

Energy efficiency trends in G20 countries

September 2011

ADEME

**Improving Policies through
Energy Efficiency Indicators (IPEEI initiative within IPEEC)**

General objectives

Context :

Within the framework initiative “Improving Policies through Energy Efficiency Indicators” (IPEEI) initiated by France and operated by ADEME, a work program has been launched including **calculating EE indicators**, organizing training sessions and establishing a monitoring system for energy efficiency policies.

Objectives of the G20 country report:

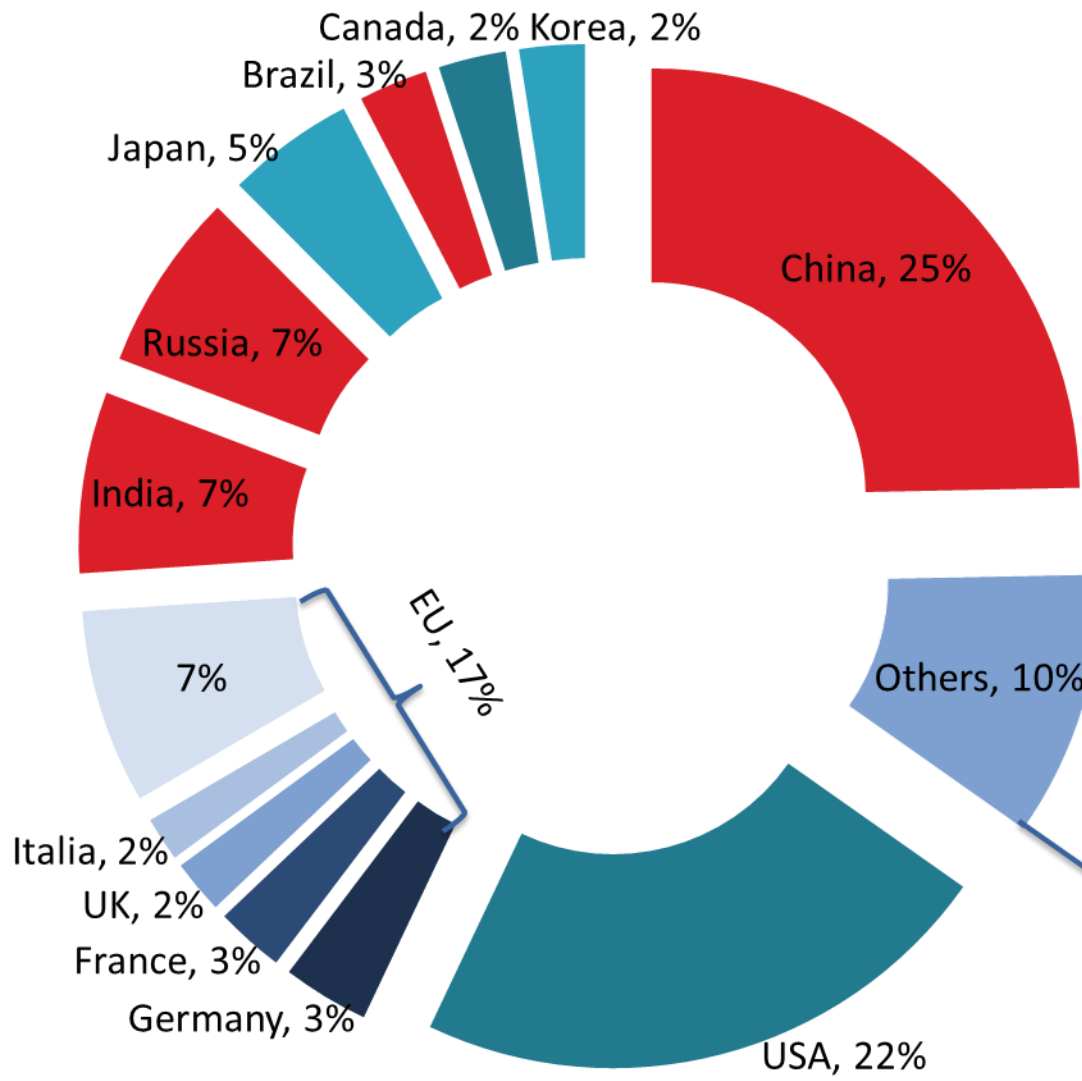
To review the recent energy efficiency trends through energy efficiency indicators of G20 countries in relation to policy implementation at level of main sectors and end uses.

Deliverables :

- A report on the energy efficiency trends in the G20 based on around 30 indicators
- The creation of an interactive database, for both indicators and policies and measures in force

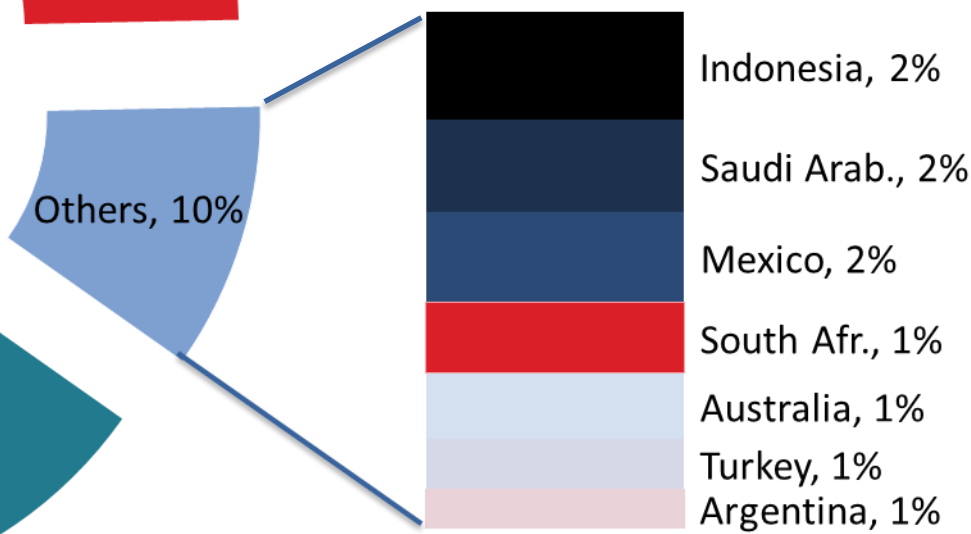
Overall

Total energy consumption in G20 (2010)



China, USA and Europe represent more than 60% of G20 energy consumption.

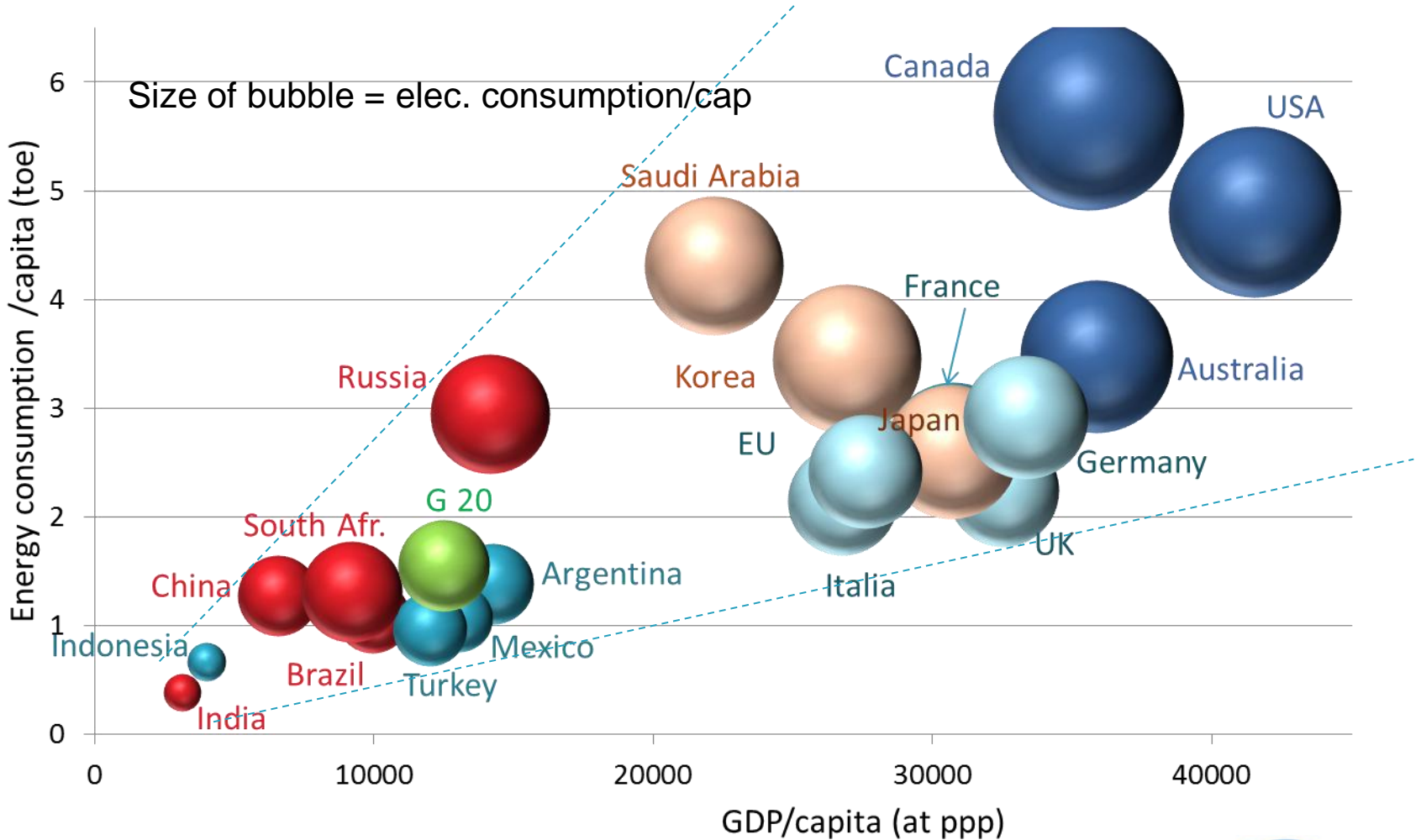
BRICS make up 42% of the total, and China represents 60% of BRICS' consumption, up from 33% in 1990 (40% for China). While EU and USA represent respectively 17% and 22% (against 23% and 27% in 1990)



BRICS : Brazil, Russia, India, China and South Africa

- Some correlation between the energy/electricity consumption per capita and GDP/capita
- The higher the income per capita, the larger the dispersion of per capita consumption
- Some countries are particularly intensive given their income level (Canada, US, Saudi Arabia, Russia, Korea)

Total energy and electricity consumption/capita and GDP/capita (2010)

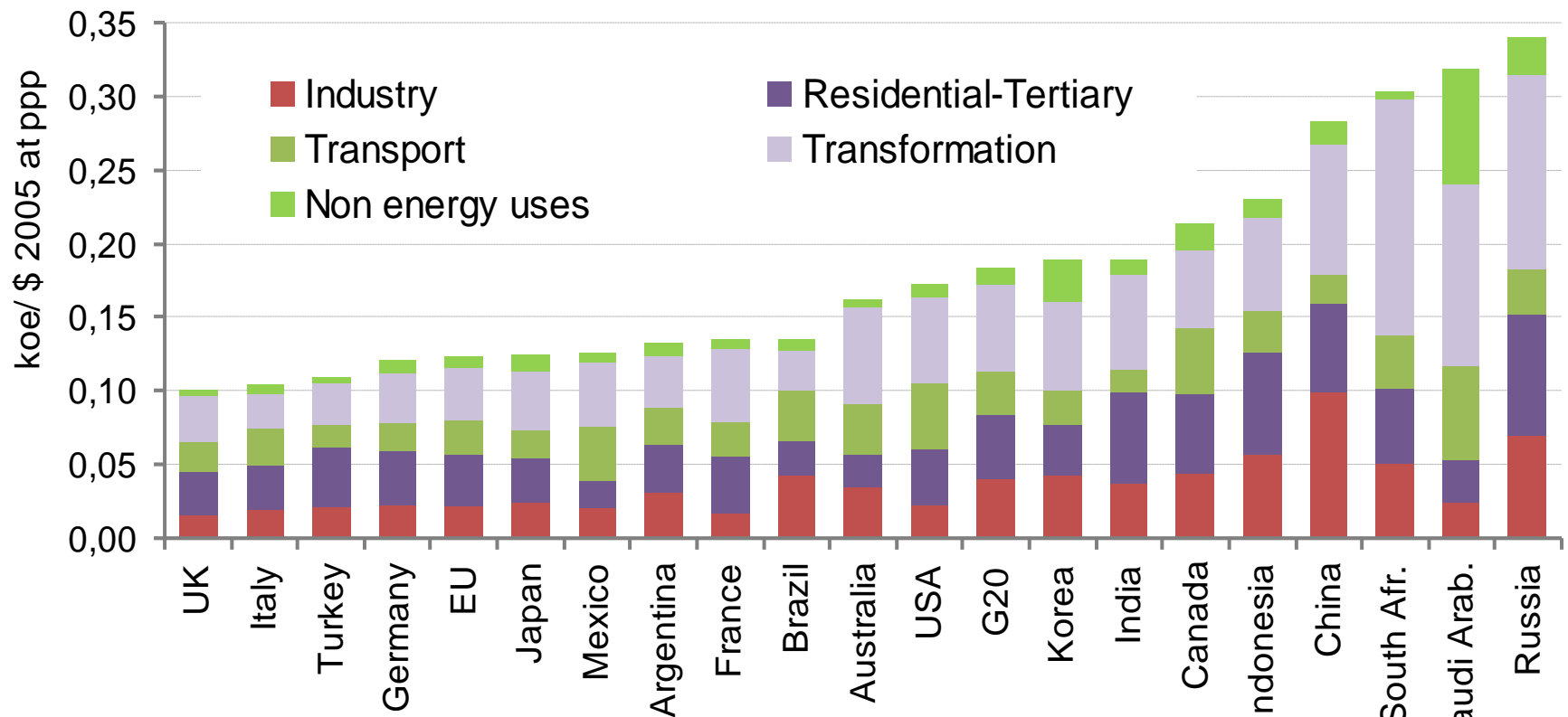


In European countries the residential/tertiary sector is quite important while industry is important in China and Brazil.

Non energy uses represent a large share of primary intensity in Saudi Arabia and Korea (because of petrochemicals).

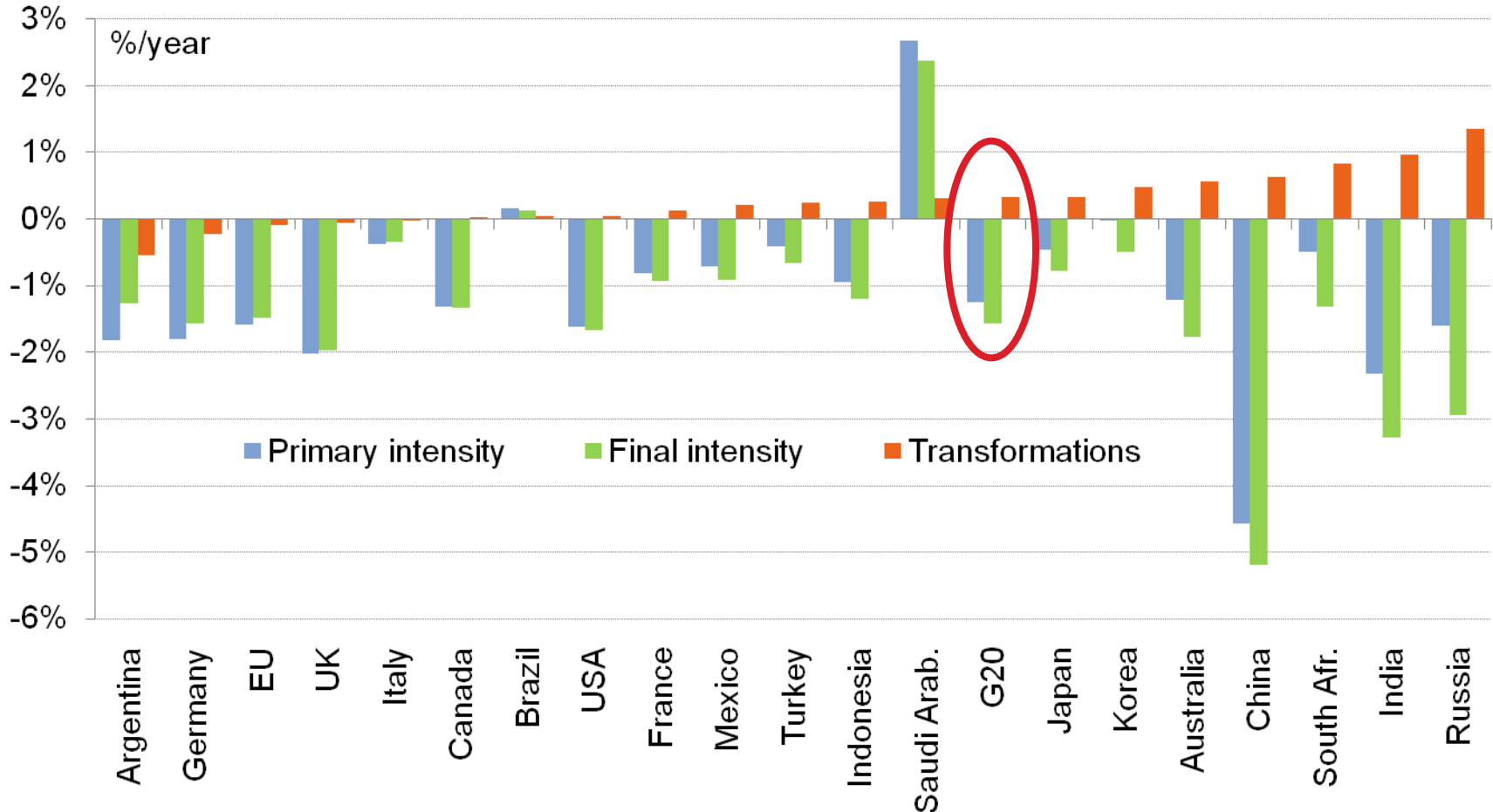
Transformations have a high share in China, South Africa, Saudi Arabia and Russia, countries that are large producers, and transformers of primary energy .

Primary intensity by sector (2010)



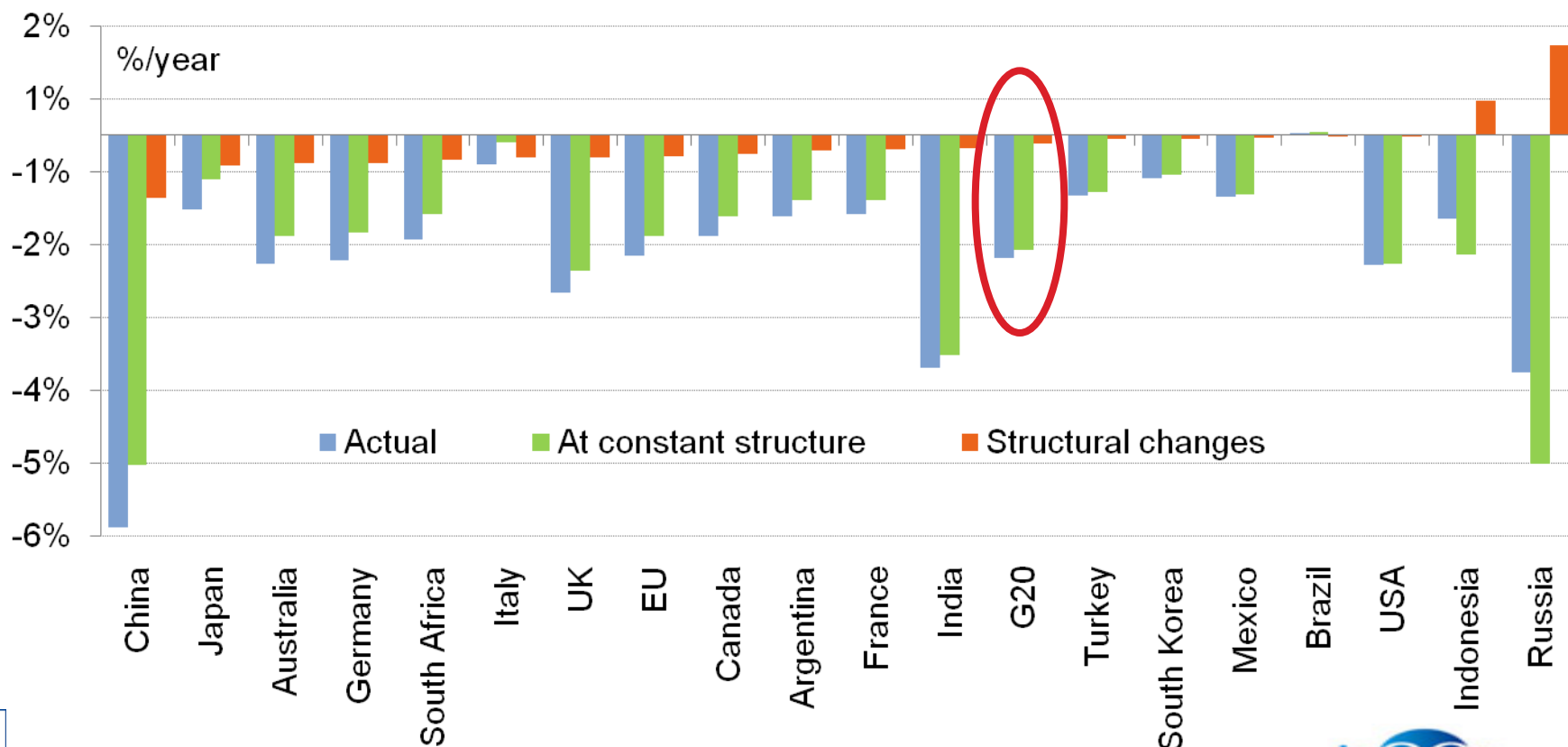
Final intensity is decreasing faster than primary intensity at G20 level (-1.6%/y against -1.3%/y) and in the majority of countries implying a growth in transformations losses
 Reverse trends in EU (mainly in Germany) and Argentina where power transformation losses are reduced because of a development of cogeneration, wind, gas combined cycles

Primary/final intensity and transformation (1990-2010)



- In most countries, the increasing share of services in the GDP has contributed to reduce the energy intensity.
- In two countries, Russia and Indonesia, the growing share of industry has contributed to increase the final energy intensity as industry is the most energy intensive sector (on average 12 times higher than tertiary)

Impact of structural changes in GDP on the final energy intensity (1990-2009)

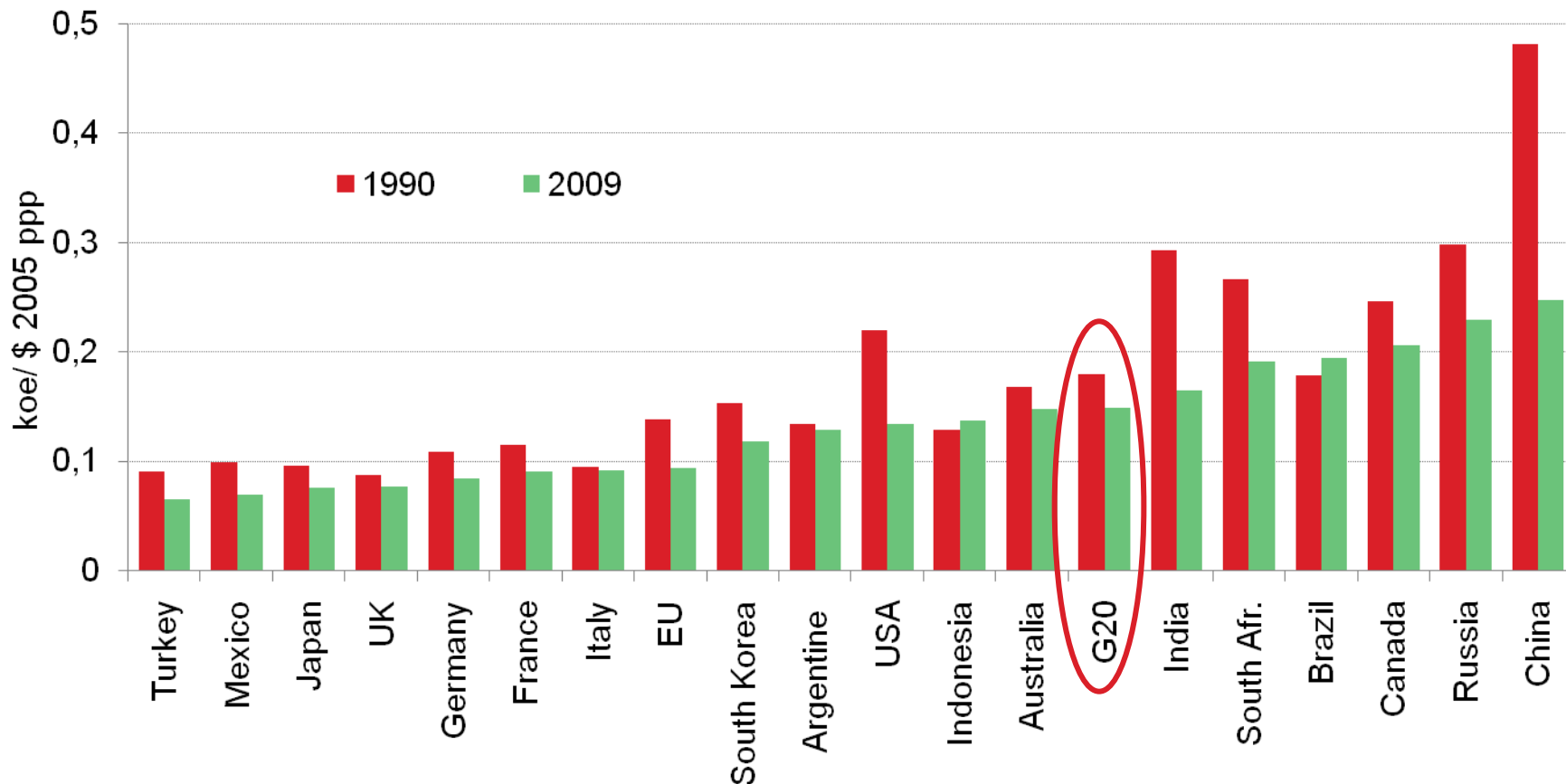


Industry

Since 1990, the general trend in industry is towards a decrease in the energy required per unit of value added (-1%/y for G20 as a whole).

These energy intensity levels are converging because of the globalisation of industrial activities.

Trends in energy intensity of industry sector

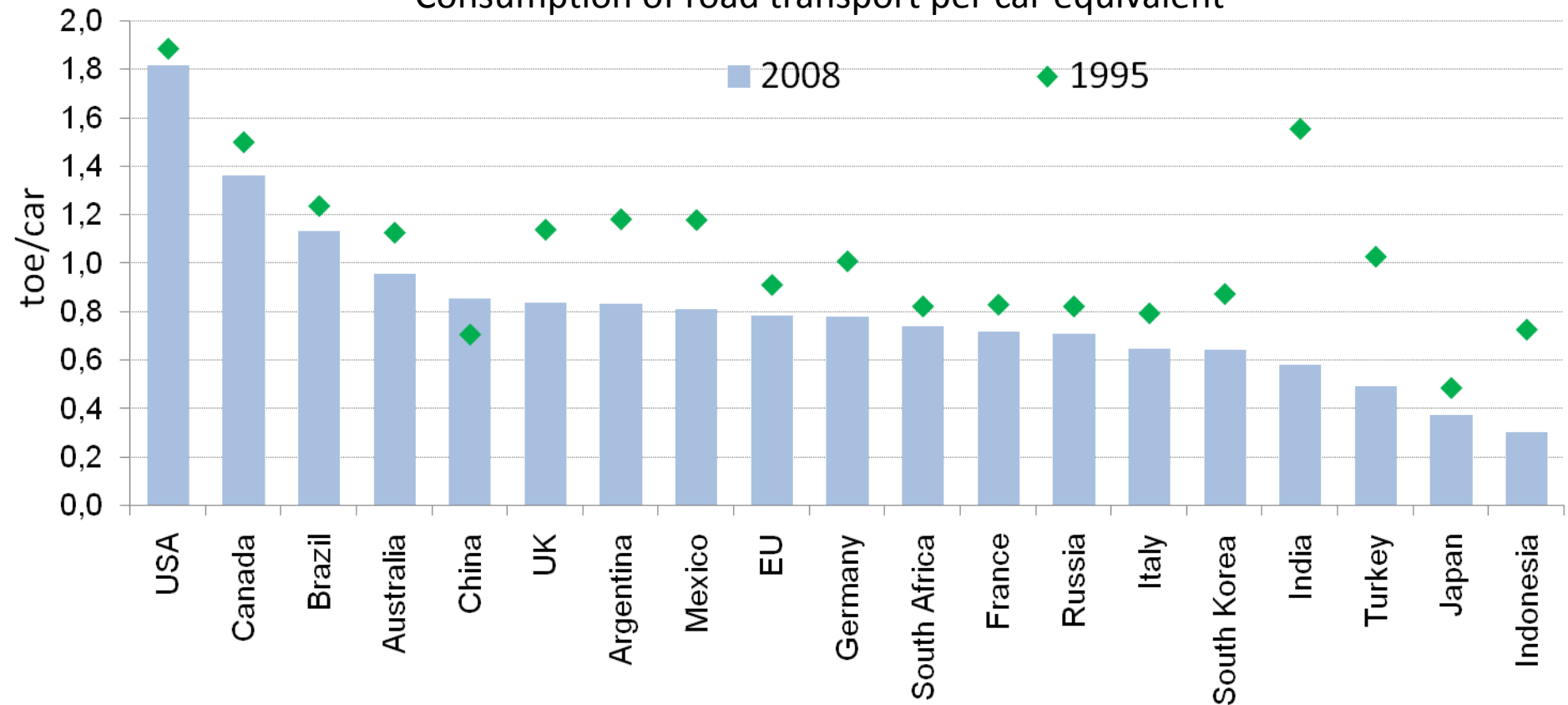


TRANSPORT

Large discrepancies among countries, with higher unit consumption per car equivalent in North America.

Decreasing trends in all the countries except in China due to an increase in the energy efficiency of transport vehicles

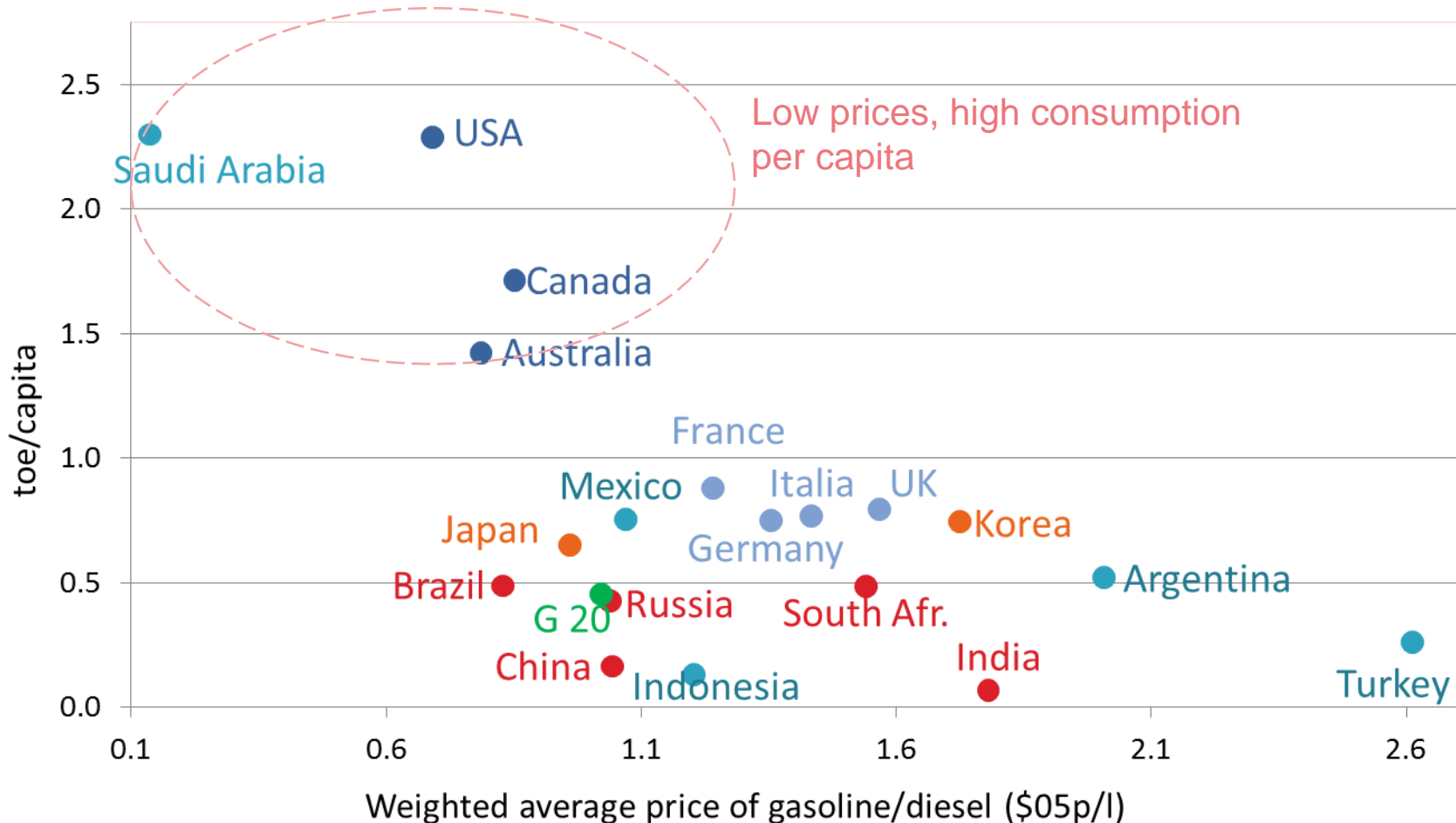
Consumption of road transport per car equivalent*



1 bus equivalent to 15 cars
1 trucks and light veh equiv. to 4 cars
1 motorbike equiv. to 0,15 cars

There is a negative relation between fuel prices and Transport energy consumption per capita. Large discrepancies between countries: North America, Australia and Saudi Arabia have the highest per capita transport consumption and lowest motor fuel prices. In USA, prices are on average 40% lower than France, while energy consumption per capita is almost 3 times higher in USA.

Road transport energy consumption per capita* and motor fuel prices** (2010)

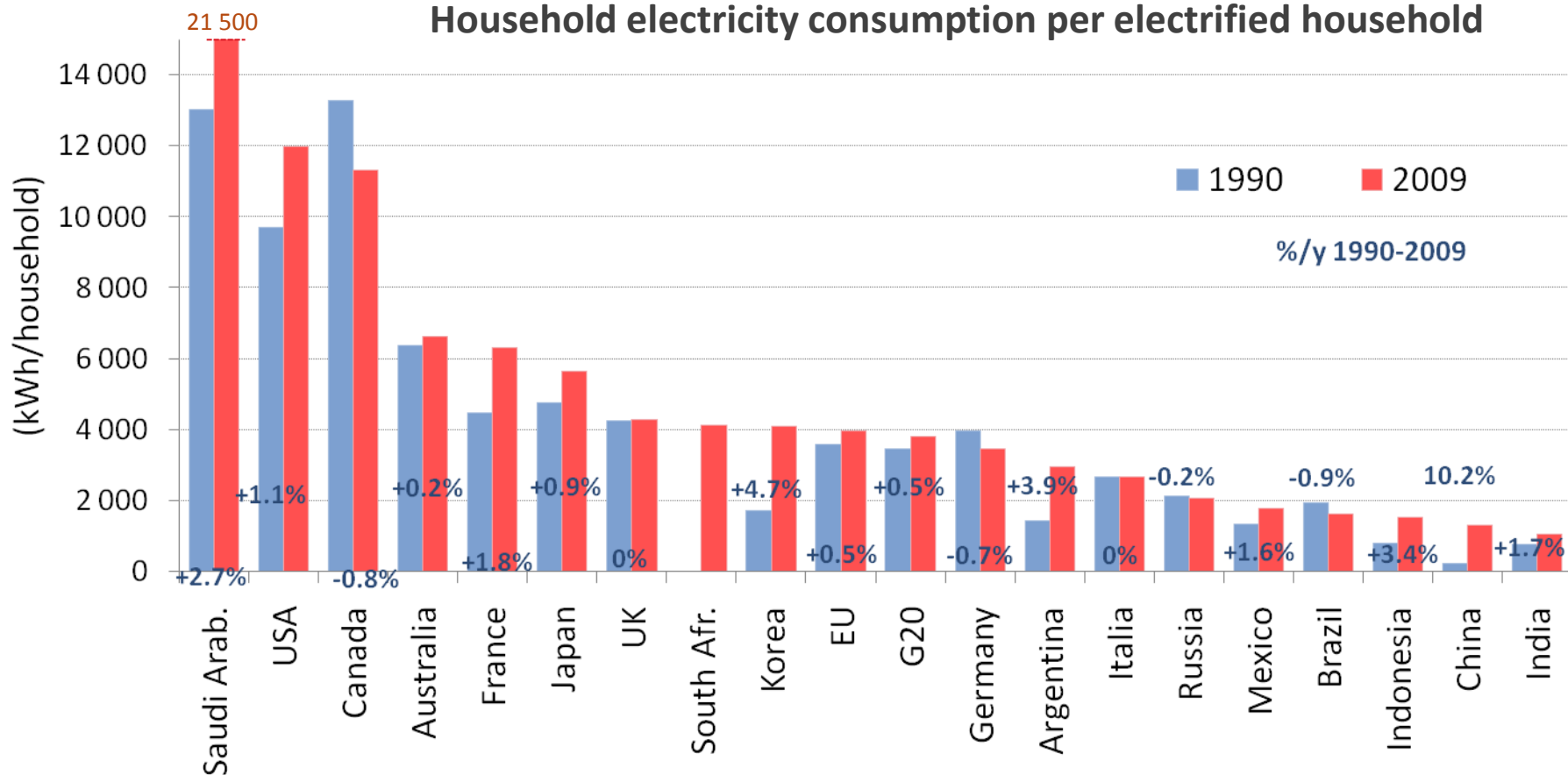


*population older than 20 years old
 ** fuel price at ppp in constant \$ 2005

Households

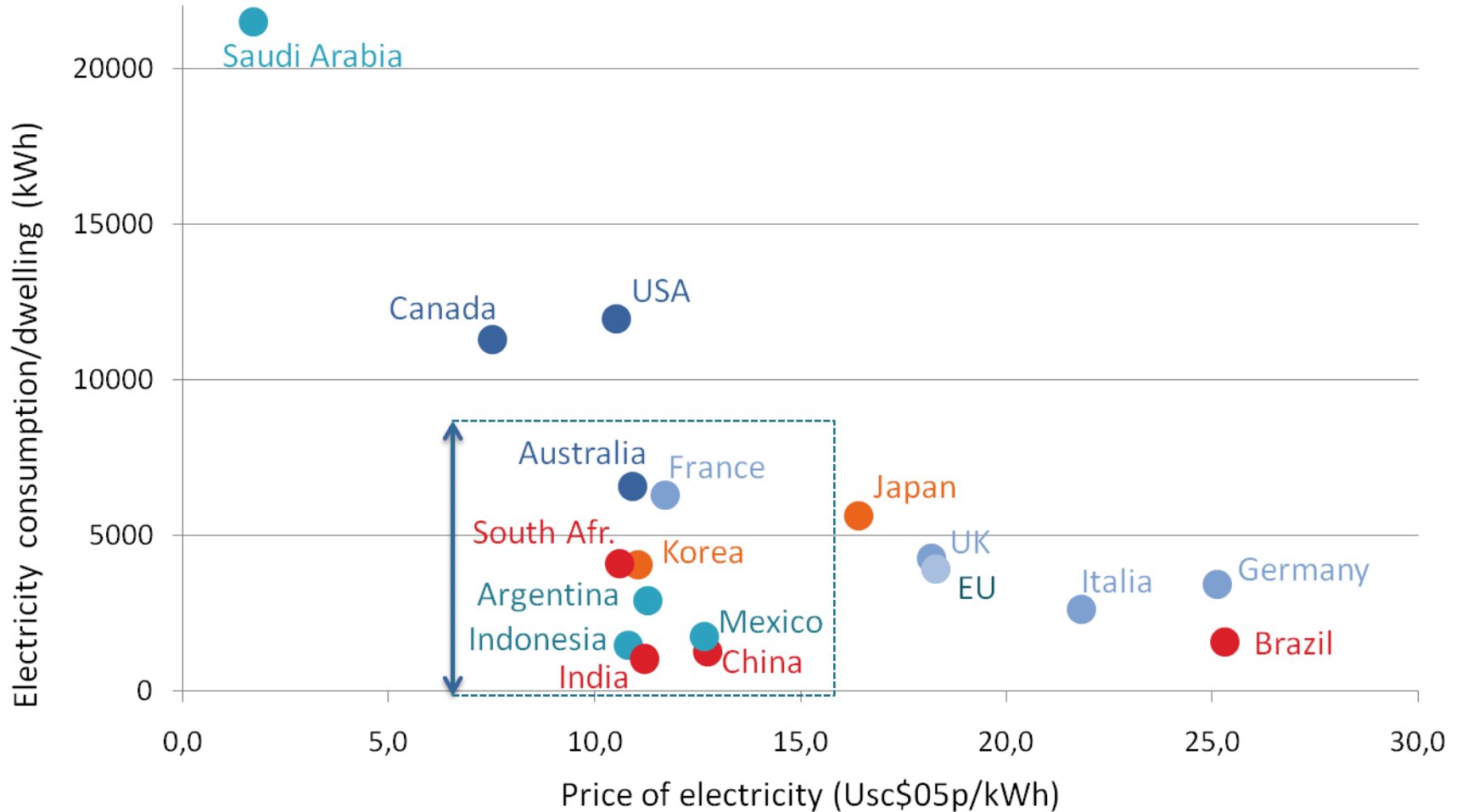
- Big discrepancies among countries in electricity intensity per household: Saudi Arabia and North American countries consume at least 3 times more than G20 as a whole.
- Increasing trends for almost all the countries due to the penetration of new equipment (air conditioning ,office equipment), more and larger equipment per households

Household electricity consumption per electrified household



In general, the higher the prices, the lower the electricity consumption per dwelling
However large range of electricity consumption per dwelling for a quite similar level of prices

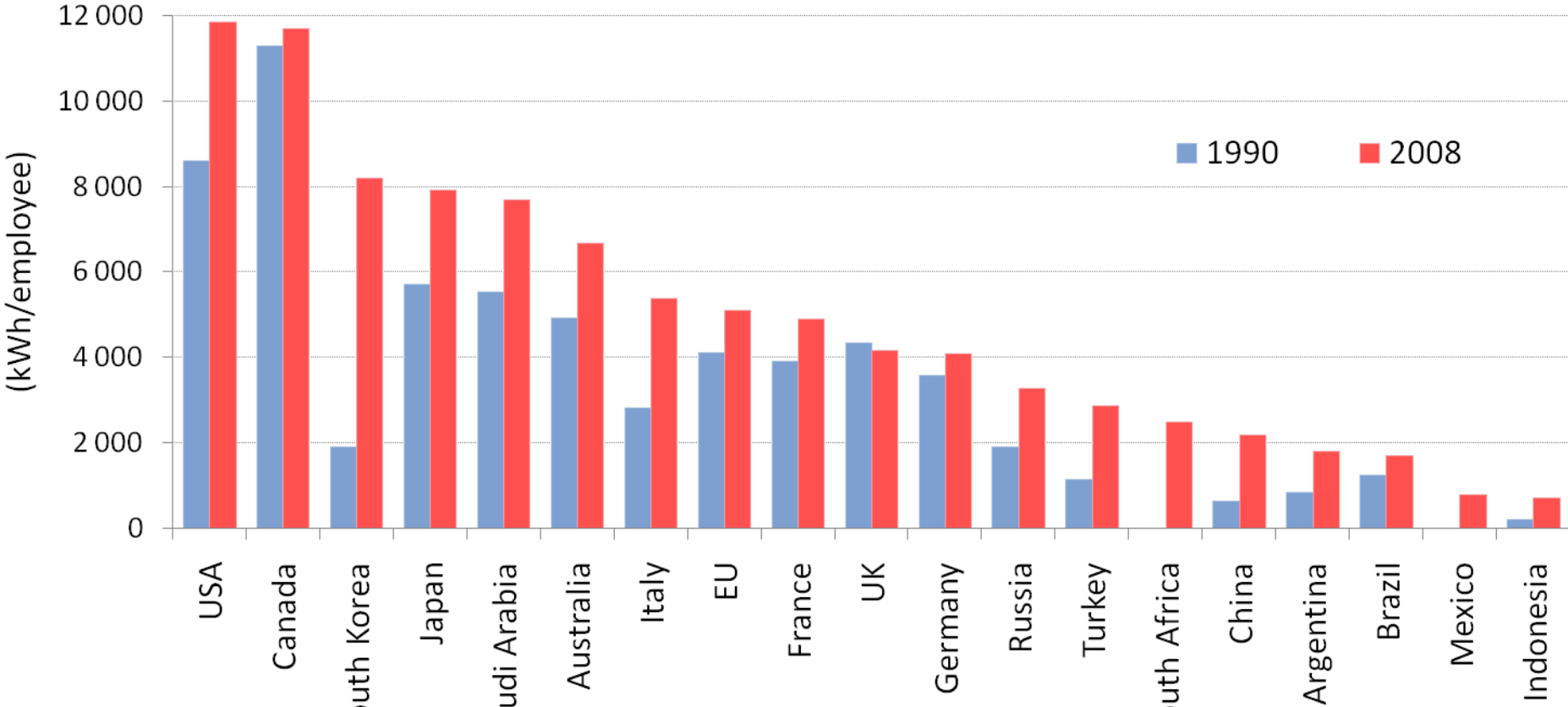
Household electricity consumption per electrified household and electricity price (2009)



Tertiary

- Large discrepancies among countries in electricity consumption per employee (around 12 000 kWh/employee in North America, 1700 kWh in South America or 720 kWh in Indonesia).
- Increasing trends linked to the development of new telecommunications type (such as Internet), the growing number of new appliances (such as IT devices) and air conditioning.

Electricity consumption per employee



Thank you for your attention

For more information

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