energy consumption should be lower than growth in GDP. Energy consumption in each subsector also needs to be taken care not to increase excessively, compared to other related indicators.
- Energy intensity in each subsector is affected by various factors.
  - Case in Japan shows how various factors such as energy-saving behavior and government policy contribute to reducing energy consumption.
  - In the case of Chinese Taipei, structural effects like transition of industrial subsectors have particularly a significant impact on energy intensity in industrial sectors.
- In the 8th edition draft results, APEC expects to reach its 2035 energy intensity target in 2035 for the Reference Scenario and 2031 for the Carbon Neutral Scenario though each economy takes its own path.



# Thank You

<https://aperc.ieej.or.jp/>