



# EGEDA under APEC-EWG

August 2017

## Overview of APEC energy supply and demand

### APEC and the world

Over the period 1990-2014, total population in APEC grew gradually at an annual average growth rate (AAGR) of 0.9%, from 1990 to reach 2.83 billion in 2014. Population of the rest of the world on the other hand, grew by 1.6% on average per year during the same period, from 2.99 billion in 1990 to 4.43 billion in 2014.

The sluggish growth in APEC population was still evident in 2014 with the 0.7% increase from the 2013 level of 2.80 billion while the rest of the world grew by 1.5% during the same year. Given the slow growth in APEC population, its share to the world's population decreased from 43% in 1990 to 39% in 2014. (Figure 1)

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*"APEC GDP (at constant 2010 USD) grew faster than the rest of the world"*

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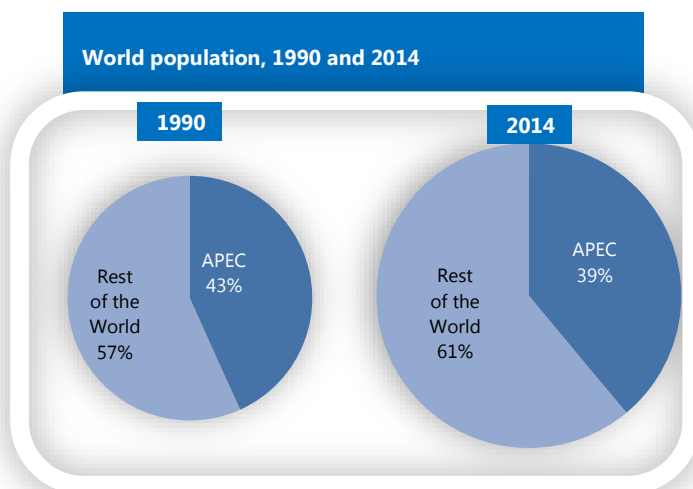


Figure 1

While population growth in APEC slowed down between 1990 and 2014, its GDP (constant 2010 USD) grew faster than the rest of the world at 3.1% AAGR. This period marked the fast growth seen in China (10.1% AAGR) and the group of economies that make up South-East Asia (5.0% AAGR). (Figure 2)

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In terms of primary energy supply, APEC accounted for more than 50% of the world's total primary energy supply (TPES) between 1990 and 2014 (Figure 3). The four percentage point increase in its share to the world TPES in 2014 compared with 1990 levels can be attributed to its rising income for the last 20 years.

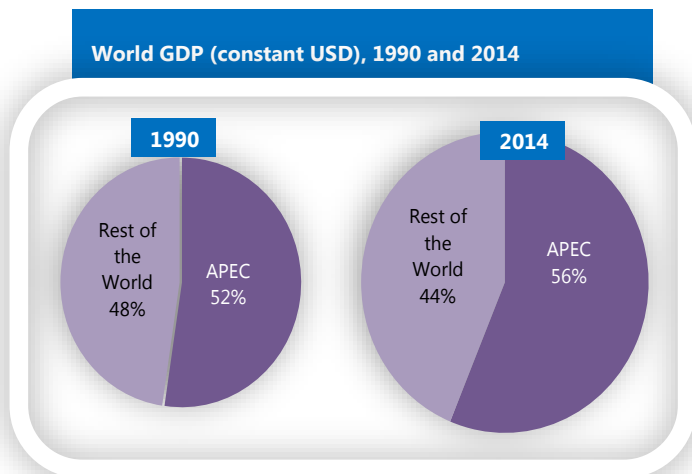


Figure 2

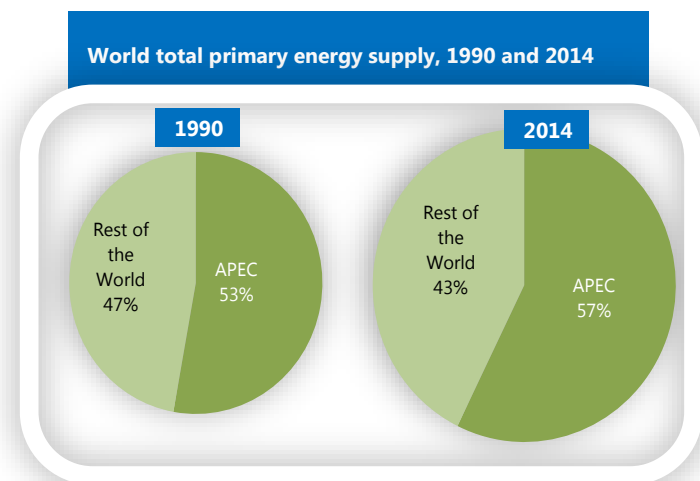


Figure 3

## Energy supply trends in APEC

### Total primary energy supply

In 2014, total primary energy supply in APEC was 7 844 Mtoe representing a 0.6% expansion from the 2013 levels (7 795 Mtoe). This rate was slower as compared with its annual average growth rate (AAGR) of 2.2% between 1990 and 2014 and the previous year's (2013) 1.7% increase (Figure 4).

Coal which overtook oil as the major fuel in APEC in 2005, continued to dominate APEC TPES in 2014 with a 38% share (Figure 5). Its absolute volume however, slightly decreased from 2 998 Mtoe in 2013 to 2 969 Mtoe in 2014. Over the period 1990 to 2014, it has an AAGR of 3.3%.

Oil was the second largest fuel in APEC in 2014, maintaining its share of 29% of TPES since 2010. It grew modestly from 2013 to 2014 at 1.4%, a bit higher compared with 1.1% AAGR during the period 1990 to 2014.

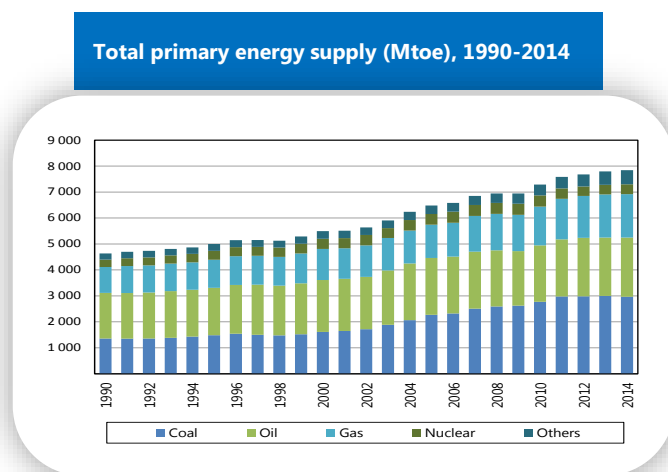


Figure 4

Gas supply which has shown significant increases for the last two decades (2.2% AAGR between 1990 and 2014) marginally increased by 0.5% from 2013 to reach 1 669 Mtoe (21% of TPES) in 2014. This can be attributed to the decrease in gas supply in Russia— second largest (22%) in terms of APEC total gas supply in 2014—by 5.9% in 2014 over 2013.

In APEC TPES, nuclear supply continued to be very minimal with a share of 5% in 2014. Albeit its small share of the TPES, it grew significantly in 2014 from the 2013 level of 3.1% owing to the 18.7% increase in China in the same period. Since 1990, nuclear supply grew by 1.2% on the average annually up to 2014.

Other fuels which include hydro, and other renewable energy, grew the fastest at 5.2% among all

the fuels in 2014 against 2013. With a modest share, about 7% of the APEC TPES, its AAGR over the period 1990 to 2014 was notable at 3.4%.

### Primary energy mix by region

Fossil fuels dominated the primary energy mix in APEC with a more than 80% share on average from 1990 to 2014. Shares of each fuel in 2014 were almost the same as 2013 in total APEC, but mixes of primary energy per region, varied. Oil was the main energy source in most regions in APEC, which ranged between 35% and 44% of the respective regions' primary energy mix in 2014.

In China however, coal dominated the primary energy mix with 69% of its total supply while gas was the major fuel in Russia accounting for more than 52% of its primary energy mix. The share of other fuels was higher in other Americas (20%) in 2014 while nuclear is higher in the USA (10%) compared with other regions (Figure 6).

### Primary energy mix by region, 2014

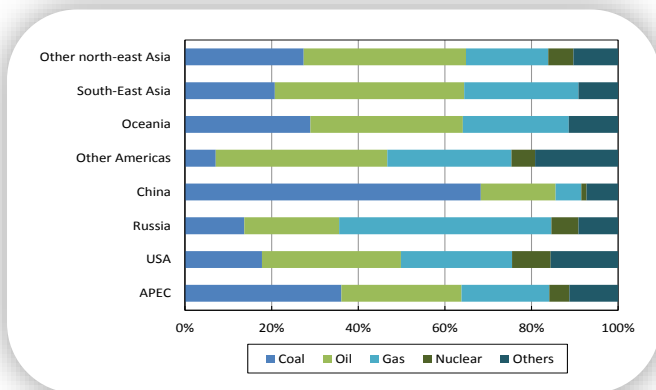


Figure 6

### Indigenous production

Indigenous energy production increased marginally (2.0%) in 2014 (7 618 Mtoe) from the 2013 levels (7 471 Mtoe). Although there were no drop recorded in energy production in APEC from 2013 to 2014, lower growth rates (as compared with growth rates observed in the previous year) were seen in other fuels (10.1% to 5.6%) and gas (2.8% to 0.3%).

### APEC Indigenous production (Mtoe), 1990-2014

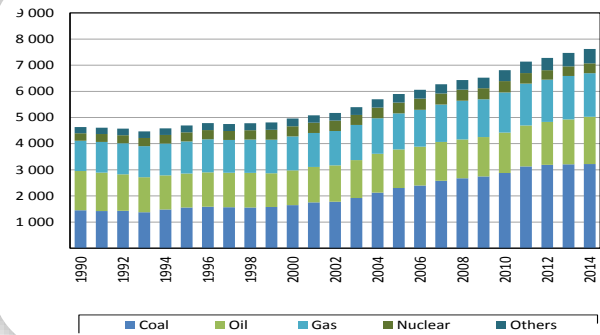


Figure 7

During the last four years, the AAGR of indigenous production between the periods 1990 to 2014 remain the same at 2.1% (Figure 7).

### Self-sufficiency

The overall self-sufficiency level (Indigenous production/Total primary energy supply) in APEC was 97.1% in 2014. A minimal increase over the 2013 level (95.8%) but still comparable to the high levels observed since 1990 (Figure 8). The self-sufficiency ratio of oil was the lowest (79%) among all the fuels in APEC in 2014.

### APEC energy self-sufficiency, 1990-2014

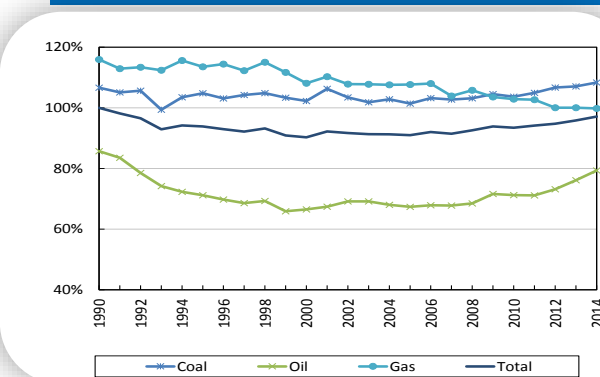


Figure 8

### Net imports by region

While imports declined by 1% in 2014 over 2013 levels, the APEC region as a whole was a net importer. Its net imports (Imports – Exports) reached 465 Mtoe in 2014. This is 9% lower than net import levels observed in 2013. Between the periods 1990 to 2014, the AAGR of net imports was 4.8% (Figure 10). On regional level, other north-east Asia, China and the US were net importers in 2014 while the remaining regions in APEC were net exporters.

## Power generation

With electricity demand in APEC continuously increasing, power generation between 1990 and 2014 expanded by 3.3% annually on the average. In 2014, power generation increased by 2.1% to reach 15 183 TWh from its 2013 levels of 14 870 TWh.

Electricity sourced from fossil fuels continued to dominate the total power generation in APEC with a more than 70% share in 2014, albeit its slight increase from 2013 to 2014 at 0.7%. This was far below its AAGR from 1990 to 2014 at 3.6% (Figure 11). Power generated from hydropower and nuclear came second (15% share) and third (10% share), respectively in APEC’s power generation in 2014.

Although its share of total power generation was small (4.1% share), the increase from other power sources [other renewables (9.8%)] and geothermal (4.5%) offset the minimal increase in thermal power generation in 2014.

### Power generation mix by region

While fossil fuels dominated power generation in total APEC, the power generation mix by region varied in 2014 (Figure 12). The increase in coal generation was mainly driven by the share of China (73%), while the gas generation share was driven by Russia with more than 50% share of gas generation in APEC in 2014. Hydropower generation increased from 2 102 TWh in 2013 to 2 238 TWh in 2014 due in part to the more than 40% share of hydropower generation in China and in other Americas (21%) in 2014.

Net imports by region, 1990-2014

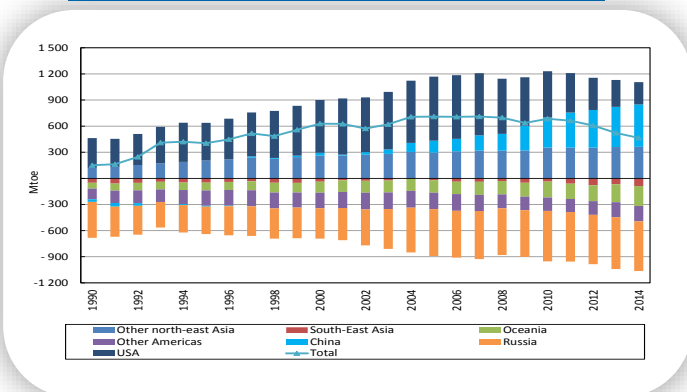


Figure 10

Power generation by type (Twh), 1990-2014

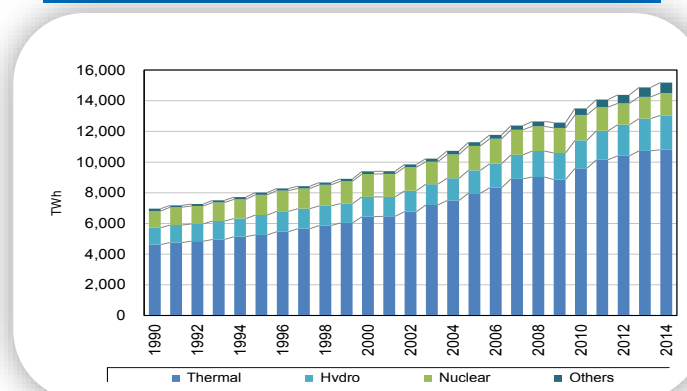


Figure 11

Power generation mix by region, 2014

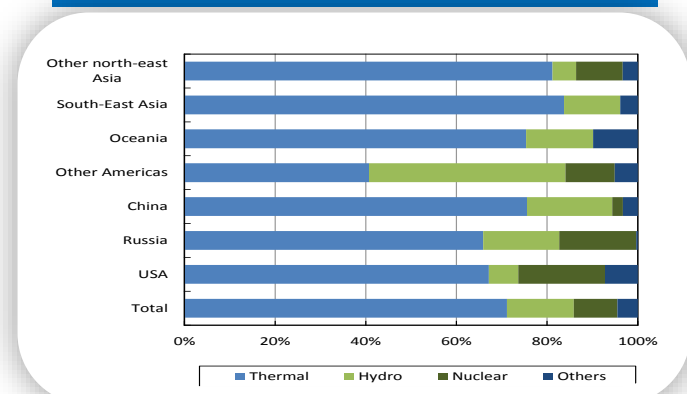


Figure 12

The 4.5% increase in electricity generation from geothermal was driven by the increases in Oceania (12%) and South-East Asia (7%), with a combined geothermal generation of 28 TWh in 2014 as against its 2013 levels of 25 TWh. Nuclear power generation continued to recover from the previous years' (2011 and 2012) decreases with a 3.1% increase from 2013 power generation levels to reach 1 460 TWh in 2014. The United States and other north-east Asia contributed to its expansion with a combined share of more than 70% of nuclear power generation in APEC in 2014.

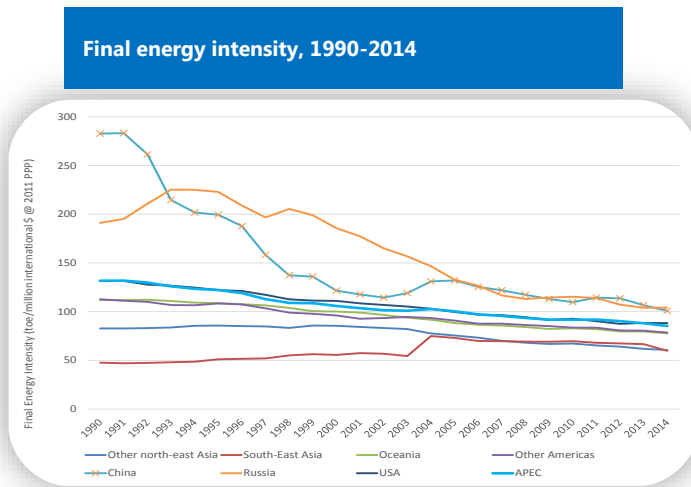


Figure 13

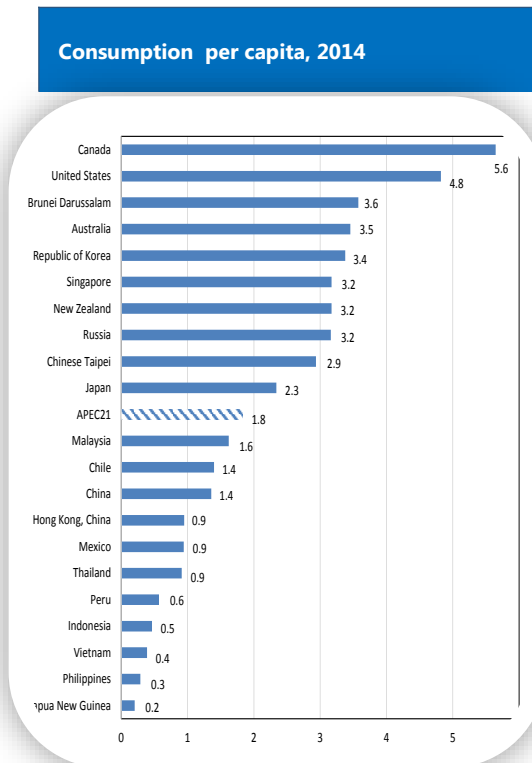


Figure 14

## Energy intensity

### Final energy intensity

Final energy intensity [Total final energy supply/GDP (2011) USD PPP] in APEC continued to be on a downward trend for the last two decades. A 35% energy intensity reduction was noted from 1990 to 2014 or an annual reduction of 1.8% on average. In 2014, final energy intensity was recorded at 85 toe/million (2011) USD PPP representing a 3.1% improvement from the 2013 final energy intensity level of 88 toe/million (2011) USD PPP (Figure 13).

## Energy per capita

### Energy consumption per capita

As GDP per capita in APEC rose significantly, so did its energy consumption per capita [1.8 tonnes of oil equivalent (toe)] in 2014 (Figure 14). Despite the strong demand growth in China and South-East Asia reflecting strong overall economic development, energy demand per capita in both China and South-East Asia remained well below the APEC average. For example, China's final energy demand per capita in 2014 was 1.4 toe and that of South-East Asia was 1.5 toe on average, as compared with Canada (biggest at 5.6 toe) and the United States (second biggest at 4.8 toe).

## Energy demand trends in APEC

### Total final energy consumption by sector

Final energy consumption in APEC reached 5 167 Mtoe in 2014, a modest increase (1%) from the 2013 levels of 5 116 Mtoe. Between 1990 and 2014 total final energy consumption (TFEC) more than doubled but the AAGR remained at 2.0% .

In 2014, industry was the leading consuming sector (36%) followed by the buildings sector [(29%) residential, commercial and agriculture sub-sectors combined] then the transport sector (26%) and finally non-energy use (9%) (Figure 15). While the industry was the major energy consuming sector in APEC, it declined by 2.1% from its 2013 consumption levels to reach 1 869 Mtoe in 2014. If non-energy use is included, total industry consumption reached 2 323 Mtoe or more than 40% of TFEC in 2014.

Non-energy use in industry should not be overlooked, having increased faster (6.3% from 2013 to 2014) than the other major energy sectors from 1990 to 2014 with an AAGR of 4.4%. The buildings sector as well as transport sector, though they posted positive increases between the periods 1990 and 2014, fell short of their previous growth (3.9% in 2013 to 2.6% in 2014 and 2.3% in 2013 to 2% in 2014, respectively).

Sectoral consumption by region varied in 2014. Energy consumption in industry (57% of APEC TFEC) was largest in China, owing to the economy's rapid growth in industrial activity over the last two decades that resulted in its emergence as the 'factory' of the world. The size and high consumption levels of buildings in the United States and China put their combined share at more than 60% of the total APEC buildings consumption in 2014. The surge of energy consumption in APEC's transport sector was due largely to robust demand growth in most of the regions in APEC in the last two decades. Rapidly increasing income per capita and urbanisation contributed to the growth of transport demand in APEC.

Total final energy consumption in APEC by sector, 1990-2014

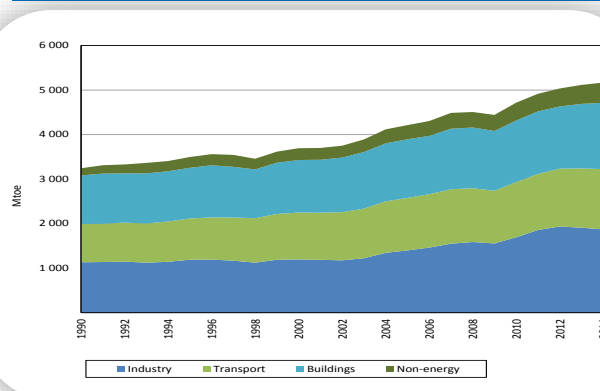


Figure 15

### Final energy consumption by energy source

Oil dominated final energy consumption in APEC over the last two decades. It accounted for 40% of the TFEC in 2014, electricity came next with a 21% share and then coal with 17% (Figure 16).

Other fuels (renewables) may be the least in terms of share (6%) in APEC in 2014 but it grew the fastest (3.4% in 2014 from its 2013 levels) among the major fuels. Gas consumption also significantly grew next to other fuels at 2.8%.

Total final energy consumption by energy source, 1990 and 2014

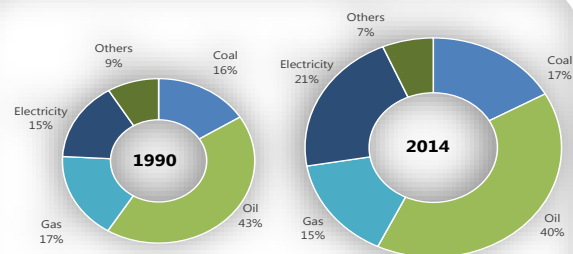


Figure 16

## CO<sub>2</sub> emissions

The estimated CO<sub>2</sub> emissions from fuel combustion in APEC was 5 707 Mt-C in 2014 (Figure 17). This represented a slight decrease of 1% from 5 763 Mt- C in 2013 or 2.2% annually on average from 1990 to 2014.

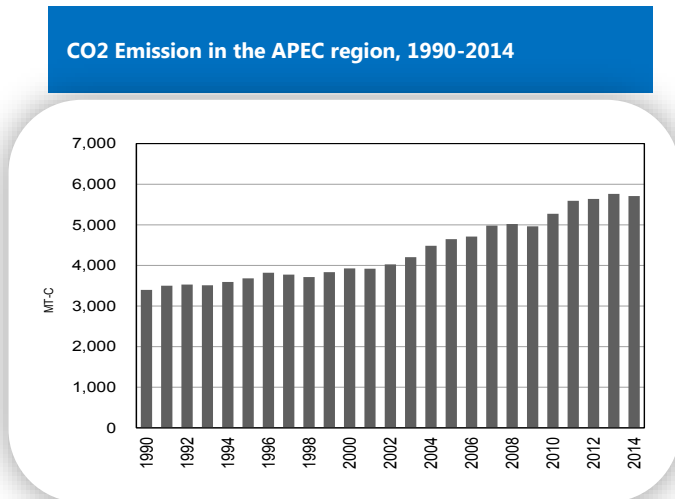


Figure 17

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For comments and suggestions, please contact

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### Notes:

All energy data came from APEC c/o APERC/ESTO while GDP, population and all other macro-economic indicators from World Bank