

Demand side data and efficiency indicators in APEC: Buildings

**IEA Demand Side Data and Energy Efficiency Indicators
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Elvira Torres Gelindon
Research Fellow, Asia Pacific Energy Research Centre



Outline

Background

Energy consumption trends in buildings

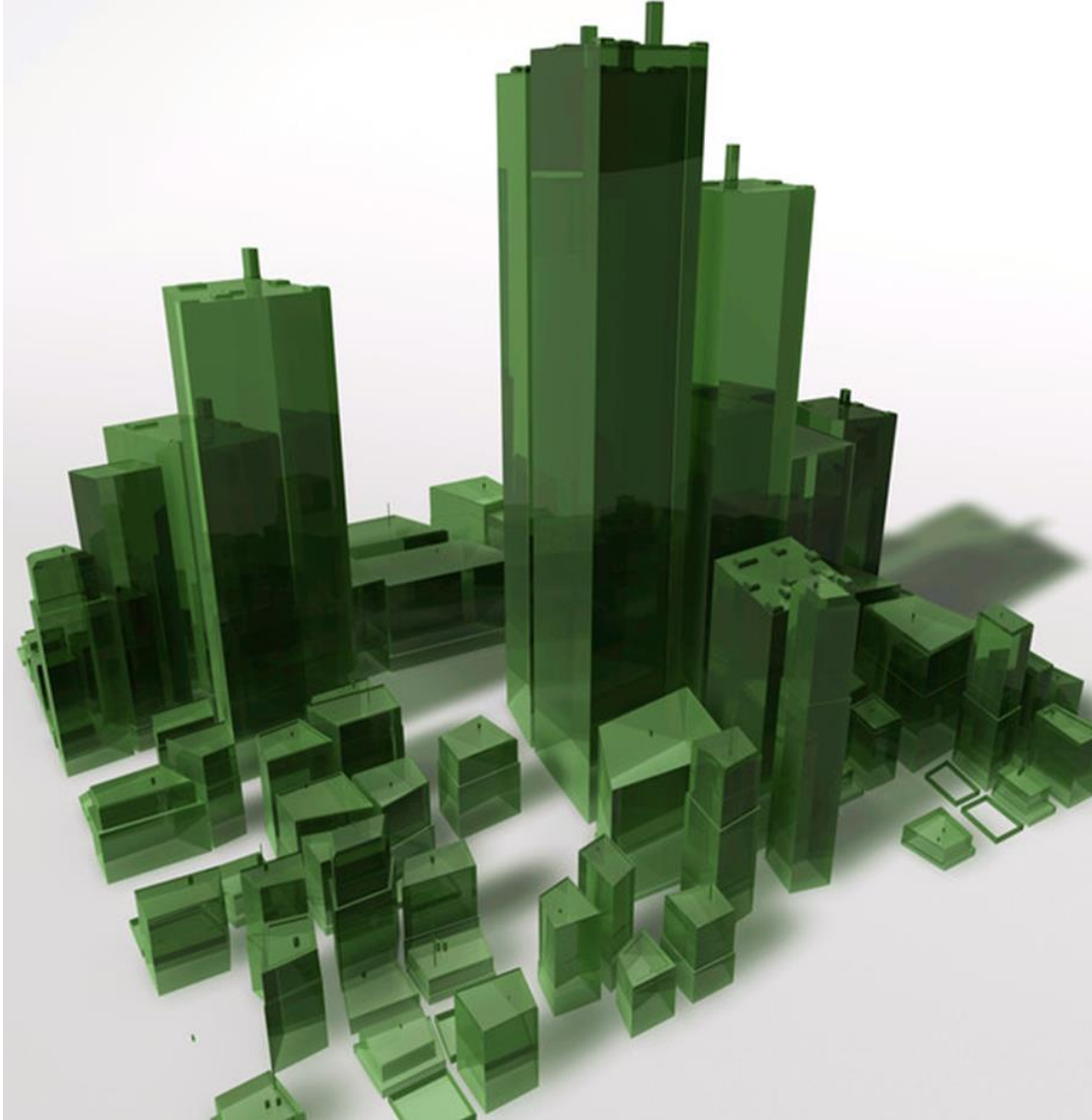
Energy balance table and EEI template

Tracking energy efficiency in buildings

Conclusions

Background

Buildings, why are they important?



- The buildings sector, includes energy used for constructing, heating, cooling and lighting homes and businesses, as well as the appliances and equipment installed in them;
- Global floor area is growing rapidly, especially in developing economies, and growing wealth means more and more consumers are buying air conditioners, other appliances and gadgets.
- Buildings are a major demand on energy sources, and the emissions associated with supplying and consuming this energy make up an important component of total emissions.

Sources: IEA, 2023 ([Buildings - Energy System – IEA](#));
IEA-EBC, 2021 (<https://iea-ebc.org/buildings-tcps>)

Buildings and energy demand

Space heating

Space cooling and ventilation

Water heating

Lighting

All other building consumption

Space heating

Space cooling

Water heating

Cooking

Lighting

Appliances (refrigerators, freezers, dish washers, clothes washers, entertainment)

Activity

climate, floor area, building type (relative to sector activity), age of building, maturity of an economy, quality of building energy management, per capita income, climatic, etc.

Services (ISIC*
35-39, 45-99)

* [International Standard Industrial Classification](#)

Households

Activity

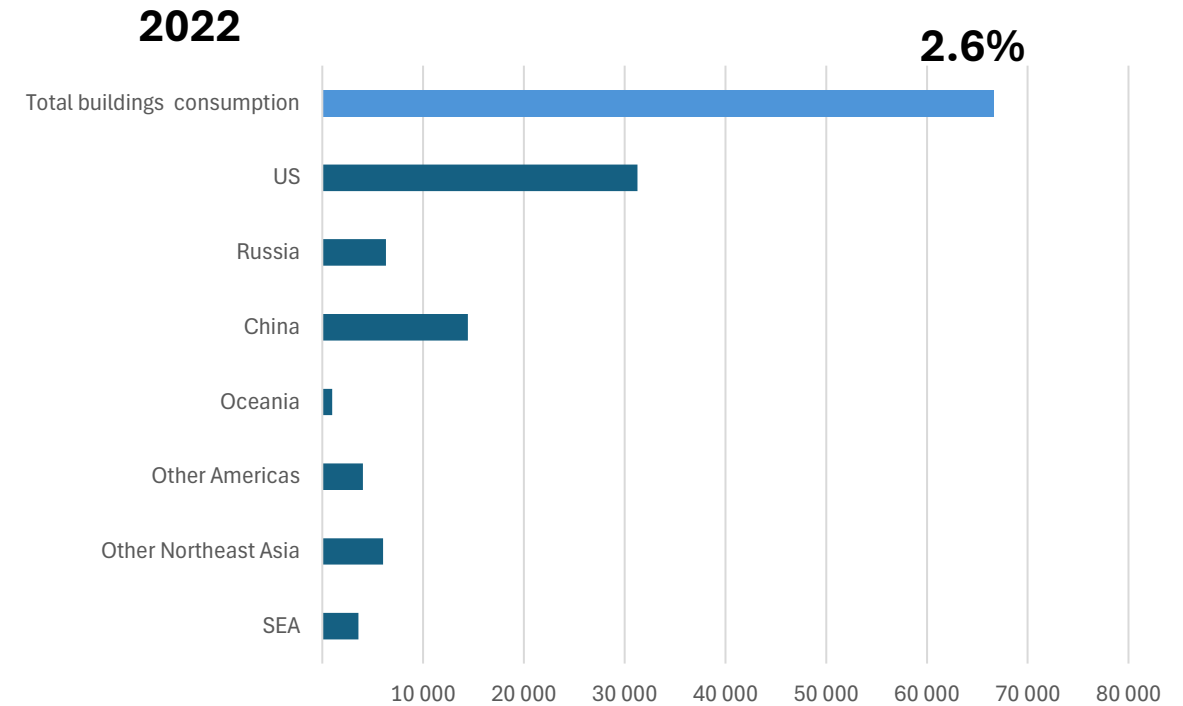
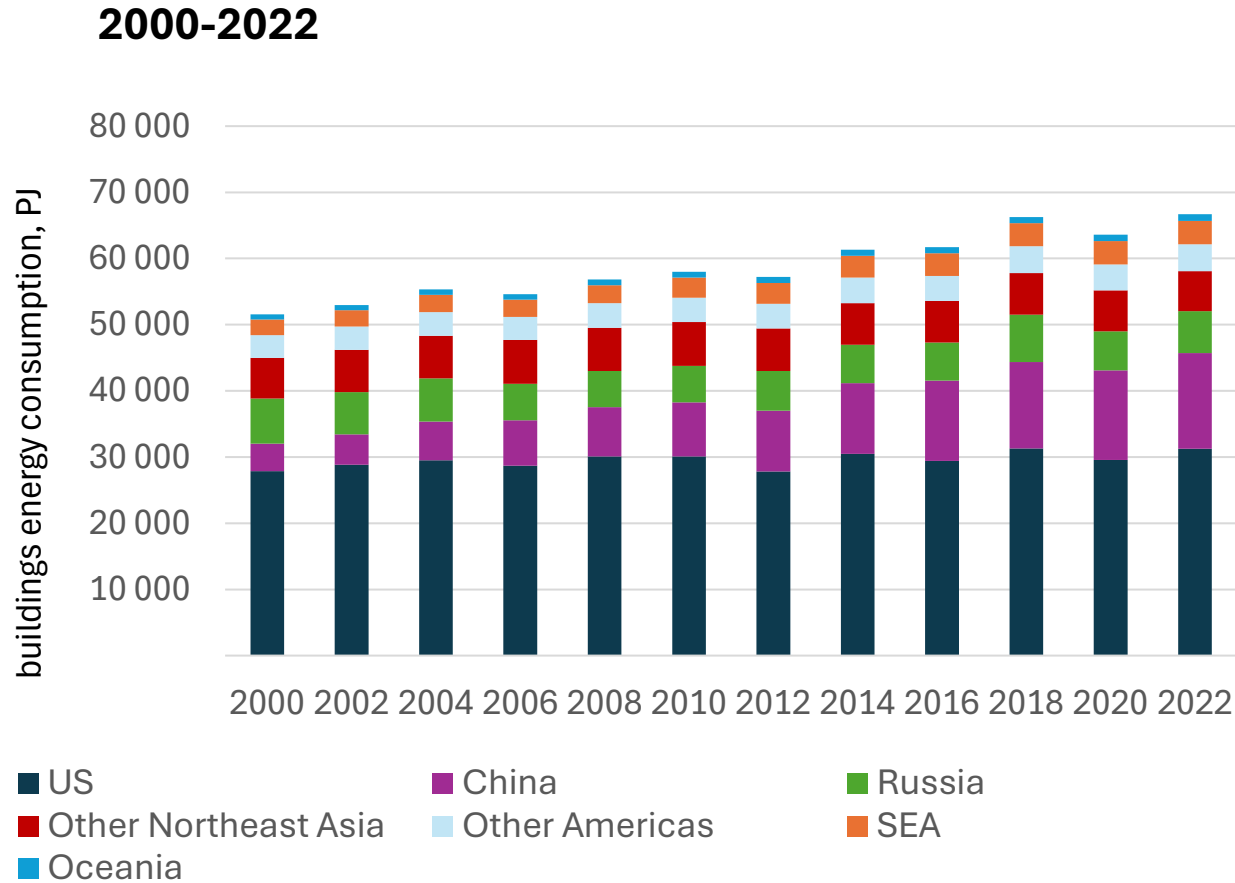
Population, income, number of occupied dwellings, household size, total floor area, urbanization rates, climatic, appliance stocks, etc.

Energy consumption trends in buildings

From the energy balances

One of the regions in APEC driving buildings consumption

Buildings consumption by region

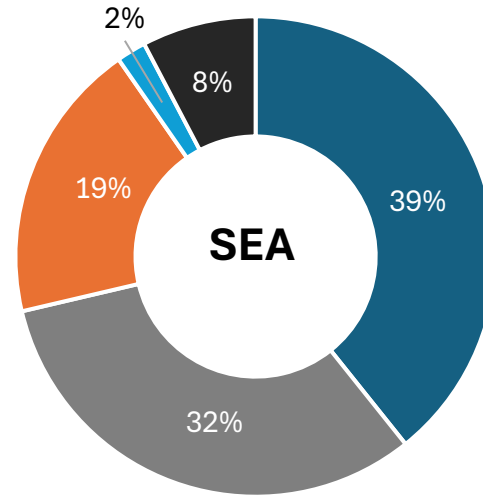
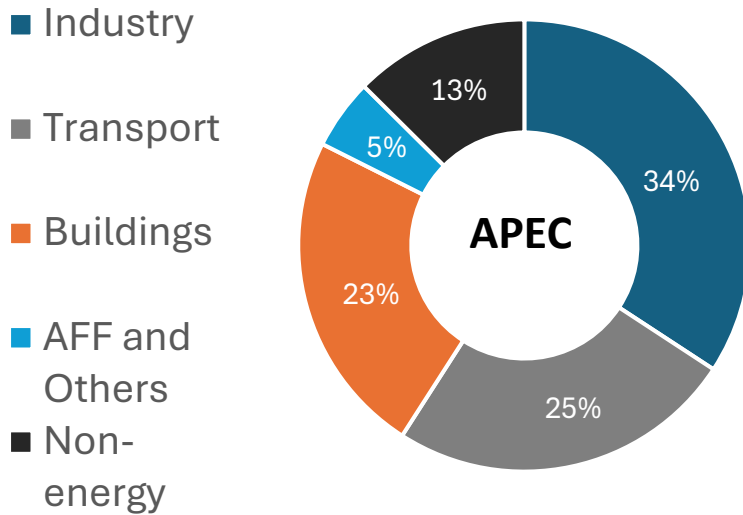


Sources: APEC data, 2025

- ❖ SEA's building consumption accounted for a small share of total APEC building consumption;
- ❖ In terms of growth in 2022, it was the third fastest (2.3%), next to other Americas (2.6%) and the US (4.8%)

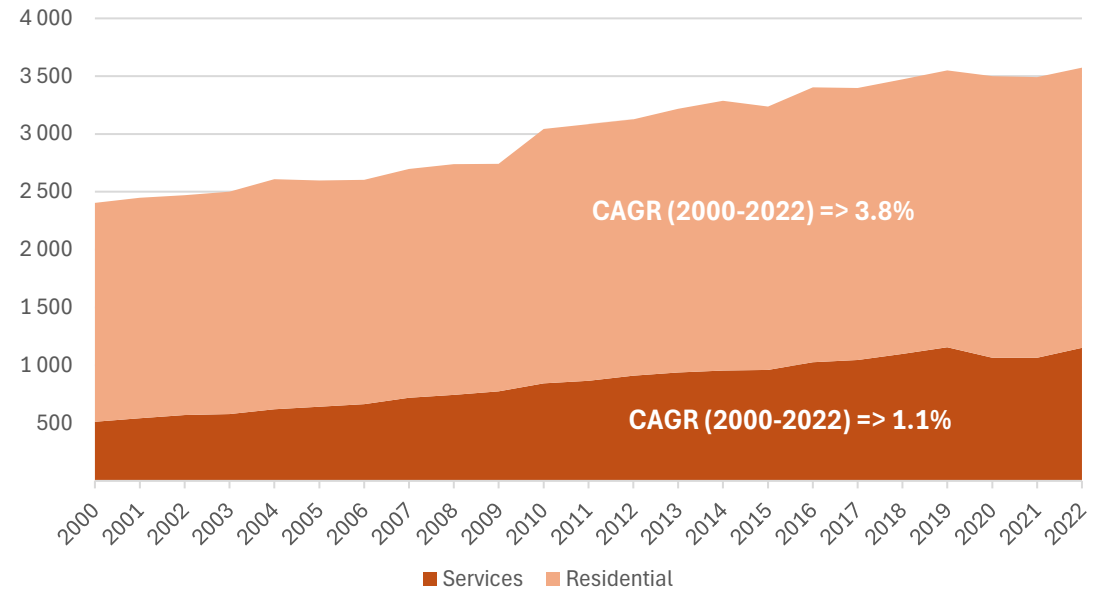
Buildings consumption is the third largest in APEC and SEA

APEC and SEA, 2022



Sources: APEC data, 2025

Buildings consumption in SEA, PJ

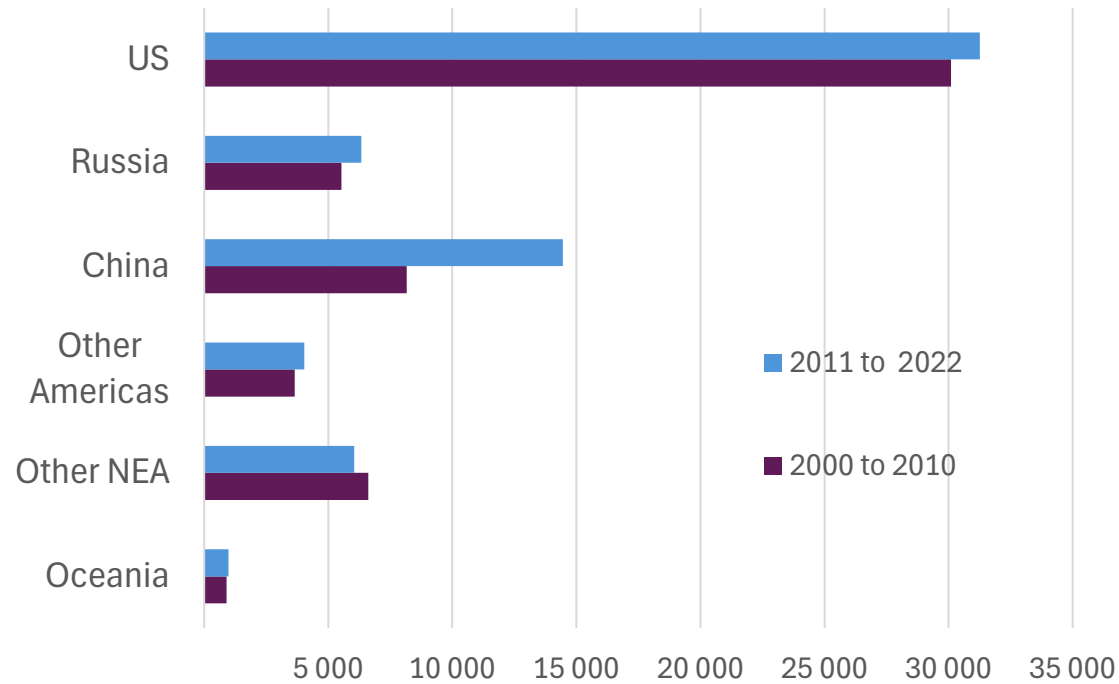


Sources: APEC data, 2025

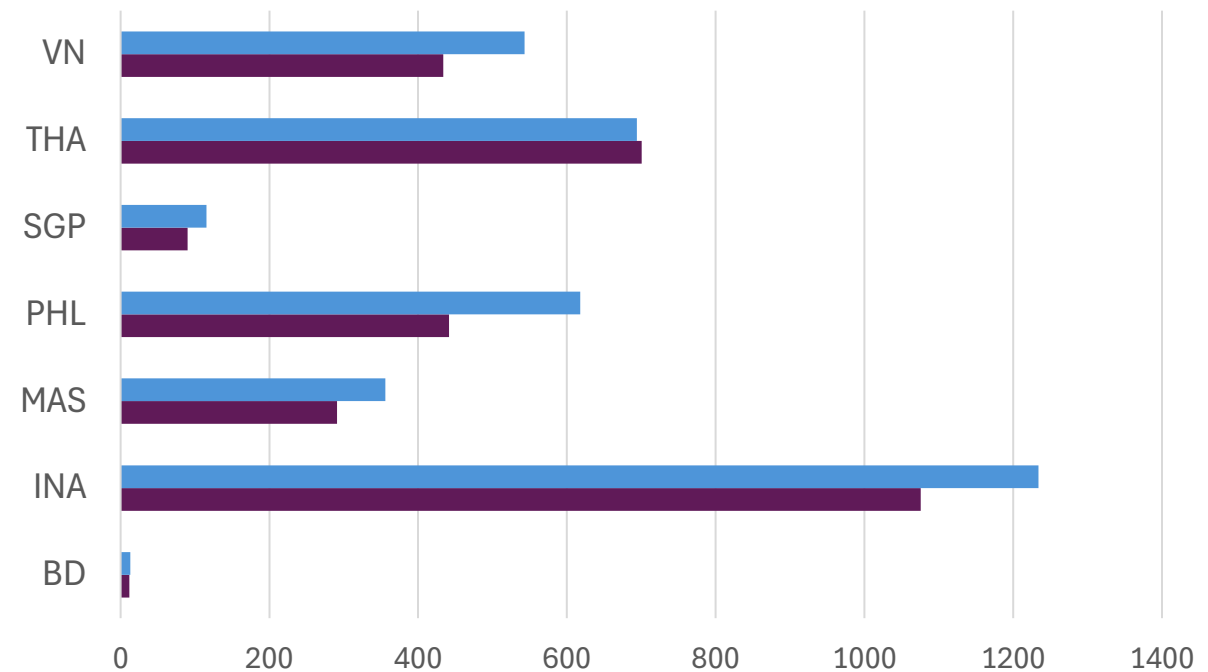
- ❖ *Energy consumption in buildings in SEA is relatively the same as APEC; accounting for a third of the total final consumption**
- ❖ *Residential consumption accounted for the largest in buildings and grew faster than services on average between 2000 and 2022*

Interesting trends in the last two decades

Other APEC regions



SEA member economies



Sources: APEC data, 2025

- ❖ Energy consumption in buildings in most APEC regions grew faster after 2011, except for other NEA*
- ❖ In SEA, Thailand has a similar trend to other NEA between 2011 and 2022

* Other NEA includes Hong Kong, China; Japan; Korea and Chinese Taipei

Energy balance table and EEI template

From the energy balances

Energy Balance Table (Table.1)														
Member: Brunei Darussalam														
Year: 2022														
	1.	1.1	1.2	1.3	1.4	1.5	2.	2.1	2.2	2.3	2.4	2.5	2.6	2.7
	Coal	Coking coal	Other bituminous coal	Sub-bituminous coal	Anthracite	Lignite	Coal products	Coke oven coke	Gas coke	Coke oven gas	Blast furnace gas	Other recovered gases	Patent fuel	Coal tar
15. Transport sector	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15.1 Domestic air transport	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15.2 Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15.3 Rail	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15.4 Domestic navigation	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15.5 Pipeline transport	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15.6 Non-specified transport	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16. Other sector	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16.1 Commercial and public services	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16.2 Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16.3 Agriculture	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16.4 Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16.5 Non-specified others	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17. Non-energy use	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17.1 Transformation sector	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17.2 Industry sector	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17.3 Transport sector	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17.4 Other sector	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fuel source

Final energy consumption

❖ Buildings consumption is aggregated; the type of fuel is the only information that was disaggregated

Energy efficiency indicators template requires more data

Services

SERVICES	Unit	1990	1991	1992	1993	2016	2017	2018	2019	2020	2021	2022	2023
Energy Use (total final energy use)													
		0.04											
Total Energy Use in Services Sector (APEC energy balances)		For information (if details are not available)											
Oil & Oil Products	PJ	4.64	5.17	5.85	6.58	68.34	86.84	93.05	98.80	103.28	111.47	83.16	
Natural Gas	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Coal & Coal Products	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Biofuels & Waste	PJ	12.61	12.45	12.32	12.22	15.10	15.60	15.93	16.14	15.16	15.48	14.98	
Heat	PJ												
Electricity	PJ	16.90	17.45	17.68	17.01	78.37	81.96	86.46	91.71	74.62	76.03	87.46	
Other	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Total	PJ	34.15	35.07	35.85	35.81	161.81	184.41	195.45	206.65	193.06	202.97	185.60	
Space Heating													
Oil & Oil Products	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Natural Gas	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Coal & Coal Products	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Biofuels & Waste	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Heat	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Electricity	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Other	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Total	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Space Cooling													
Oil & Oil Products	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Natural Gas	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Coal & Coal Products	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Biofuels & Waste	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Heat	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Electricity	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Other	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Total	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Lighting													
Electricity	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Other	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Total	PJ	0	0	0	0	0	0	0	0	0	0	0	0
Other Building Energy Use in Services Sector													

Households

RESIDENTIAL	Unit	2018	2019	2020	2021	2022	2023	sources	comments and methodology
Energy Use (total final energy use - net calorific values)									
Total Energy Use in Residential Sector (APEC energy balance For information)									
Electricity	PJ	101.74	109.99	123.45	125.93	127.17			
Other	PJ	0	0	0	0	0	0		
Total	PJ	394.84	406.57	419.86	426.16	431.66			
Space Heating									
Oil & Oil Products	PJ	0	0	0	0	0	0		
Natural Gas	PJ	0	0	0	0	0	0		
Coal & Coal Products	PJ	0	0	0	0	0	0		
Biofuels & Waste	PJ	0	0	0	0	0	0		
Heat	PJ	0	0	0	0	0	0		
Electricity	PJ	0	0	0	0	0	0		
Other	PJ	0	0	0	0	0	0		
Total	PJ	0	0	0	0	0	0		
Space Cooling									
Electricity	PJ	5.57	5.96	6.42	6.56	6.90	7.38		
Other	PJ	0	0	0	0	0	0		
Total	PJ	5.57	5.96	6.42	6.56	6.90	7.38		
Water Heating									
Oil & Oil Products	PJ	3.44	3.68	3.93	4.17	4.43	4.70		
Natural Gas	PJ	0	0	0	0	0	0		
Coal & Coal Products	PJ	0	0	0	0	0	0		
Biofuels & Waste	PJ	0	0	0	0	0	0		
Heat	PJ	0	0	0	0	0	0		
Electricity	PJ	8.50	9.60	10.84	12.18	13.68	15.36		
Other	PJ	0	0	0	0	0	0		
of which: solar thermal - voluntary	PJ	0	0	0	0	0	0		
Total	PJ	11.94	13.28	14.77	16.35	18.11	20.07		

- [EEI template](#)

- ❖ Collected data can only be filled in with aggregated numbers
- ❖ Generally, only two member economies can submit the template with household end-uses

Efforts in collecting EEI data

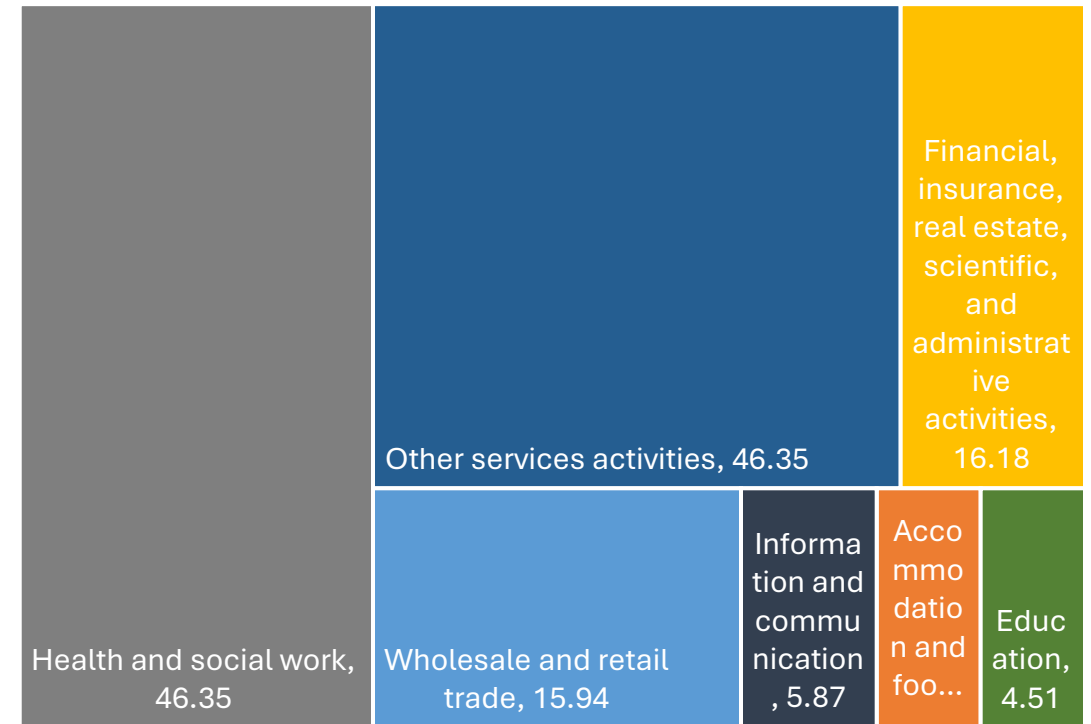
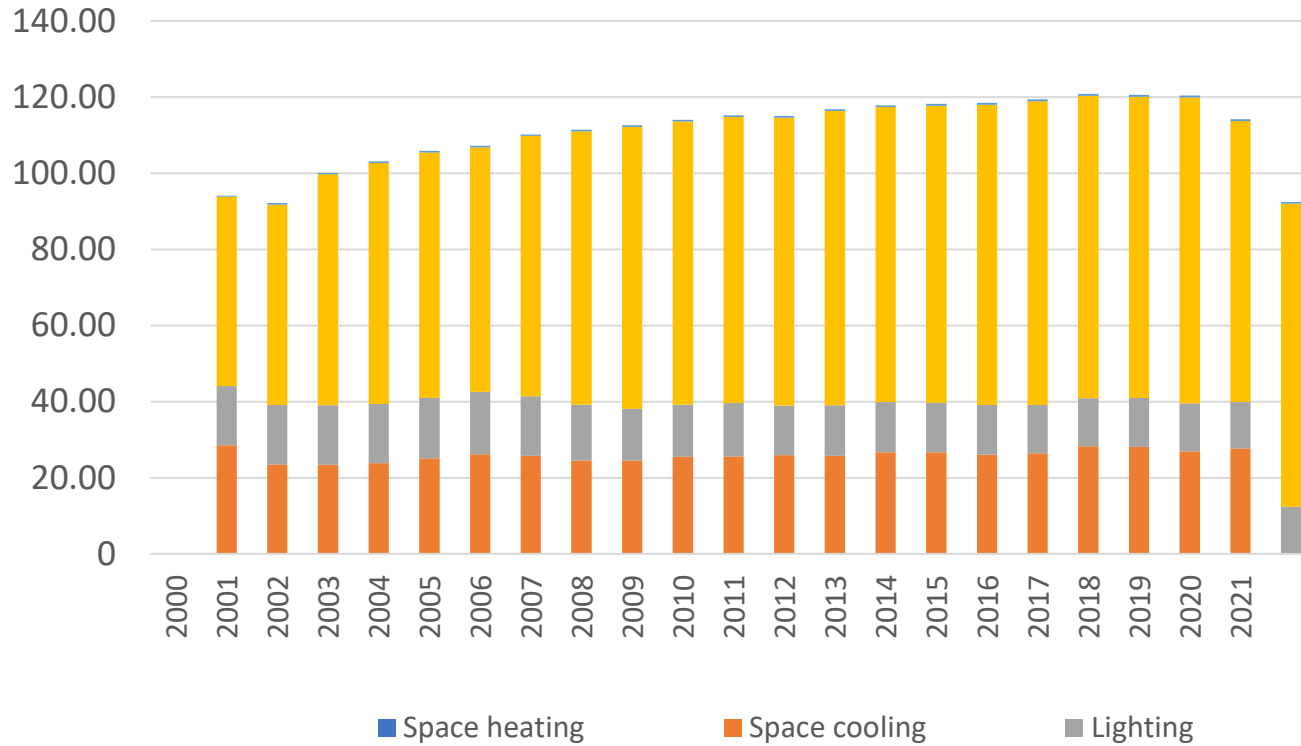
Economies/Regions	Collection		Estimation by the consultant	
	Services	Households	Services	Households
Brunei Darussalam	X	X		✓
Indonesia	X	X		
Malaysia	X	X		✓
The Philippines	X	X		✓
Singapore	X	X		
Thailand	X	X		✓
Viet Nam	X	X		
Other Non-OECD APEC economies	X	X		
Hong Kong, China	✓	✓		
Chinese Taipei	✓	✓		
OECD-IEA	✓	✓		

❖ APEC is continuously increasing efforts until all members can fill in the template

Tracking energy efficiency indicators

What can we obtain from the indicators?

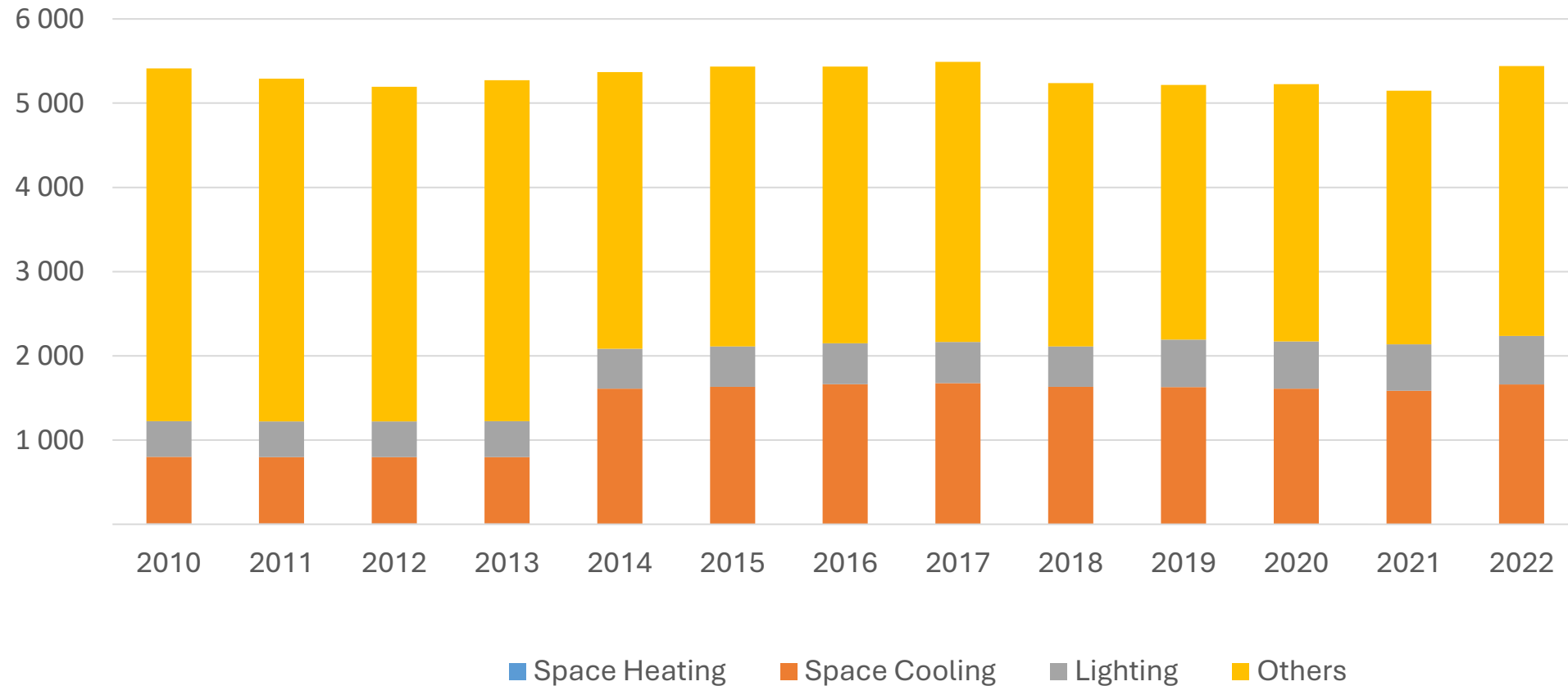
Services trends: Hong Kong, China case



Sources: APEC data, 2025

- ❖ Space cooling has the largest share of the buildings consumption;
- ❖ By sub-sector, health and social work, consumed the largest energy

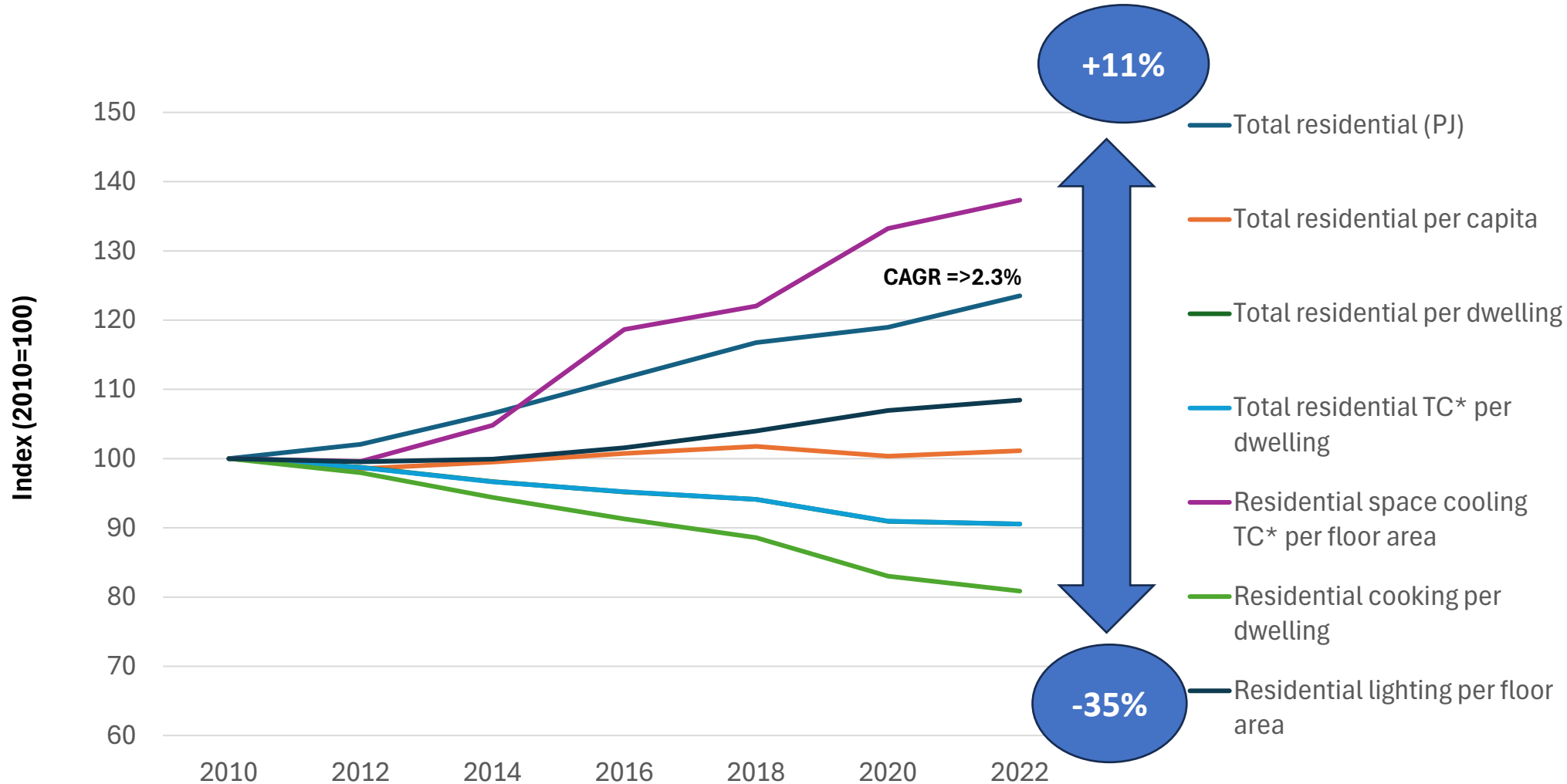
Services trends: Chinese Taipei case



❖ *Energy consumption for other building uses was obviously accounting for a large share of the services' energy consumption;*

Explains basic consumption patterns the household

The Philippines – Households energy consumption



***TC =
temperature
correction**
*intends to remove
the fluctuations in
energy
consumption due
to fluctuations in
temperature in
the given year
compared with
the average
temperature of an
economy.*

❖ *The more detailed information collected, the better we know what really happens*

Conclusions

Conclusions

- ❑ Better data would give us better analysis; it needs detailed/well-disaggregated end-uses and activity data.
- ❑ Good granularity of data can show in which end-use activity energy was highly demanded; appropriate policy recommendations.
 - Helps in developing policies on energy transition
- ❑ Member economies need to explore other experiences in data collection;
 - APEC increases its efforts to assist members; energy statistics workshops are good venues
 - There is a vast potential to tap into other members' experiences and know-how.
 - Willingness to share by members
- ❑ Conducting a survey is most probably the best way to obtain end-use energy consumption.
- ❑ Estimation based on technical studies can also be helpful, but it does not really show the true patterns.

Thank you.

<https://aperc.or.jp>



Passenger-km (pkm) or tonne-km (tkm)

