

APEC energy data and balances - the need for more data

*The 19th APEC workshop on energy statistics – Joint APEC-IEA
training workshop on end-use energy consumption data*

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Outline

1. *APEC data collection*
2. *APEC energy database*
3. *Uses of APEC data*
 - i. Energy modeling
 - ii. Energy overview
 - iii. Fossil fuel reports
 - iv. Tracking APEC aspirational goals
4. *The need for more data*
 - i. Decomposition analysis
 - ii. Energy efficiency analysis
 - iii. APEC energy outlook
5. *Conclusion*

APEC data collection

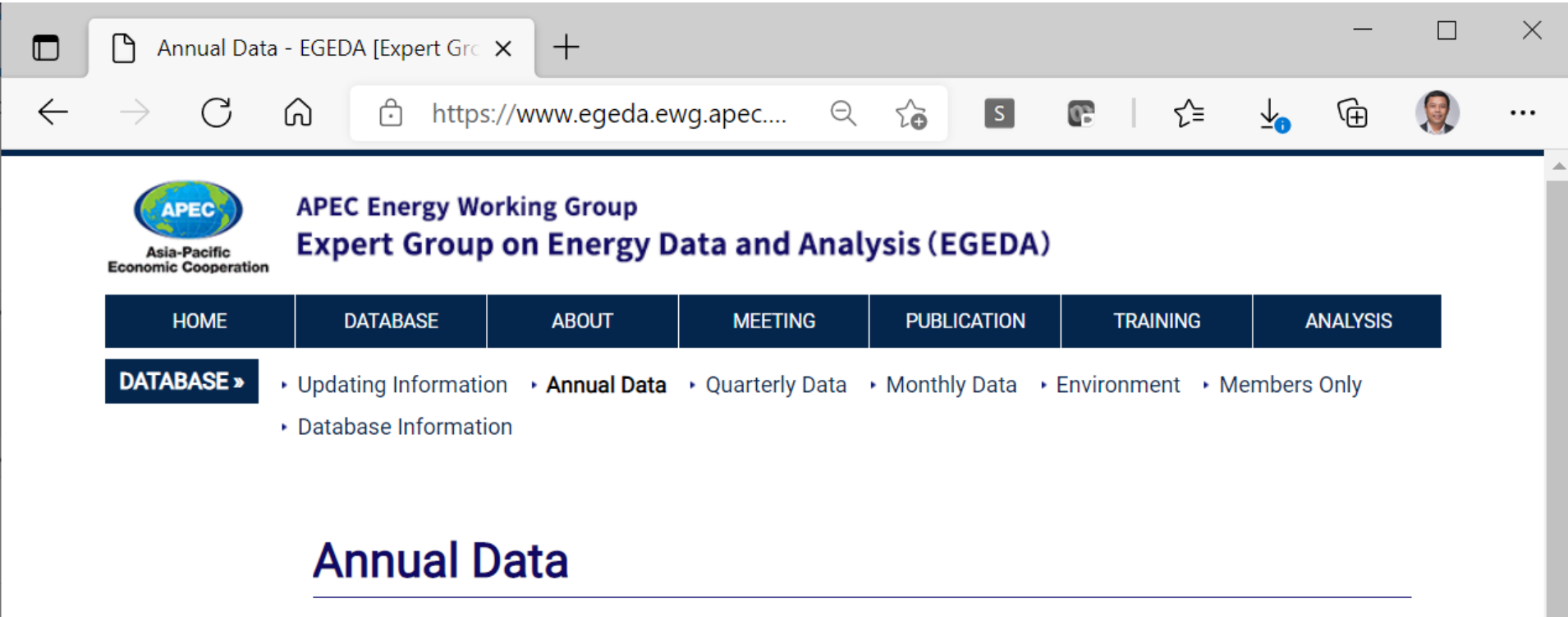


- At the 2nd EWG meeting in 1991, an expert group was established for collecting data and the APEC energy database
- The expert group started collecting **energy balances**, which later on, increased to **quarterly supply data**, **CO₂ emissions**, **monthly oil data**, **monthly gas data** and **energy efficiency indicators**

APEC Members

Australia
Brunei Darussalam
Canada
Chile
China
Hong Kong, China
Indonesia
Japan
Korea
Malaysia
Mexico
New Zealand
Papua New Guinea
Peru
Philippines
Russia
Singapore
Chinese Taipei
Thailand
United States
Viet Nam

The APEC energy database



The screenshot shows a web browser window with the URL <https://www.egeda.ewg.apec...>. The page header features the APEC logo (Asia-Pacific Economic Cooperation) and the text "APEC Energy Working Group Expert Group on Energy Data and Analysis (EGEDA)". Below the header is a navigation menu with the following items: HOME, DATABASE, ABOUT, MEETING, PUBLICATION, TRAINING, and ANALYSIS. The "DATABASE" menu item is highlighted and expanded to show a list of sub-items: Updating Information, Annual Data, Quarterly Data, Monthly Data, Environment, and Members Only. Below the navigation menu, the "Annual Data" section is displayed with a horizontal line underneath.

Annual Data

Energy Balance

▾ Energy Balance Tables (New format)

▾ Energy Balance Tables

▾ Energy Balance Tables in Physical Unit

The APEC energy balance

Energy Balance Table

Economy: Xxxx

Year: 20xx

Unit:KTOE

	Coal and peat	Coal and peat products	Crude oil & NGL	Petroleum products	Gas	Nuclear	Hydro	Geothermal, solar etc.	Others	Electricity	Heat	Total	Total Renewables
1. Indigenous production	1,817,687	0	189,324	0	142,525	76,712	105,934	46,756	73,352	0	0	2,452,290	207,493
2. Imports	120,144	62	461,886	67,727	106,105	0	0	0	0	489	0	756,412	0
3. Exports	-2,939	-6,654	-2,627	-64,160	-2,992	0	0	0	0	-1,798	-64	-81,169	0
4. International marine bunkers	0	0	0	-4,632	0	0	0	0	0	0	0	-4,632	0
5. International aviation bunkers	0	0	0	-4,944	0	0	0	0	0	0	0	-4,944	0
6. Stock changes	-14,205	-3,627	-10,091	-6,731	0	0	0	0	0	0	0	-34,655	0
7. Total primary energy supply	1,920,686	-10,220	638,492	-12,740	245,639	76,712	105,934	46,756	73,352	-1,309	0	3,083,301	207,493
8. Transfers	0	0	0	-108,527	0	0	0	0	0	0	0	-108,527	0
9. Total transformation sector	-1,502,464	178,661	-626,277	700,785	-73,933	-76,712	-105,934	-46,756	-32,107	616,287	125,255	-843,194	-166,268
9.1 Main activity producer	-1,097,169	-8,424	-153	-2,515	-49,125	-76,712	-105,934	-46,756	-32,107	616,287	125,255	-677,352	-166,268
9.2 Autoproducers	0	-31,447	0	-5,431	0	0	0	0	0	0	0	-36,877	0
9.3 Refineries	0	0	-626,124	708,730	0	0	0	0	0	0	0	82,606	0
9.4 Coal transformation	-394,486	218,542	0	0	0	0	0	0	0	0	0	-175,944	0
9.5 Other transformation	-10,809	-11	0	0	-24,807	0	0	0	0	0	0	-35,627	0
10. Losses & own use	-39,065	-8,815	-3,735	-33,001	-32,827	0	0	0	-148	-98,896	-17,705	-234,192	-148
11. Discrepancy	70,015	3,416	-8,451	-5,118	33,601	0	0	0	-42	0	-313	93,109	-22
12. Total final consumption	449,172	163,043	29	541,399	172,480	0	0	0	41,055	516,083	107,237	1,990,496	41,055
13. Total final energy consumption	385,547	150,295	29	436,455	163,605	0	0	0	41,055	516,083	107,237	1,800,306	41,055
14. Industry sector	298,542	146,469	29	76,369	85,320	0	0	0	6,585	325,916	70,535	1,009,764	6,585
14.1 Iron and steel	50,718	93,841	0	705	9,725	0	0	0	510	52,824	4,398	212,721	510
14.2 Chemical (incl. petrochemical)	79,402	30,761	17	43,480	22,496	0	0	0	931	65,779	38,213	281,080	931
14.3 Non-ferrous metals	11,988	3,617	4	1,321	5,951	0	0	0	69	57,603	5,610	86,163	69
14.4 Non-metallic mineral products	122,503	8,798	5	10,706	12,203	0	0	0	363	30,155	426	185,159	363
14.5 Transportation equipment	576	231	0	1,183	10,199	0	0	0	32	10,088	1,215	23,523	32
14.6 Machinery	2,405	6,181	0	2,140	10,977	0	0	0	206	45,960	1,270	69,140	206
14.7 Mining and quarrying	4,310	1,301	1	2,805	307	0	0	0	22	10,780	733	20,259	22
14.8 Food, beverages and tobacco	13,845	1,310	1	718	5,032	0	0	0	2,009	10,864	4,626	38,404	2,009
14.9 Pulp, paper and printing	5,620	64	0	435	3,477	0	0	0	662	8,109	5,581	23,949	662
14.10 Wood and wood products	340	9	0	165	414	0	0	0	942	3,257	255	5,382	942
14.11 Construction	3,322	72	0	12,221	222	0	0	0	217	7,635	550	24,238	217
14.12 Textiles and leather	3,493	77	1	422	3,993	0	0	0	614	18,398	7,618	34,616	614
14.13 Non-specified industry	20	206	0	68	324	0	0	0	9	4,463	39	5,129	9
15. Transport sector	1,729	2	0	267,566	24,308	0	0	0	11,978	13,833	0	319,416	11,978
15.1 Domestic air transport	0	0	0	31,797	0	0	0	0	0	0	0	31,797	0
15.2 Road	0	0	0	195,759	22,175	0	0	0	11,978	2,988	0	232,900	11,978
15.3 Rail	1,729	2	0	4,573	0	0	0	0	0	7,797	0	14,101	0
15.4 Inland waterways	0	0	0	27,118	0	0	0	0	0	0	0	27,118	0
15.5 Pipeline transport	0	0	0	152	384	0	0	0	0	376	0	912	0
15.6 Non-specified transport	0	0	0	8,167	1,750	0	0	0	0	2,671	0	12,588	0
16. Other sector	85,277	3,824	0	92,520	53,977	0	0	0	22,492	176,333	36,702	471,126	22,492
16.1 Commerce and public services	14,846	714	0	1,487	6,563	0	0	0	673	29,991	3,053	57,327	673
16.2 Residential	41,481	2,270	0	37,767	42,149	0	0	0	17,571	86,495	29,064	256,796	17,571
16.3 Agriculture	12,705	700	0	17,633	116	0	0	0	4,248	10,686	16	46,103	4,248
16.4 Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0
16.5 Non-specified others	16,246	140	0	35,633	5,150	0	0	0	0	49,162	4,569	110,900	0
17. Non-energy use	63,625	12,747	0	104,944	8,874	0	0	0	0	0	0	190,191	0
18. Electricity output in GWh	4,806,743	0	0	10,858	186,883	294,359	1,231,787	543,669	91,834	0	0	7,166,133	1,814,209
19. Heat output in ktoe	108,613	0	0	3,909	8,571	0	0	0	4,162	0	0	125,255	1,778

Energy Flows

- **Supply**
 - Production
 - Trade
 - Bunkers
 - Stocks
 - Net supply
- **Transformation**
 - Electricity and heat
 - Oil refining
 - Coal transformation
- **Final consumption**
 - Industry
 - Transport
 - Services
 - Residential
 - Agriculture and Fishing
 - Others
- **Non-energy use**

The APEC energy balance

Energy Balance Table

Economy: Xxxx

Year: 20xx

Unit:KTOE

	Coal and peat	Coal and peat products	Crude oil & NGL	Petroleum products	Gas	Nuclear	Hydro	Geothermal, solar etc.	Others	Electricity	Heat	Total	Total Renewables
1. Indigenous production	1,817,687	0	189,324	0	142,525	76,712	105,934	46,756	73,352	0	0	2,452,290	207,493
2. Imports	120,144	62	461,886	67,727	106,105	0	0	0	0	489	0	756,412	0
3. Exports	-2,939	-6,654	-2,627	-64,160	-2,992	0	0	0	0	-1,798	0	-81,169	0
4. International marine bunkers	0	0	0	-4,632	0	0	0	0	0	0	0	-4,632	0
5. International aviation bunkers	0	0	0	-4,944	0	0	0	0	0	0	0	-4,944	0
6. Stock changes	-14,205	-3,627	-10,091	-6,731	0	0	0	0	0	0	0	-34,655	0
7. Total primary energy supply	1,920,686	-10,220	638,492	-12,740	245,639	76,712	105,934	46,756	73,352	-1,309	0	3,083,301	207,493
8. Transfers	0	0	0	-108,527	0	0	0	0	0	0	0	-108,527	0
9. Total transformation sector	-1,502,464	178,661	-626,277	700,785	-73,933	-76,712	-105,934	-46,756	-32,107	616,287	125,255	-843,194	-166,268
9.1 Main activity producer	-1,097,169	-8,424	-153	-2,515	-49,125	-76,712	-105,934	-46,756	-32,107	616,287	125,255	-677,352	-166,268
9.2 Autoproducers	0	-31,447	0	-5,431	0	0	0	0	0	0	0	-36,877	0
9.3 Refineries	0	0	-626,124	708,730	0	0	0	0	0	0	0	82,606	0
9.4 Coal transformation	-394,486	218,542	0	0	0	0	0	0	0	0	0	-175,944	0
9.5 Other transformation	-10,809	-11	0	0	-24,807	0	0	0	0	0	0	-35,627	0
10. Losses & own use	-39,065	-8,815	-3,735	-33,001	-32,827	0	0	0	-148	-98,896	-17,705	-234,192	-148
11. Discrepancy	70,015	3,416	-8,451	-5,118	33,601				-42		-313	93,109	-22
12. Total final consumption	449,172	163,043	29	541,399	172,480	0	0	0	41,055	516,083	107,237	1,990,496	41,055
13. Total final energy consumption	385,547	150,295	29	436,455	163,605	0	0	0	41,055	516,083	107,237	1,800,306	41,055
14. Industry sector	298,542	146,469	29	76,369	85,320	0	0	0	6,585	325,916	70,535	1,009,764	6,585
14.1 Iron and steel	50,718	93,841	0	705	9,725	0	0	0	510	52,824	4,398	212,721	510
14.2 Chemical (incl. petrochemical)	79,402	30,761	17	43,480	22,496	0	0	0	931	65,779	38,213	281,080	931
14.3 Non-ferrous metals	11,988	3,617	4	1,321	5,951	0	0	0	69	57,603	5,610	86,163	69
14.4 Non-metallic mineral products	122,503	8,798	5	10,706	12,203	0	0	0	363	30,155	426	185,159	363
14.5 Transportation equipment	576	231	0	1,183	10,199	0	0	0	32	10,088	1,215	23,523	32
14.6 Machinery	2,405	6,181	0	2,140	10,977	0	0	0	206	45,960	1,270	69,140	206
14.7 Mining and quarrying	4,310	1,301	1	2,805	307	0	0	0	22	10,780	733	20,259	22
14.8 Food, beverages and tobacco	13,845	1,310	1	718	5,032	0	0	0	2,009	10,864	4,626	38,404	2,009
14.9 Pulp, paper and printing	5,620	64	0	435	3,477	0	0	0	662	8,109	5,581	23,949	662
14.10 Wood and wood products	340	9	0	165	414	0	0	0	942	3,257	255	5,382	942
14.11 Construction	3,322	72	0	12,221	222	0	0	0	217	7,635	550	24,238	217
14.12 Textiles and leather	3,493	77	1	422	3,993	0	0	0	614	18,398	7,618	34,616	614
14.13 Non-specified industry	20	206	0	68	324	0	0	0	9	4,463	39	5,129	9
15. Transport sector	1,729	2	0	267,566	24,308	0	0	0	11,978	13,833	0	319,416	11,978
15.1 Domestic air transport	0	0	0	31,797	0	0	0	0	0	0	0	31,797	0
15.2 Road	0	0	0	195,759	22,175	0	0	0	11,978	2,988	0	232,900	11,978
15.3 Rail	1,729	2	0	4,573	0	0	0	0	0	7,797	0	14,101	0
15.4 Inland waterways	0	0	0	27,118	0	0	0	0	0	0	0	27,118	0
15.5 Pipeline transport	0	0	0	152	384	0	0	0	0	376	0	912	0
15.6 Non-specified transport	0	0	0	8,167	1,750	0	0	0	0	2,671	0	12,588	0
16. Other sector	85,277	3,824	0	92,520	53,977	0	0	0	22,492	176,333	36,702	471,126	22,492
16.1 Commerce and public services	14,846	714	0	1,487	6,563	0	0	0	673	29,991	3,053	57,327	673
16.2 Residential	41,481	2,270	0	37,767	42,149	0	0	0	17,571	86,495	29,064	256,796	17,571
16.3 Agriculture	12,705	700	0	17,633	116	0	0	0	4,248	10,686	16	46,103	4,248
16.4 Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0
16.5 Non-specified others	16,246	140	0	35,633	5,150	0	0	0	0	49,162	4,569	110,900	0
17. Non-energy use	63,625	12,747	0	104,944	8,874	0	0	0	0	0	0	190,191	0
18. Electricity output in GWh	4,806,743	0	0	10,858	186,883	294,359	1,231,787	543,669	91,834	0	0	7,166,133	1,814,209
19. Heat output in ktoe	108,613	0	0	3,909	8,571	0	0	0	4,162	0	0	125,255	1,778

• Industry

- Iron and Steel
- Chemical (including petrochemical)
- Non-ferrous metals
- Non-metallic minerals
- Transportation equipment
- Machinery
- Food, beverages and tobacco
- Pulp and paper
- Wood and wood prods
- Textile and leather
- Mining and quarrying
- Construction
- Other industry

• Transport

- Domestic aviation
- Road
- Rail
- Domestic navigation
- Pipeline transport
- Others

The APEC energy balance

Energy Balance Table

Economy: Xxxx

Year: 20xx

Unit:KTOE

	Coal and peat	Coal and peat products	Crude oil & NGL	Petroleum products	Gas	Nuclear	Hydro	Geothermal, solar etc.	Others	Electricity	Heat	Total	Total Renewables
1. Indigenous production	1,817,687	0	189,324	0	142,525	76,712	105,934	46,756	73,352	0	0	2,452,290	207,493
2. Imports	120,144	62	461,886	67,727	106,105	0	0	0	0	489	0	756,412	0
3. Exports	-2,939	-6,654	-2,627	-64,160	-2,992	0	0	0	0	-1,798	0	-81,169	0
4. International marine bunkers	0	0	0	-4,632	0	0	0	0	0	0	0	-4,632	0
5. International aviation bunkers	0	0	0	-4,944	0	0	0	0	0	0	0	-4,944	0
6. Stock changes	-14,205	-3,627	-10,091	-6,731	0	0	0	0	0	0	0	-34,655	0
7. Total primary energy supply	1,920,686	-10,220	638,492	-12,740	245,639	76,712	105,934	46,756	73,352	-1,309	0	3,083,301	207,493
8. Transfers	0	0	0	-108,527	0	0	0	0	0	0	0	-108,527	0
9. Total transformation sector	-1,502,464	178,661	-626,277	700,785	-73,933	-76,712	-105,934	-46,756	-32,107	616,287	125,255	-843,194	-166,268
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9.5 Other transformation	-10,809	-11	0	0	-24,807	0	0	0	0	0	0	-35,627	0
10. Losses & own use	-39,065	-8,815	-3,735	-33,001	-32,827	0	0	0	-148	-98,896	-17,705	-234,192	-148
11. Discrepancy	70,015	3,416	-8,451	-5,118	33,601				-42		-313	93,109	-22
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14.1 Iron and steel	50,718	93,841	0	705	9,725	0	0	0	510	52,824	4,398	212,721	510
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14.7 Mining and quarrying	4,310	1,301	1	2,805	307	0	0	0	22	10,780	733	20,259	22
14.8 Food, beverages and tobacco	13,845	1,310	1	718	5,032	0	0	0	2,009	10,864	4,626	38,404	2,009
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15.3 Rail	1,729	2	0	4,573	0	0	0	0	0	7,797	0	14,101	0
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16.4 Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0
16.5 Non-specified others	16,246	140	0	35,633	5,150	0	0	0	0	49,162	4,569	110,900	0
17. Non-energy use	63,625	12,747	0	104,944	8,874	0	0	0	0	0	0	190,191	0
18. Electricity output in GWh	4,806,743	0	0	10,858	186,883	294,359	1,231,787	543,669	91,834	0	0	7,166,133	1,814,209
19. Heat output in ktoe	108,613	0	0	3,909	8,571	0	0	0	4,162	0	0	125,255	1,778

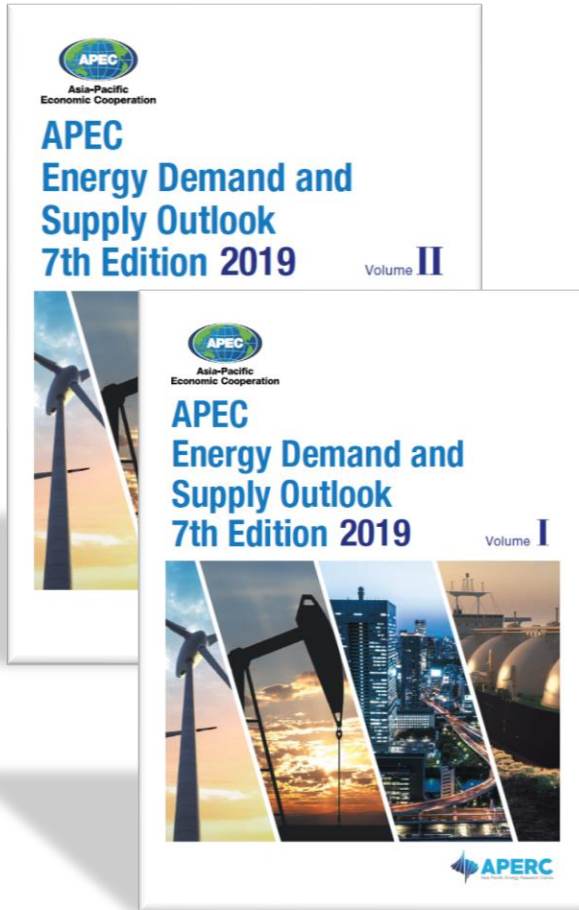
Energy Products

- Coal and coal products
- Crude oil and petroleum products
- Natural Gas
- Nuclear
- Renewable energy
 - Hydro
 - Geothermal
 - Solar
 - Wind
 - Tide, wave and ocean
 - Biomass
 - Wastes
 - Liquid biofuels
 - Electricity and heat
 - Others



2. Uses of APEC data

APEC Energy Outlook (modeling)



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

- The '**APEC Energy Demand and Supply Outlook**' project is a priority task for APERC under the APEC Energy Action Programme adopted by leaders in 1995.
- The Outlook provides quantitative analyses and policy insights on projected trends for energy demand and supply in APEC economies through 2050.
- APERC has previously produced seven editions of the APEC Energy Demand and Supply Outlook. The latest version is the seventh edition published in May 2019.
- The Outlook comes in two volumes, Vol 1 summarizes the result by sector while Vol II shows the result by economy

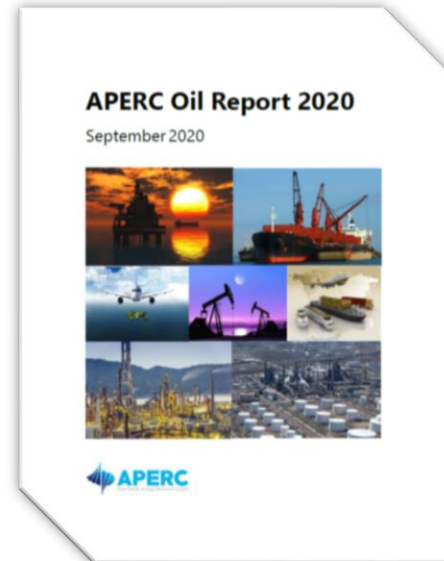
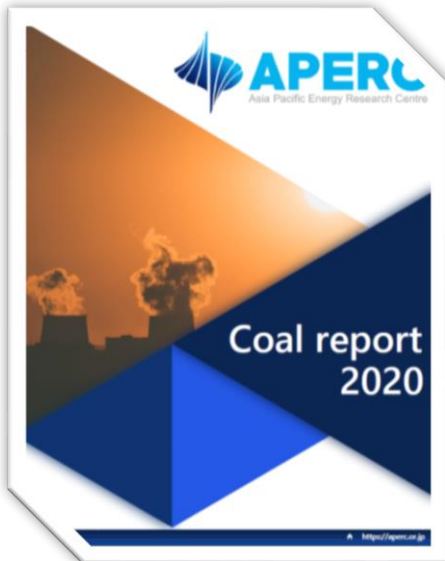
APEC Energy Overview

- The '**APEC Energy Overview**' series started in 2000 with the approval of EWG19, in order to help policymakers to share useful information and deepen understanding on energy issues in the APEC region.
- The Overview is an annual publication, which contains **updated energy demand/supply data** as well as descriptions of energy policy and 'Notable Energy Developments' of the 21 APEC member economies
- Progress of **APEC goals** on **energy intensity** and **renewable share** has been tracked and analysed in each year.
- Data used in the analyses were from EGEDA focal points.



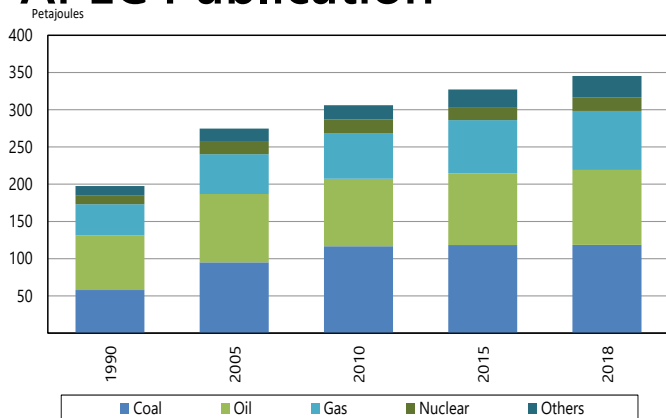
Topical Studies and OGSS

- Along with the Outlook and the Overview, APERC has been conducting research on topics relevant to energy issues and policies in the APEC region.
- APERC publishes reports on **coal**, **oil** and **gas** situation in APEC as well as studies under Oil and Gas Security Initiative Studies (OGSS)
- The reports contain current and future **trends** and other developments in the respective coal, oil and gas markets.

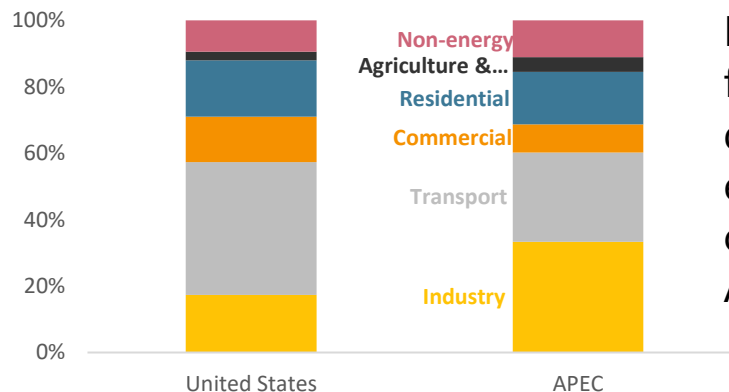


How do we use those data? Basic use

APEC Publication



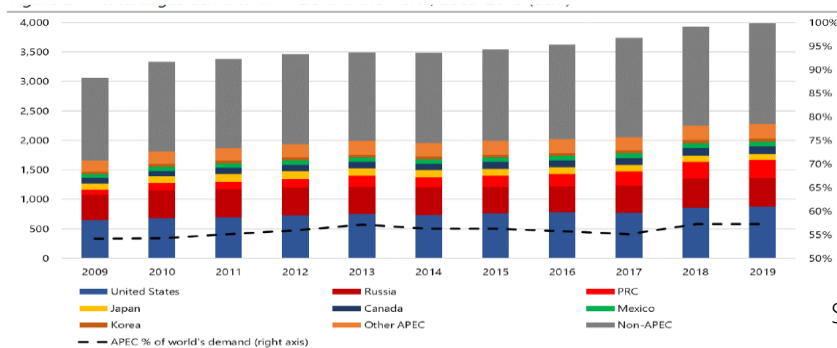
APEC Overview



Relative sectoral final energy demand, of an economy compared with APEC total

APEC total primary energy supply describes the supply trend historically

APEC Gas Report



Shows the importance of APEC in global gas consumption

Sources: APEC, IREA data, APERC analysis

- **Relevant and timely energy data are necessary to support evidence-based energy policy and decision-making, to monitor and assess programs, to enable research and analysis, and to inform the public on energy-related**

Tracking progress of APEC goals

Energy intensity goal

- To reduce APEC's aggregate energy intensity by 45% percent by 2035.

Honolulu Declaration 2011

EWG Meetings

- APERC has been reporting progress since EWG41 in 2011.

- Proposal and approval of the energy intensity definition.

EWG53 Meeting

Doubling RE share goal

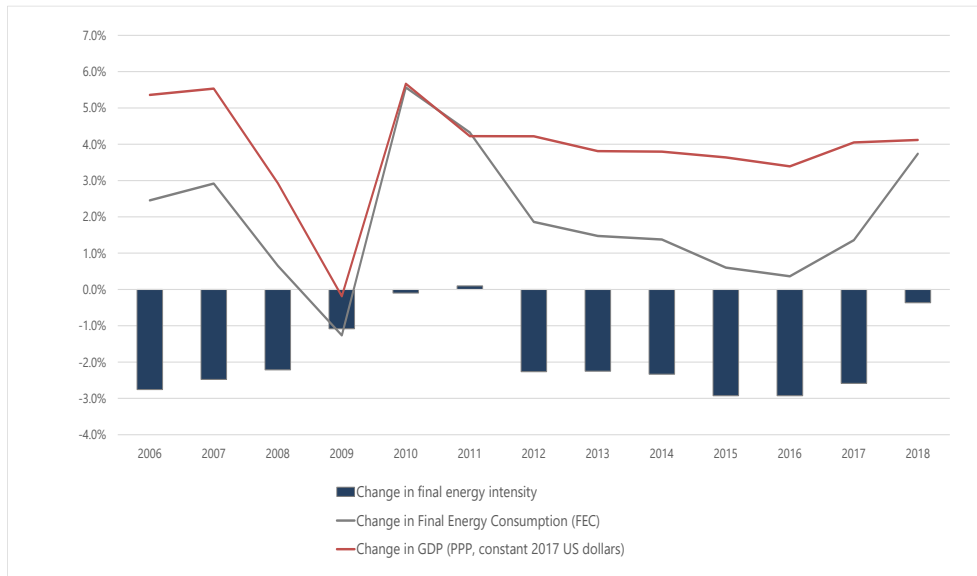
EWG 47 (May 2014) - US proposed the APEC aspirational goal of doubling the share of renewable energy by 2030

EMM 11 (Sep 2014) - "including in power generation, from 2010 levels by 2030."

EWG 54 (Nov 2017) - traditional biomass will not be counted

Energy intensity from available data

1) APEC intensity reduction goal



Definitions

❑ Total final energy consumption (TFEC) includes industry, transport, commercial, residential and agriculture (forestry and fishery)

❑ Final energy intensity

$$FEI = \frac{FEC \text{ (Mtoe)}}{GDP \text{ (million USD, PPP)}}$$

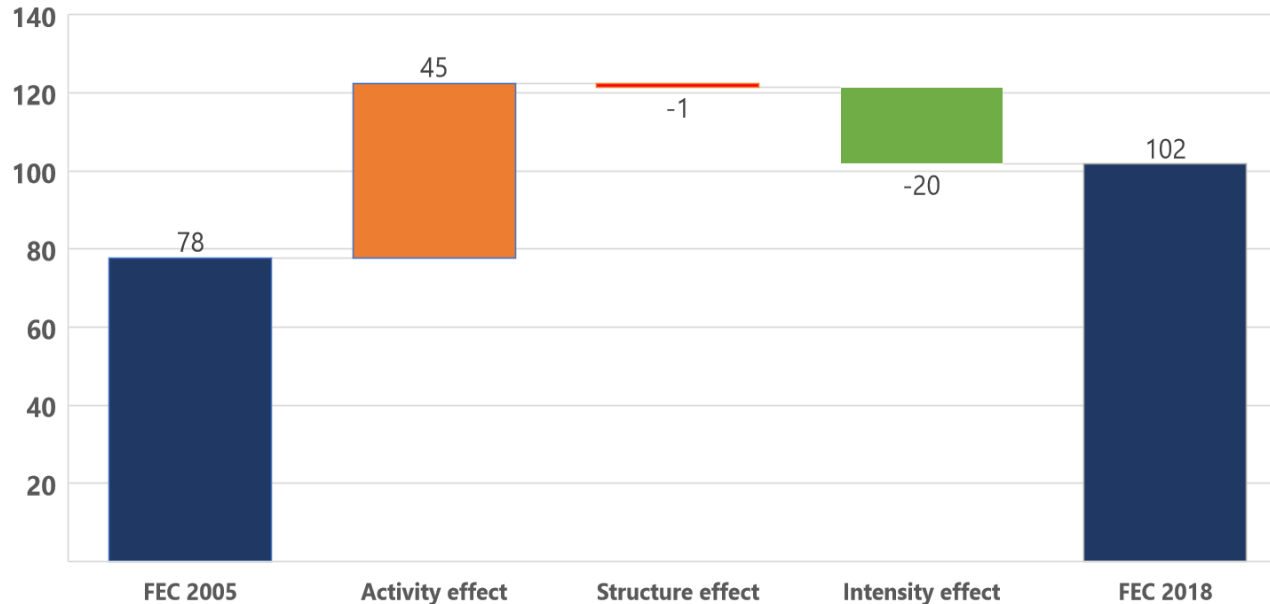
- Shows decoupling of energy consumption and GDP; Sources: APEC data, EGEDA analysis
- Declines in energy intensity are proxy in measuring efficiency improvements.

■ *More detailed information is required to understand the key drivers of energy consumption and to provide policy-relevant analysis on how to influence these trends (IEA).*

■ *The EWG and other Experts Group request more detailed analysis.*

Decomposition using available data

...but data intensive



- GVA of industry, commercial and agriculture sectors.
- But not a good proxy to measure activity in transport or the residential sectors

Sources: APEC data, EGEDA analysis

$$\Delta E_{tot} = E^T - E^0 = \Delta E_{act} + \Delta E_{str} + \Delta E_{int}$$

Decomposition represented by Logarithmic Mean Divisia Index (LMDI)-I Formula by B.W. Ang

$$= \sum_i \frac{E_i^T - E_i^0}{\ln E_i^T - \ln E_i^0} \ln \left(\frac{Q^T}{Q^0} \right) + \sum_i \frac{E_i^T - E_i^0}{\ln E_i^T - \ln E_i^0} \ln \left(\frac{S_i^T}{S_i^0} \right) + \sum_i \frac{E_i^T - E_i^0}{\ln E_i^T - \ln E_i^0} \ln \left(\frac{I_i^T}{I_i^0} \right)$$

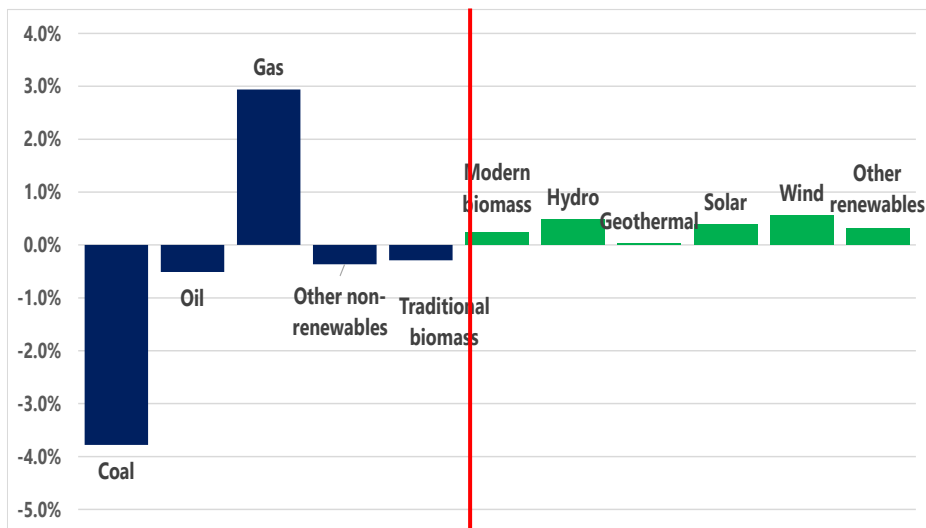
Decomposition method allows us to separate structural shifts or activity shifts, understanding better true trends in energy consumption as well as trends in economic activity that influence energy consumption in APEC.

RE share can be calculated too

Share in TPES

Non-renewables

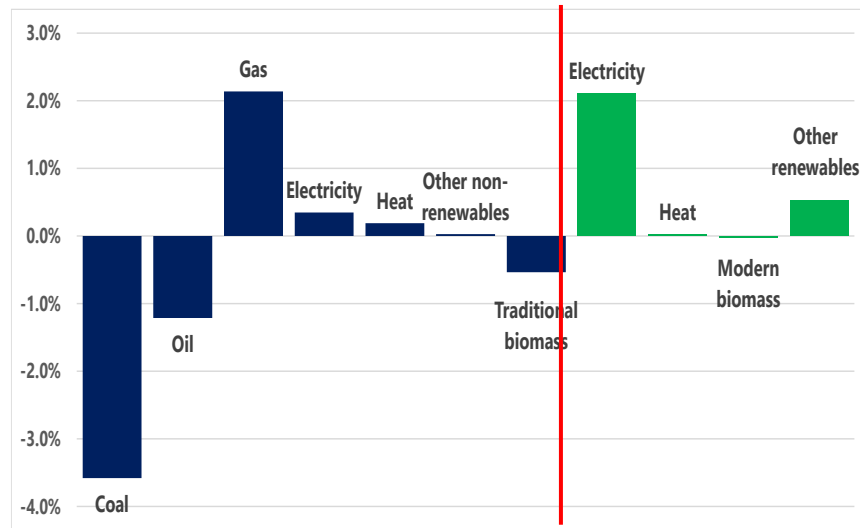
Modern Renewables



Share in TREC

Non-renewables

Modern Renewables



Sources: APEC data, EGEDA analysis

- *Biomass used in the residential and commercial sectors is assumed to be traditional biomass because solid biofuels are typically used in these sectors for heating (residential) and cooking (residential and commercial), with inefficient technologies that often have adverse effects on human health.*
- *All other renewables (hydro, geothermal and so on) including biogas and wood pellets are considered modern renewables, although data on wood pellets are limited.*



3. However, we need for more data for energy efficiency analysis

For the energy-intensive industry sector

- *Iron and steel industry*
 - Energy consumption per ton of crude steel production
 - Crude steel production in basic oxygen furnaces
 - Crude steel production in electric arc furnaces
 - Direct reduced iron production
- *Cement industry*
 - Energy consumption per ton of cement production
 - Clinker production
 - Cement production
- *Pulp and paper industry*
 - Production of pulp
 - Production of paper
 - Production of paper boards

For buildings sector

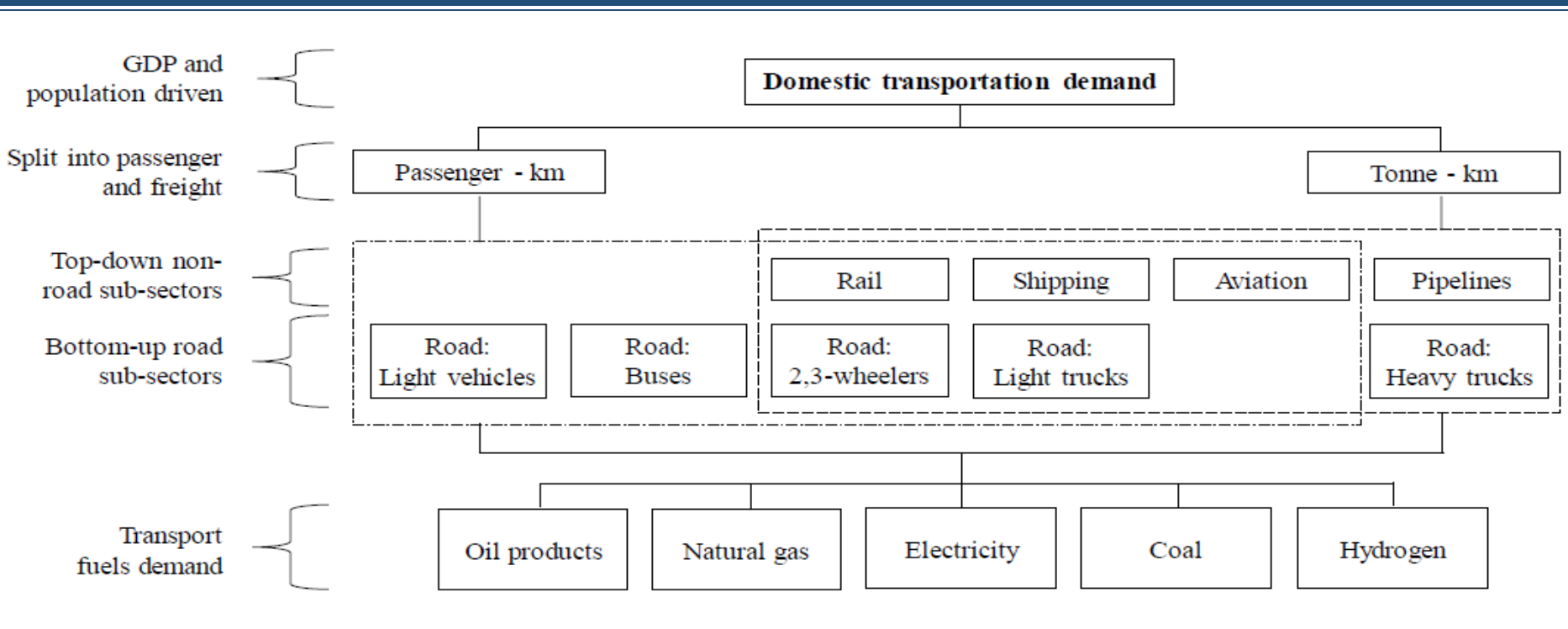
We should know energy consumption for the following end-uses:

- *Space heating*
- *Space cooling*
- *Water heating*
- *Cooking*
- *Lighting*
- *Appliances*
- *To determine:*
 - Largest end-use
 - Energy consumption per dwelling
 - Possible reason for increase in consumption
 - Which end-use to focus energy efficiency programs

Aside from end-use consumption, we also need to know activity data such as:

- Number of dwellings (occupied), floor area of buildings, cooling/heating degree-days, number of electrical appliances

For the transport sector...



Sources: APEC Energy Demand and Supply Outlook 7th Ed

- *What factors drive energy consumption in the sector*
- *How to make the transport sector more efficient*

For the transport sector

Additional data requirements

- *Energy consumption disaggregated into:*
 - Passenger and freight transport
 - Passenger cars and buses
 - Passenger and freight trains
 - Passenger and freight ships
- *Activity data such as:*
 - Passenger transport in passenger-kilometers
 - Freight transport in ton-kilometers

For what?

Policy making

Economic

How the status of the energy sector and its trends in an economy might improve the chances for economic development to be sustainable in the long run.

Social

Issues related to accessibility, affordability and disparity in energy supply and demand.

Environmental

Impact of energy systems on the overall environment. INDCs

Sectoral

Efficiency of technology; behavioral change, e.g MEPS, BATs

- *Energy efficiency analysis needs more data than what is currently available*
- *In this workshop, the use of such data will be discussed extensively*

Better data = better analysis

- More useful analysis requires more detailed data, e.g. passenger-km travel and number of vehicles (transport), floor area and weather effect (residential), etc.
- Data providers have limitation on data access; mostly aggregated;
- Confidentiality hinders data collection;
- A well-established statistics body is a key; Any socio-economic category needs statistics to operate. This is also true for energy statistics



**Thank you for your kind
attention.**

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