



**Asia-Pacific
Economic Cooperation**

2013/EWG46/018

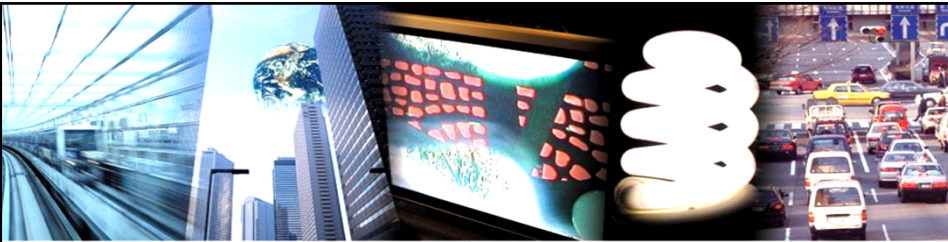
Agenda Item: 10d

APEC's Energy Intensity Reduction Goal: Progress Update

Purpose: Information
Submitted by: APERC




**46th Energy Working Group Meeting
Da Nang, Viet Nam
18–21 November 2013**



EWG 46, Da Nang, Vietnam
November 2013

10d - APEC's Energy Intensity Reduction Goal: Progress Update

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Asia-Pacific
Economic Cooperation

Why This Presentation?

- APEC has adopted a goal of reducing the APEC-wide energy intensity (that is energy demand/GDP) by 45% between 2005 and 2035
- APERC has been monitoring APEC's progress toward this goal; an update was most recently presented at EWG 44 in Washington (November 2012) based on statistics through the year 2010
- IEA recently published complete 2011 energy statistics for all APEC economies except Papua New Guinea (PNG); APEC (under coordination of IEEJ/EDMC) has published energy statistics for PNG
- Therefore, we are now able to present this update based on statistics through the year 2011

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Alternative Approaches to Calculating Energy Intensity

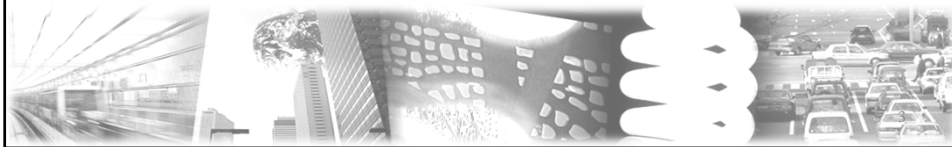
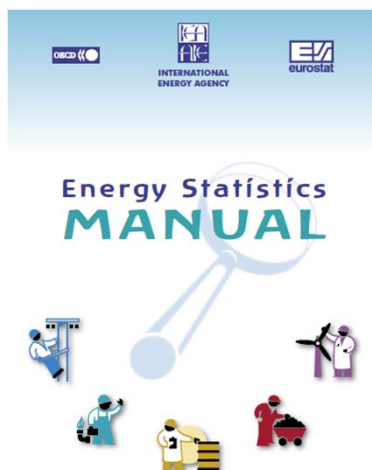


Table 7.2 • IEA Energy Balance Table for Spain, 1999

Million tonnes of oil equivalent	Coal	Crude Oil	Petroleum Products	Gas	Nuclear	Hydro	Geothermal	Combust. Solar etc.	Electricity	Heat	Total
SUPPLY AND CONSUMPTION											
Production	8.60	0.30	-	0.13	15.34	1.97	0.27	4.08e	-	-	30.70
Imports	11.90	60.01	16.85	13.90	-	-	-	-	1.03	-	103.09
Exports	-0.28	-	-7.09	-	-	-	-	-	-0.54	-	-7.90
Intl. Maritime Bunkers	-	-	-3.88	-	-	-	-	-	-	-	-5.88
Stock Changes	-0.36	0.54	-0.97	-0.74	-	-	-	-	-	-	-1.56
TYPES	19.26	60.85	9.91	13.29	15.34	1.97	0.27	4.08	0.49	-	116.46
Transformers	-	-1.56	-1.52	-	-	-	-	-	-	-	0.05
Structural Balances	-0.35	-	-0.74	-	-	-	-	-	-	-	-1.08
Electricity Plants	-16.77	-	-2.44	-0.59	-15.34	-1.97	-0.24	-0.28	15.30	-	-22.82
CHP Plants	-0.04	-	-1.58	-2.37	-	-	-	-0.75e	2.44e	0.07	-2.22
Heat Plants	-	-	-	-	-	-	-	-	-	-	-
Gas Works	-	-	-0.14e	0.03	-	-	-	-	-	-	-0.11
Petroleum Refineries	-	-	62.16	-	-	-	-	-	-	-	-0.27
Coal Transformation	-	-	-	-	-	-	-	-	-	-	-1.05
Liquefaction Plants	-	-	-	-	-	-	-	-	-	-	-0.00
Other Transformation	-	-	0.00	-0.03	-	-	-	-	-	-	-5.81
Own Use	-0.25	-	4.27	-0.68	-	-	-	-0.00e	-1.71	-	-1.64
Disappearance Issues	-	-	-	-0.25	-	-	-	-	-	-	-
TFC	1.32	0.01	53.37	10.09	-	-	0.03	3.04	15.24	0.07	83.18
INDUSTRY SECTOR	1.17	0.01	9.78	7.69	-	-	-0.00	1.02	6.57	0.07	26.33
Iron and Steel	0.89e	-	0.37	0.68	-	-	-	-	1.14	-	3.08
Chemical & Petrochemicals	0.04	0.01	5.36	1.28	-	-	-	-	0.92	0.02	8.15
of which: Feedstocks	-	-	4.60	0.45	-	-	-	-	-	-	5.05
Non-ferrous Metals	0.05	-	0.14	0.13	-	-	-	-	0.77	-	1.09
Non-metallic Minerals	0.15	-	1.94	2.28	-	-	-	0.08e	0.76	-	5.21
Transport Equipment	-	-	0.13	0.35	-	-	-	-	0.28	-	0.76
Machinery	0.02	-	0.23	0.21	-	-	-	-	0.46	-	0.95
Mining and Quarrying	0.00	-	0.13	0.08	-	-	-	-	0.13	-	0.34
Food and Tobacco	0.01	-	0.59	0.75	-	0.00	-	-	0.66	0.01	2.01
Paper, Pulp and Printing	0.00	-	0.31	0.83	-	-	-	-	0.47	-	1.61
Wood and Wood Products	-	-	0.04	0.07	-	-	-	-	0.12	-	0.23
Construction	-	-	0.11	0.00	-	-	-	-	0.11	-	0.22
Textile and Leather	-	-	0.18	0.53	-	-	-	-	0.34	0.01	1.06
Non-specified	-	-	0.25	0.01	-	0.00	0.94e	-	0.40	0.04	1.65
TRANSPORT SECTOR	-	-	32.33	0.01	-	-	-	-	0.31	-	32.65
International Civil Aviation	-	-	2.62	-	-	-	-	-	-	-	2.62
Domestic Air Transport	-	-	1.75	-	-	-	-	-	-	-	1.75
Road	-	-	25.86	0.01	-	-	-	-	-	-	25.87
Rail	-	-	0.50	-	-	-	-	-	0.21	-	0.70
Pipeline Transport	-	-	-	-	-	-	-	-	-	-	-
Internal Navigation	-	-	1.62	-	-	-	-	-	-	-	1.62
Non-specified	-	-	-	-	-	-	-	-	0.10	-	0.10
OTHER SECTORS	0.14	-	7.28	2.39	-	-	0.03	2.02	8.36	-	20.23
Agriculture	-	-	1.75	0.08	-	0.00	0.00e	-	0.29	-	2.23
Comm. and Publ. Services	0.01	-	1.47	0.54	-	-	-	-	3.67	-	5.91
Residential	0.13	-	4.06	1.77	-	0.01	2.00e	-	3.91	-	11.88
Non-specified	-	-	-	-	-	-	-	0.02e	0.19	-	0.21
NON-ENERGY USE	0.01	-	3.97	-	-	-	-	-	-	-	3.97
In Industry/Trans/Energy	0.01	-	3.64	-	-	-	-	-	-	-	3.65
In Transport	-	-	0.21	-	-	-	-	-	-	-	0.21
In Other Sectors	-	-	0.02	-	-	-	-	-	-	-	0.02

Source of Definitions



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Definition of 'Non-Energy'

Non-energy uses of fuels

A number of fuels may be used for non-energy purposes. These are:

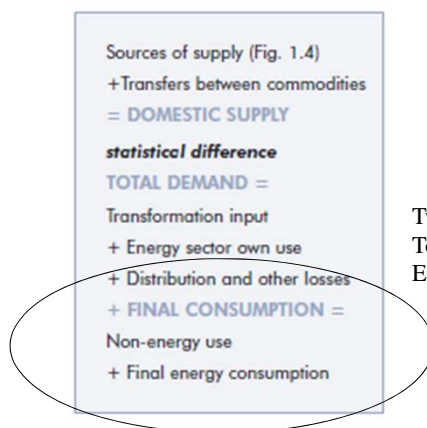
- As raw materials for the manufacture of non-fuel products (feedstock use). The use of the hydrocarbon content of fuels as raw material is an activity which is almost entirely confined to the refining and petrochemical industries.
- For their physical properties. Lubricants and greases are used in engines for their "slippery" qualities, and bitumen on roofs and roads for its waterproofing and wear qualities.
- For their solvent properties. White spirit and other industrial spirits are used as diluents in paint manufacture and for industrial cleaning purposes.

The petrochemical industry represents, by far, the most important user of fuels for non-energy purposes. It converts fossil fuels (oil, natural gas and coke-oven by-products) and biomass carbon to synthetic organic products.

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Ambiguous Definition of 'Final Energy'

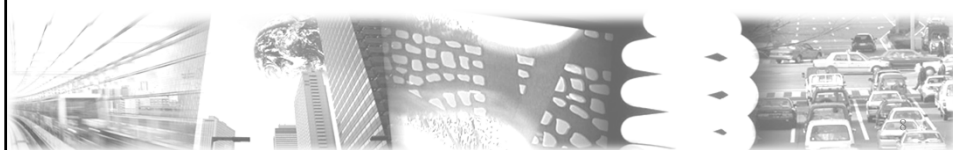
Figure 1.3 • Commodity Balance Structure



Two Possible Ways
 To Calculate Final
 Energy Intensity!

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The Results



What Happened to Primary Energy Intensity Up to 2011?

	2006	2007	2008	2009	2010	2011	2005-2011 Total	Trend to 2035
Change in Primary Energy	2.6%	2.7%	0.5%	-0.2%	6.2%	2.8%	15.3%	
Change in GDP (2005 US \$PPP)	5.1%	5.3%	2.6%	-0.5%	5.5%	4.0%	24.0%	
Change in Primary Energy Intensity	-2.3%	-2.5%	-2.1%	0.3%	0.6%	-1.2%	-7.1%	-30.6%

Note: -45% in 30 years would require an average of -2.0% per year or -11.3% every 6 years

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What Happened to Final Energy Intensity Up to 2011?

	2006	2007	2008	2009	2010	2011	2005-2011 Total	Trend to 2035
Change in Final Energy	2.2%	2.9%	-0.3%	-1.1%	5.6%	2.5%	12.4%	
Change in GDP (2005 US \$PPP)	5.1%	5.3%	2.6%	-0.5%	5.5%	4.0%	24.0%	
Change in Final Energy Intensity	-2.8%	-2.2%	-2.8%	-0.5%	0.0%	-1.4%	-9.4%	-39.0%

Note: -45% in 30 years would require an average of -2.0% per year or -11.3% every 6 years

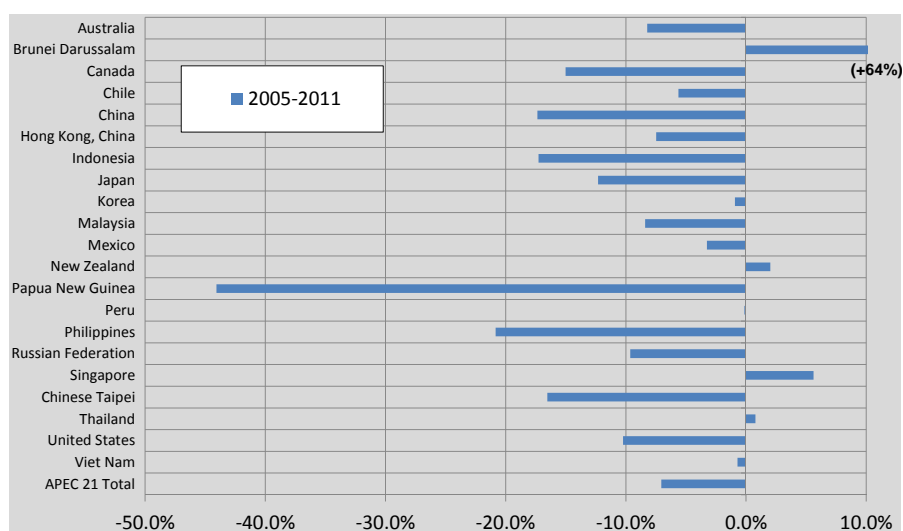
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What Happened to Final Energy Excluding Non-Energy Intensity Up to 2011?

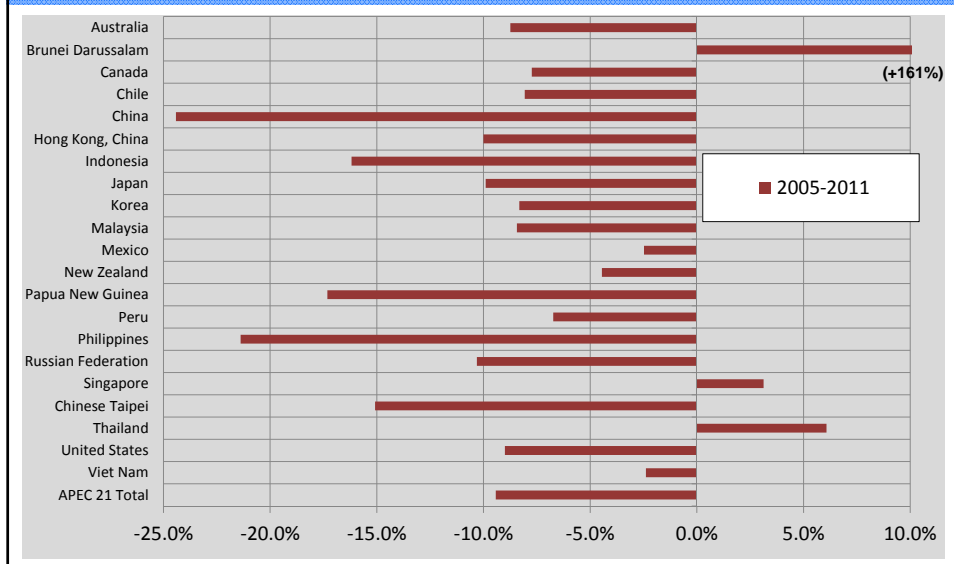
	2006	2007	2008	2009	2010	2011	2005-2011 Total	Trend to 2035
Change in Final Energy Minus Non-Energy	2.4%	2.9%	0.1%	-1.4%	5.3%	2.5%	12.3%	
Change in GDP (2005 US \$PPP)	5.1%	5.3%	2.6%	-0.5%	5.5%	4.0%	24.0%	
Change in Final Energy Intensity	-2.6%	-2.2%	-2.5%	-0.9%	-0.2%	-1.5%	-9.5%	-39.3%

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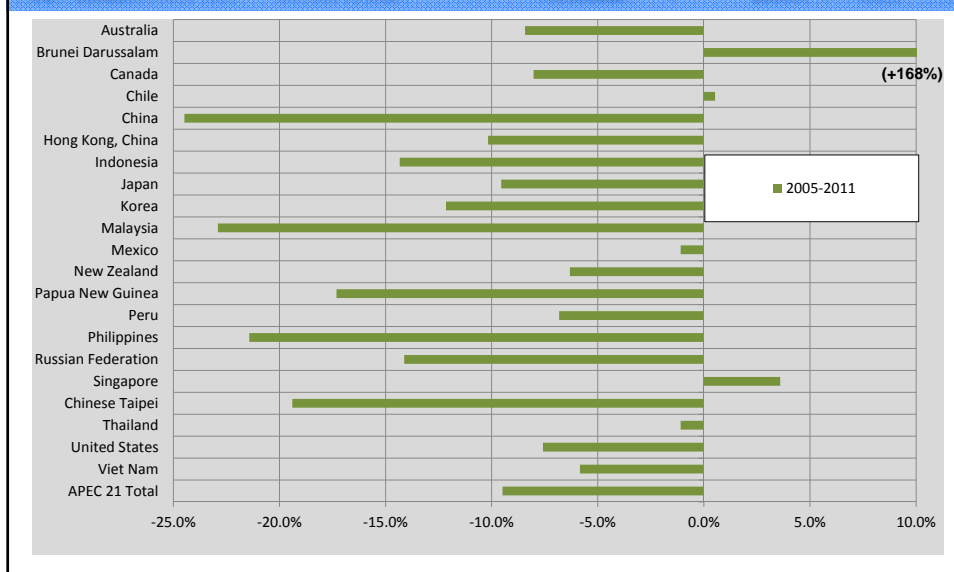
What Happened to Primary Energy Intensity by Economy Up to 2011?



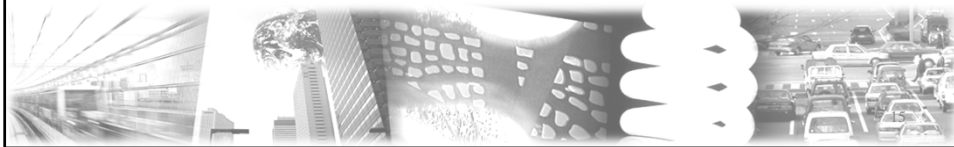
What Happened to Final Energy Intensity by Economy Up to 2011?



What Happened to Final Energy Excluding Non-Energy by Economy Up to 2011?



How Do These Results Compare with Last Year's Progress Report?



How Did the Data Change Over the Past Year?

- This year, APERC used a different source of GDP data--the World Bank--rather than Global Insight (a private service to which APERC no longer subscribes); however, the GDP data did not change significantly
- In both years, APERC used energy demand data from the IEA for all economies except PNG (for which APEC data was used); however, during the year, the IEA made some revisions to their data which were significant, especially for the year 2010
- The revisions to the IEA data had the effect of making results for the year 2010 significantly worse than were reported at EWG 44 in Washington (November, 2012)

What Happened to Primary Energy Intensity Up to 2011?

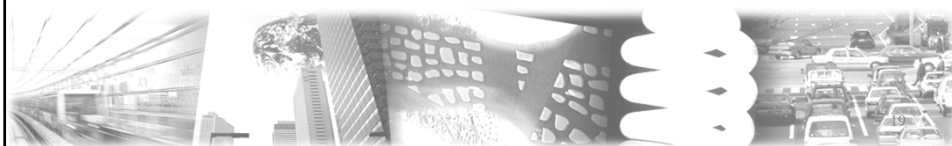
Latest Results	2006	2007	2008	2009	2010	2011	2005-2011 Total	Trend to 2035
Change in Primary Energy	2.6%	2.7%	0.5%	-0.2%	6.2%	2.8%	15.3%	
Change in GDP (2005 US \$PPP)	5.1%	5.3%	2.6%	-0.5%	5.5%	4.0%	24.0%	
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Results Reported at EWG 44 Washington (November 2012)	2006	2007	2008	2009	2010	2005-2010 Total		Trend to 2035
Change in Primary Energy	2.6%	2.6%	0.4%	-0.3%	5.3%	11.0%		
Change in GDP (2005 US \$PPP)	5.1%	5.3%	2.6%	-0.6%	5.6%	19.1%		
Change in Primary Energy Intensity	-2.3%	-2.5%	-2.2%	0.4%	-0.3%	-6.8%		-34.5%

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What Happened to Final Energy Intensity Up to 2011?

Latest Results	2006	2007	2008	2009	2010	2011	2005-2011 Total	Trend to 2035
Change in Final Energy	2.2%	2.9%	-0.3%	-1.1%	5.6%	2.5%	12.4%	
Change in GDP (2005 US \$PPP)	5.1%	5.3%	2.6%	-0.5%	5.5%	4.0%	24.0%	
Change in Final Energy Intensity	-2.8%	-2.2%	-2.8%	-0.5%	0.0%	-1.4%	-9.4%	-39.0%
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Change in Final Energy	2.4%	2.9%	-0.3%	-0.8%	4.6%	8.8%		
Change in GDP (US 2005 \$PPP)	5.1%	5.3%	2.6%	-0.6%	5.6%	19.1%		
Change in Final Energy Intensity	-2.6%	-2.3%	-2.9%	-0.2%	-1.0%	-8.7%		-42.0%

Could We Use APEC Energy Statistics to Monitor APEC's Progress?



The Two Databases

- Two international energy databases are publicly available covering the APEC economies:
 - the “APEC Energy Statistics” coordinated by the Institute for Energy Economics Japan / Energy Data and Modelling Center (EDMC) under the supervision of EGEDA; and
 - The “IEA Energy Statistics” coordinated by the Energy Statistics Division, International Energy Agency (IEA) under the supervision of the IEA’s Governing Board
- In principle, APERC would prefer to use the APEC Energy Statistics, but because of past experiences with data inconsistencies, APERC currently uses mainly data from the IEA Energy Statistics in its work

Recent Developments

- In August 2013, APERC met with representatives from EDMC to discuss the obstacles to greater use of the APEC Energy Statistics by APERC
 - EDMC representatives were of the view that at least some of the problems with the APEC Energy Statistics stem from problems with the quality of the data they receive from APEC member economies
- An outcome of this meeting was a commitment by APERC to attempt to include calculations using *both* IEA and APEC statistics in this year's report to the EWG on progress toward APEC's energy intensity improvement goal

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Goals of Using Both IEA and APEC Statistics in the Progress Report

- By compiling the progress report using both IEA and APEC statistics, APERC's and EDMC's goals were:
 - To facilitate a comparison of the impacts of using IEA vs. APEC statistics in measuring progress toward a high-profile APEC goal
 - To respond to the objections of some EWG members to the use of IEA data
 - To highlight to APEC member economies the need to work with EDMC to improve the quality of the APEC Energy Statistics

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Results from the APEC Statistics

- Initial results from the calculations using the APEC Energy Statistics revealed a number of differences between the IEA and APEC statistics that APERC could not explain without further research
- These initial results were presented and discussed at the EGEDA meeting last week in Bangkok; possible reasons for some of the differences were identified
- However, more work will be needed before a meaningful comparison of results using the two sets of statistics can be made

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Next Steps

- APERC will work with EDMC to understand the reasons for the differences between the IEA and APEC statistics
- APERC will work with EDMC to agree on a methodology for using the APEC Energy Statistics to measure progress toward the APEC energy intensity goal
- APERC will then complete the comparison of results using the APEC Energy Statistics to results using the IEA statistics
- APERC will present the proposed methodology and comparison of results at the next EGEDA meeting in late 2014, and seek EGEDA's endorsement of the methodology
- EGEDA *may* choose to recommend the methodology to the EWG for future monitoring of APEC's progress toward the energy intensity improvement goal for consideration at EWG 48 (late 2014)
- APERC will provide a progress update at EWG 47

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