

ENERGY PRODUCTION



oooo

Energy production

Renewable Energy
energy derived from natural
replenished sources
Solar, wind, hydro, biofuel



*And exceptional as nuclear
energy*



Conventional Energy
energy sources that once
exhausted, do not replenished
Natural gas, oil, coal



Methodology

Worldwide - Main trends of electricity production & energy sources

Continents - The different trends among continents, key factors that may cause the differences & the correlation between factors

Countries - Drill down to 6 countries with different energy production characteristics & the relation to GDP levels

Micro View on Israel - Electricity generation by energy sources & Actual electricity generation by renewable energies vs. the national target

Key Insights



Data Preparation

1

Cleaning the data

- The region column contained countries, continents, country groups etc.
- We deleted all rows that are not a country.
- Since we chose to focus on the electricity production side in the analysis, we deleted irrelevant columns with energy consumption data

2

JOIN with table contained countries by continent

- We added a column with continent association for each country

3

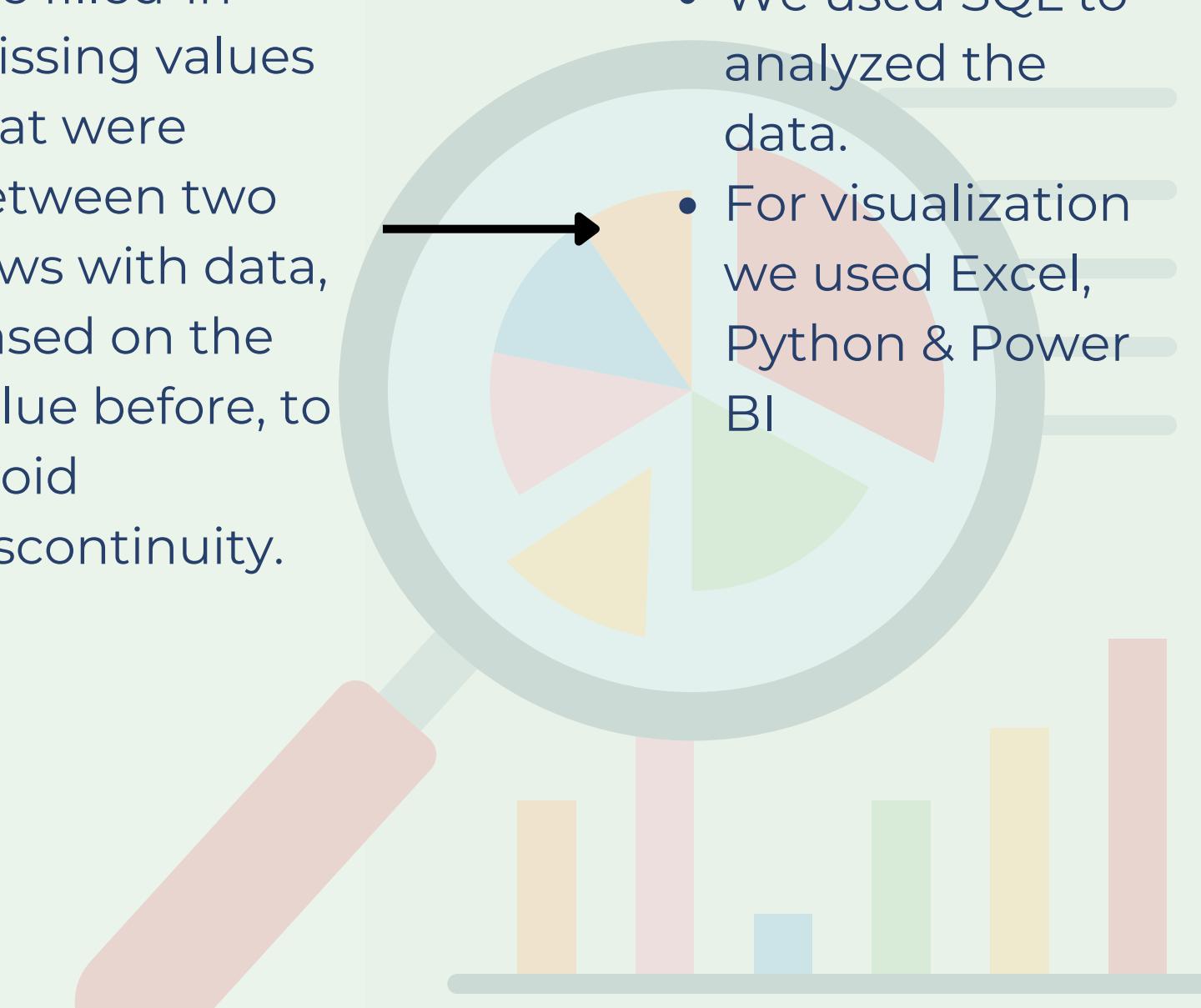
Interpolation

- We filled-in missing values that were between two rows with data, based on the value before, to avoid discontinuity.

4

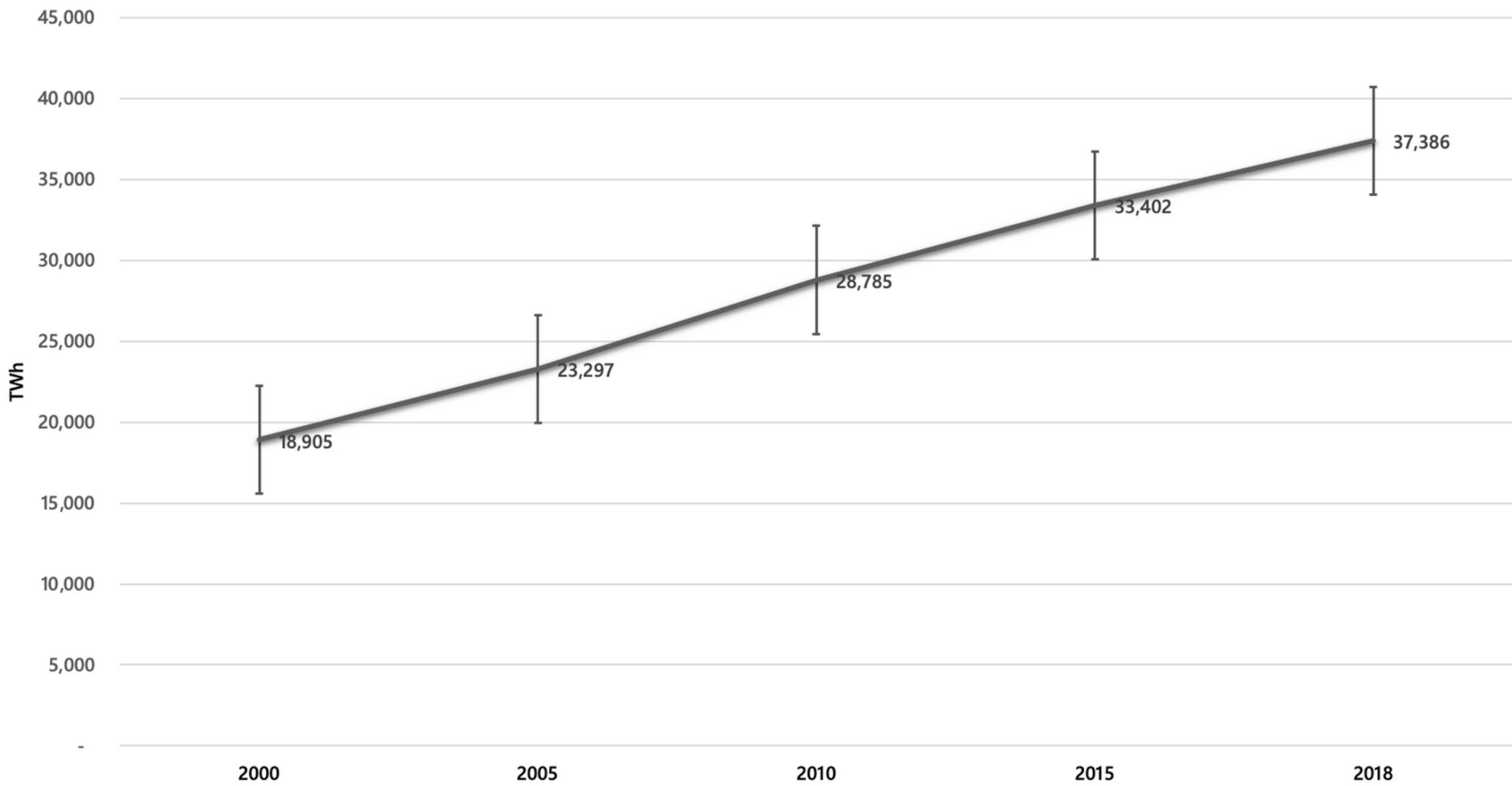
Analysis

- We used SQL to analyzed the data.
- For visualization we used Excel, Python & Power BI

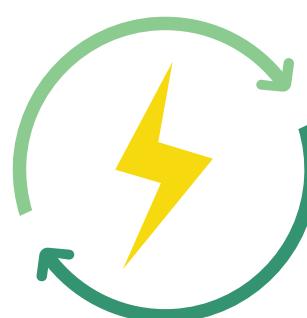


WORLDWIDE

Electricity generation over time



- Electricity generation is growing 20% in average each five years.
 - Between 2000-2018, electricity generation duplicate the annual generation.
- What are the energy sources and how do they changed over time?*

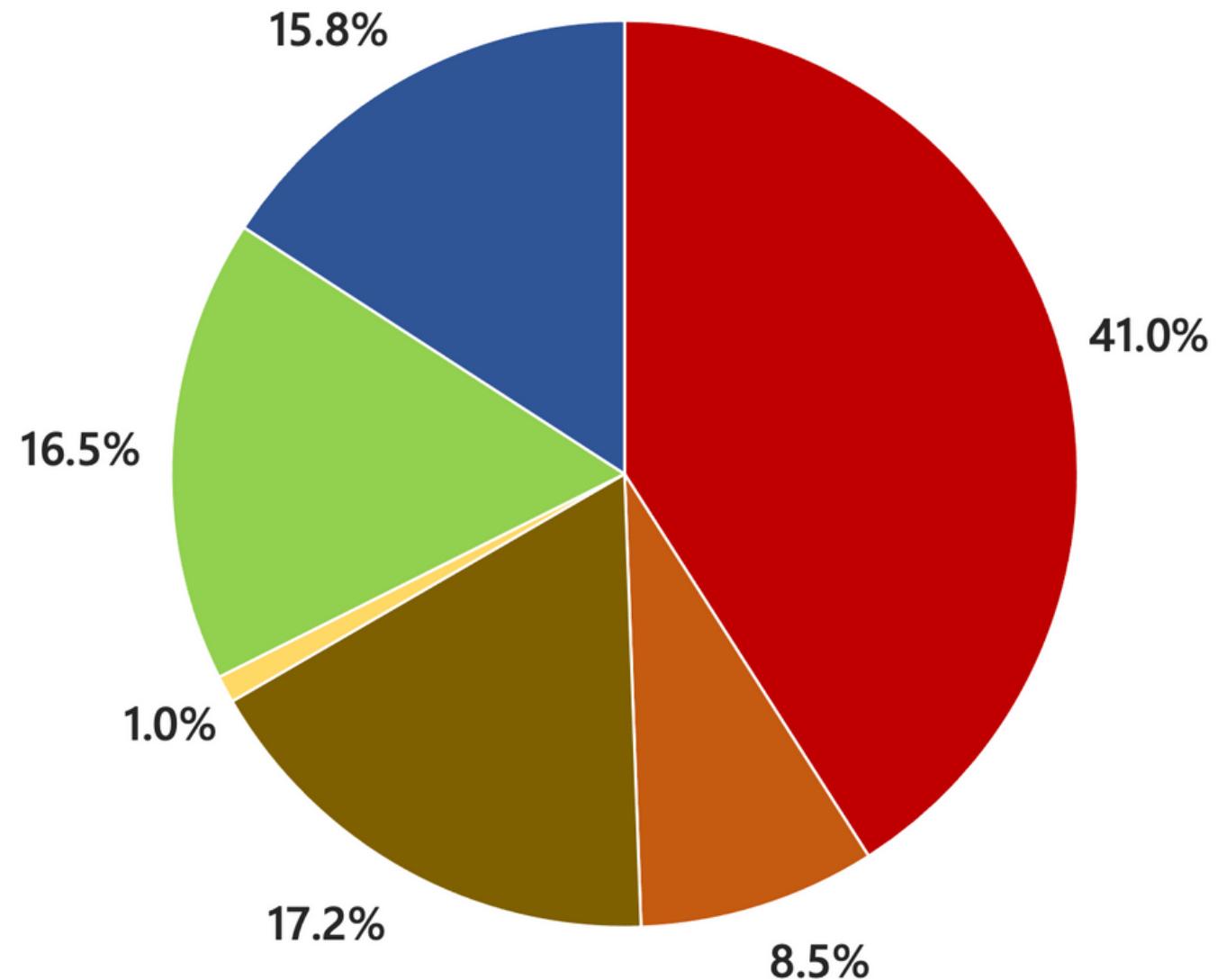


2000

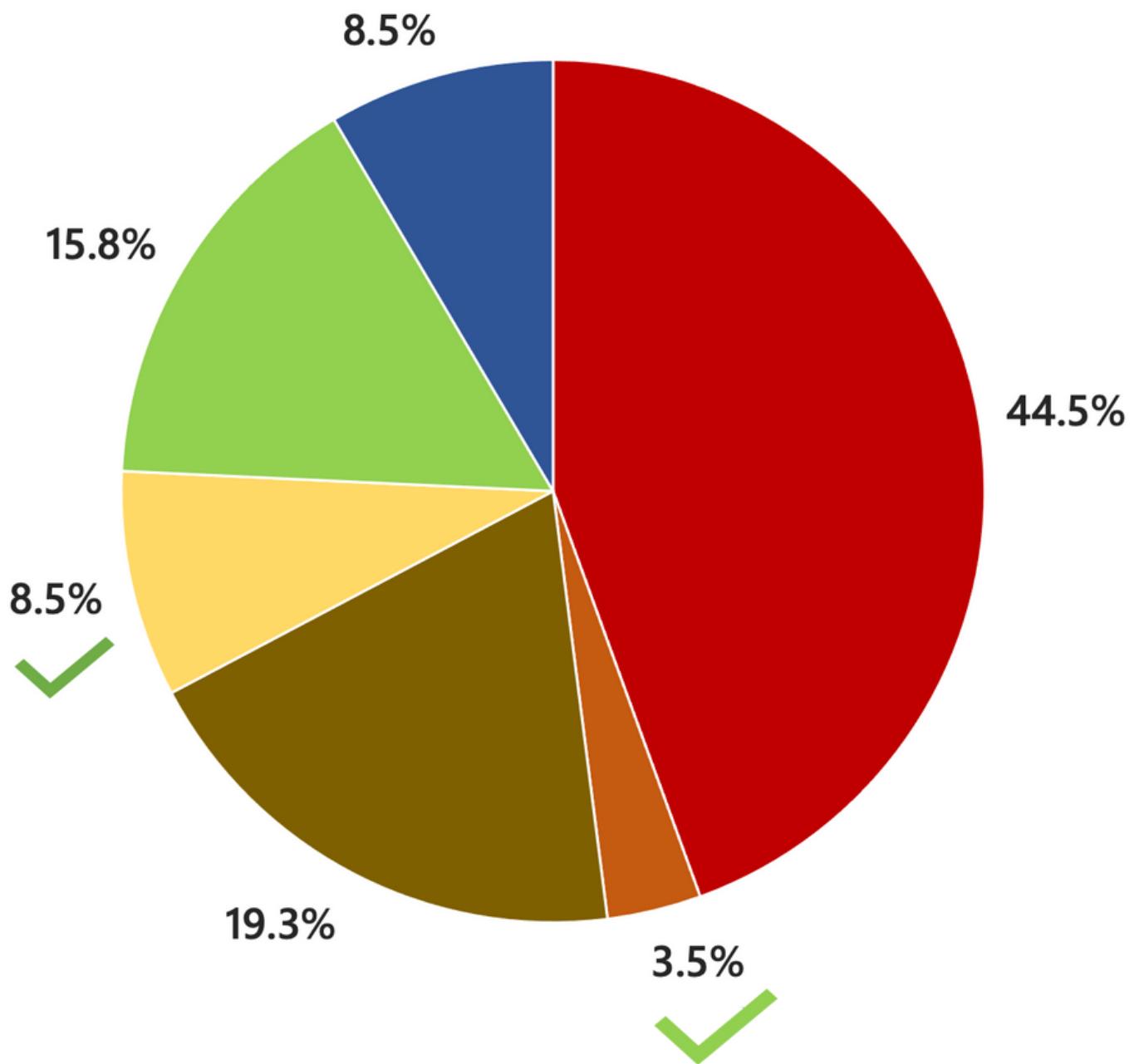
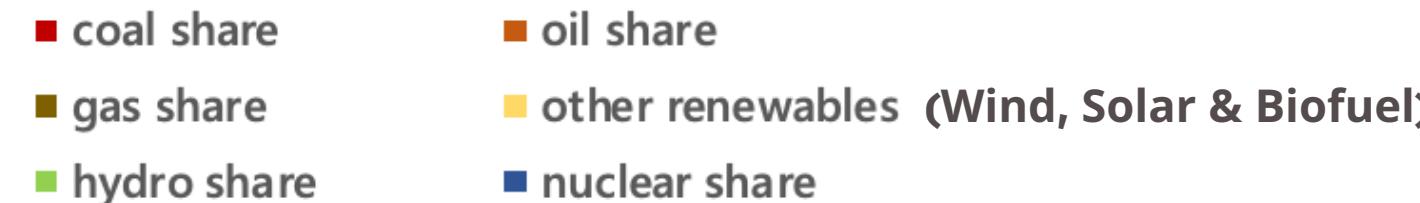
WORLDWIDE

Electricity sources

2018

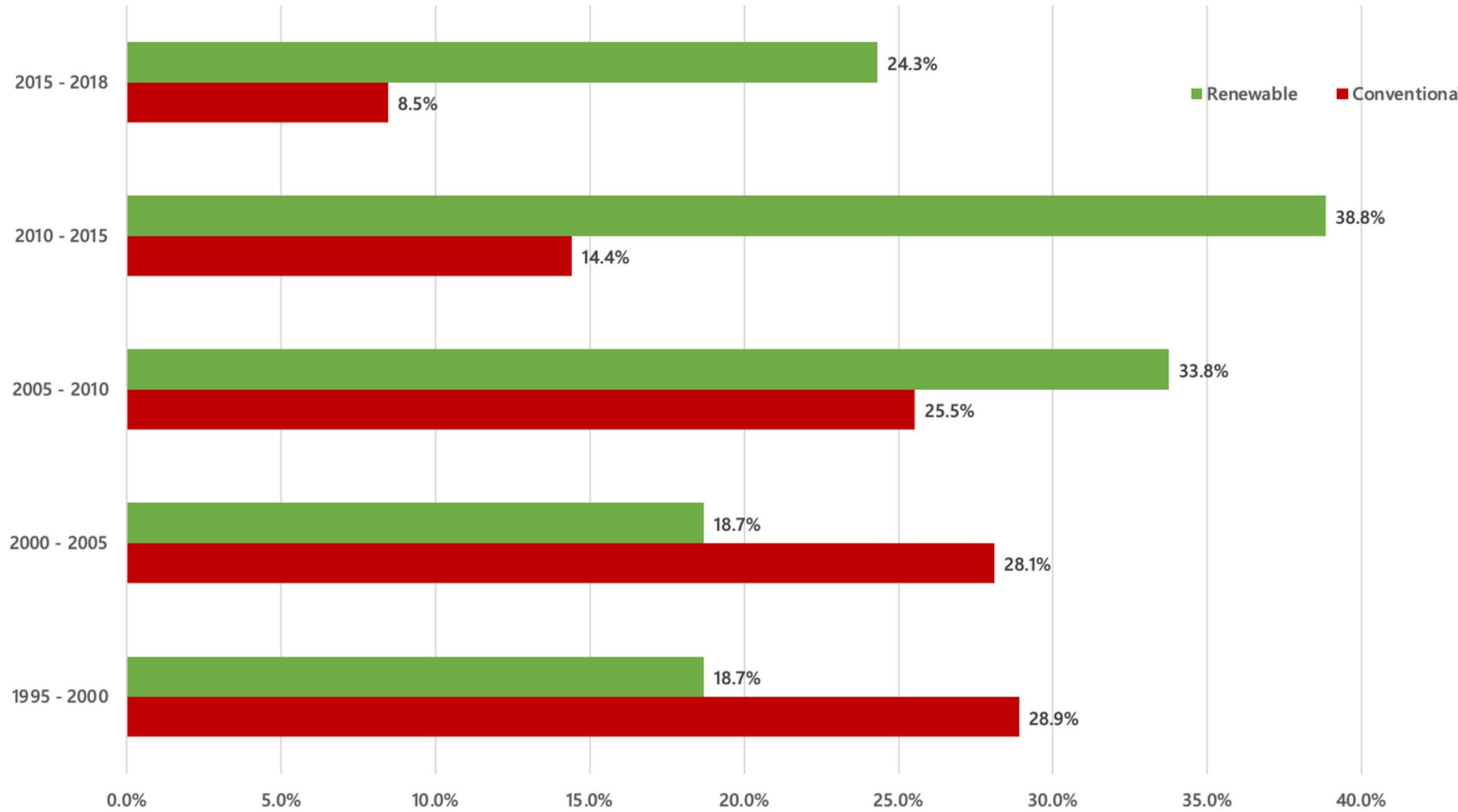


- Renewable energies as source of electricity increased between 2000 and 2018 in ~40%
- Oil production as source of electricity decreased in ~60%
- Nuclear production decreased in about 50%, probably, due to the Fukushima disaster in Japan 2011: Between 2011-2015 Japan stopped producing nuclear energy. Then, returned to produce but in lower volumes.



WORLDWIDE

Electricity generation by source type

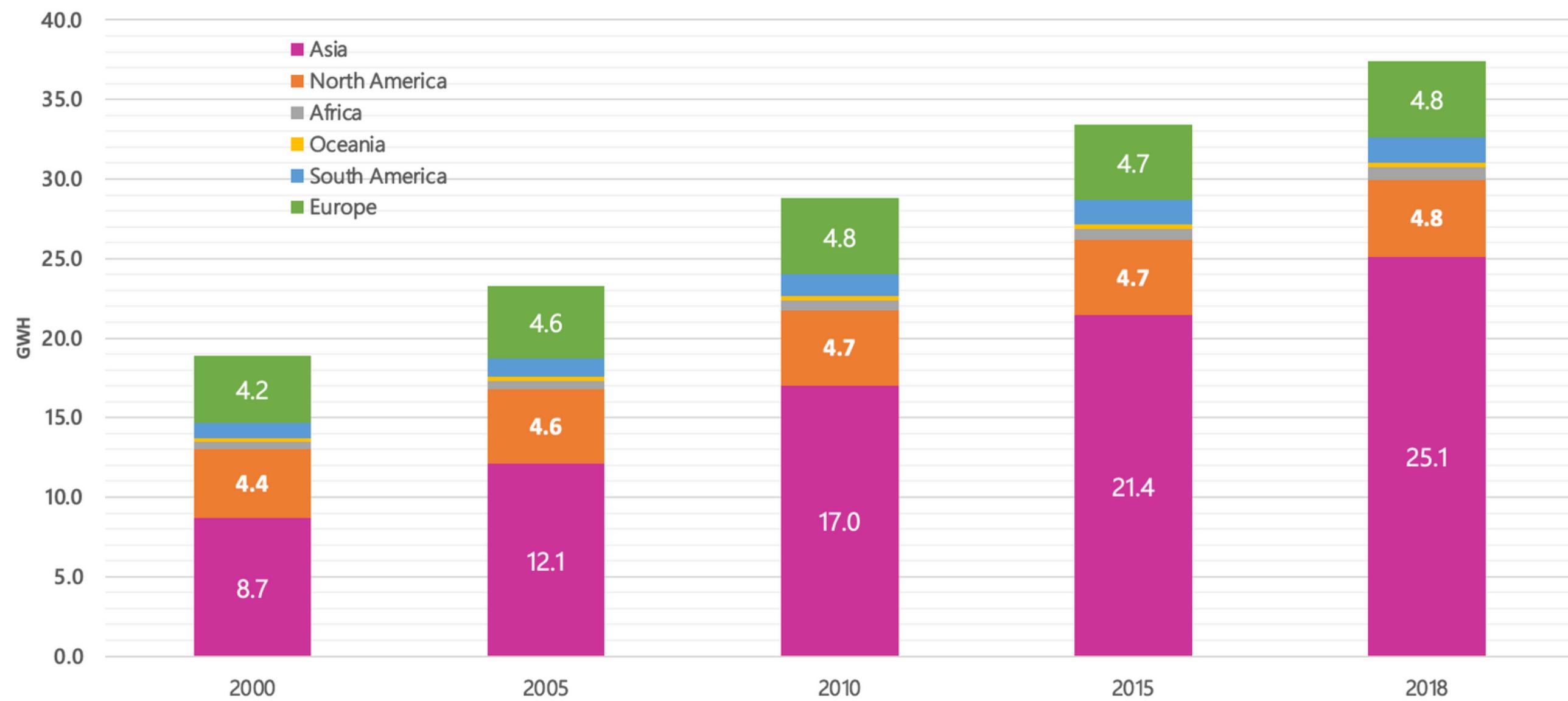


Not only that renewable energies grows over time - Since 2005, consistently, renewable energies as source of electricity generation, grows faster than conventional energies.



CONTINENTS

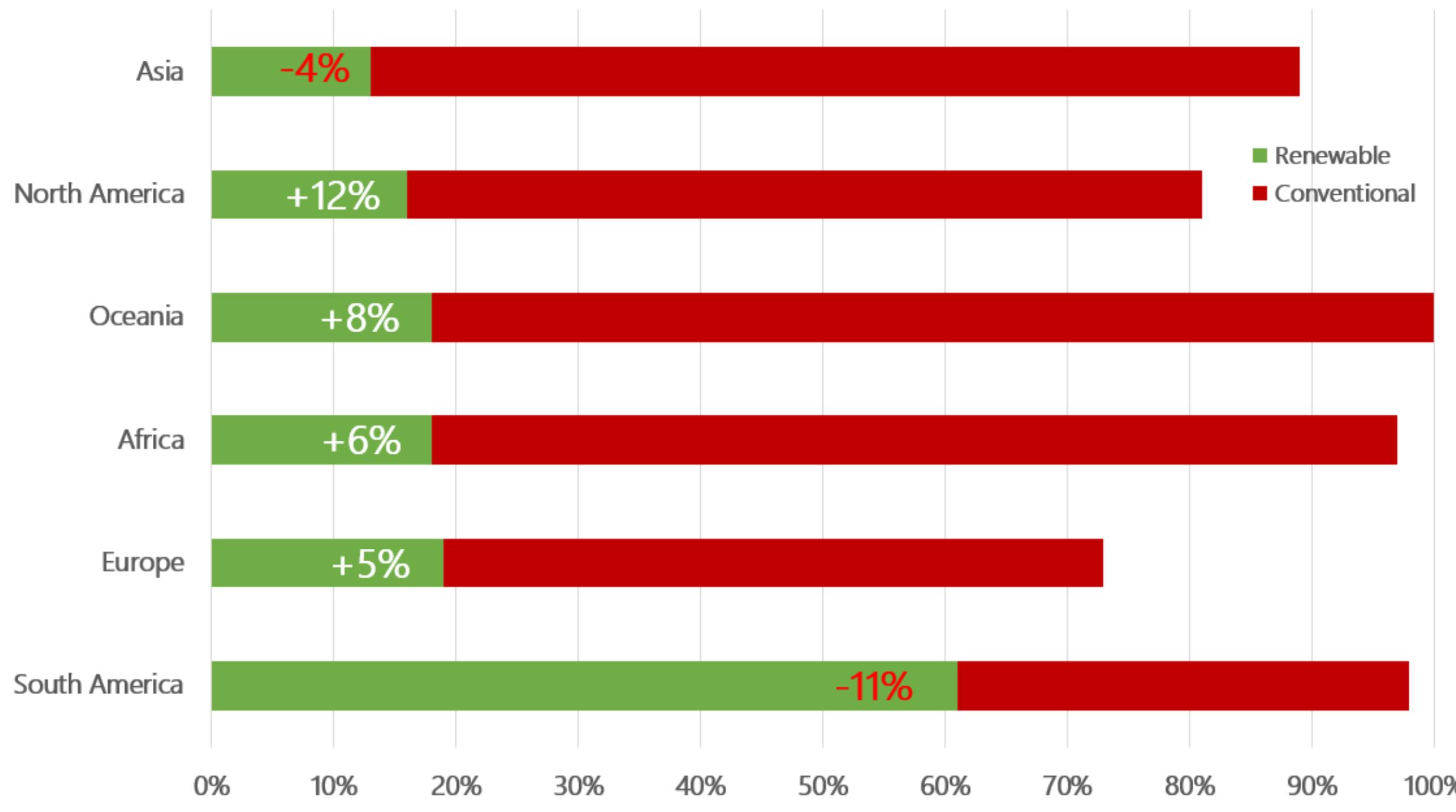
Electricity generation



- In most continents electricity production stays steady over time. Although, population is growing.
- Asia present a sharp increase in production - 30% in average each five years.
 - Strong economic growth is driving electricity demand in most countries in Asia from 90th to these days.

CONTINENTS

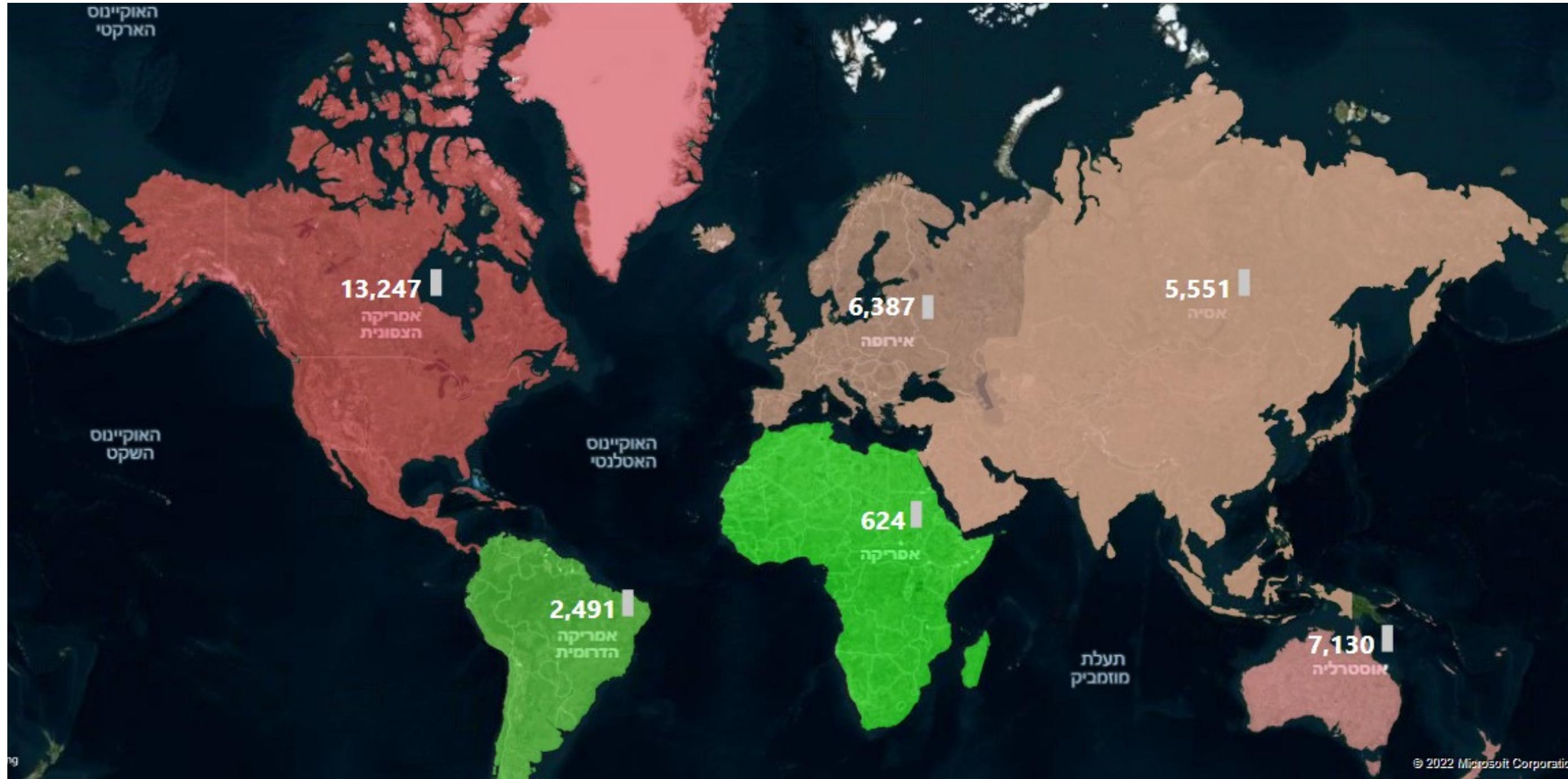
Electricity generation by source type in 2000 & The change in 2018



- North America, Oceania, Africa & Europe perform increase in renewable energies as source of electricity.
- In Asia, Saudi Arabia & Qatar both are major oil producers - with more than 13% from total oil world production.
- In South America, Brazil & Mexico also major oil producers, with 10% from total oil world production.

CONTINENTS

Annually kwh per capita
(2018)

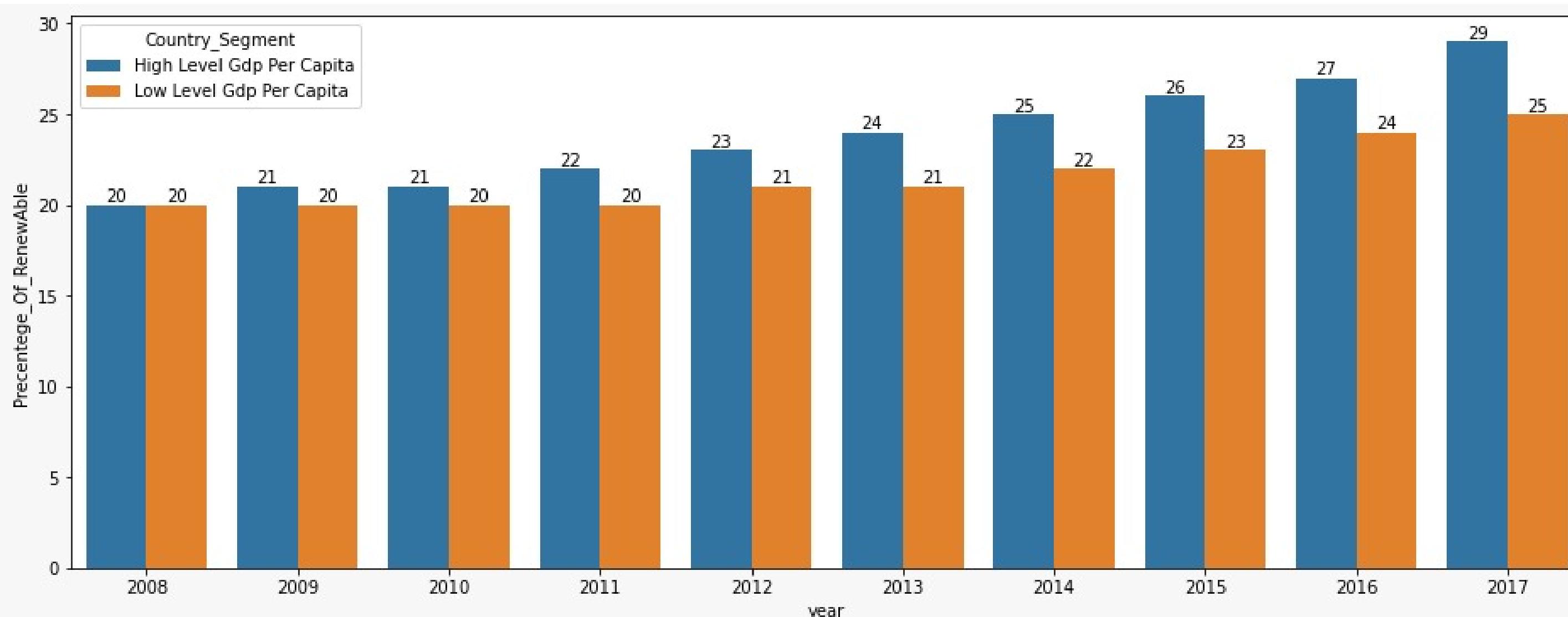


- North America & Oceania with high level of electricity generation per capita. Means, the standard of living is high and relatively, there is a massive use in advanced technologies which consume more energy.
- On the other side, South America and Africa with low level of electricity per capita. Means, there is a positive correlation between standard of living and electricity generation per capita.

In 2018 Israel produced approximately 8,000 kWh per capita

CONTINENTS

Correlation between annually GDP per capita (\$) & renewable energies as source of electricity generation

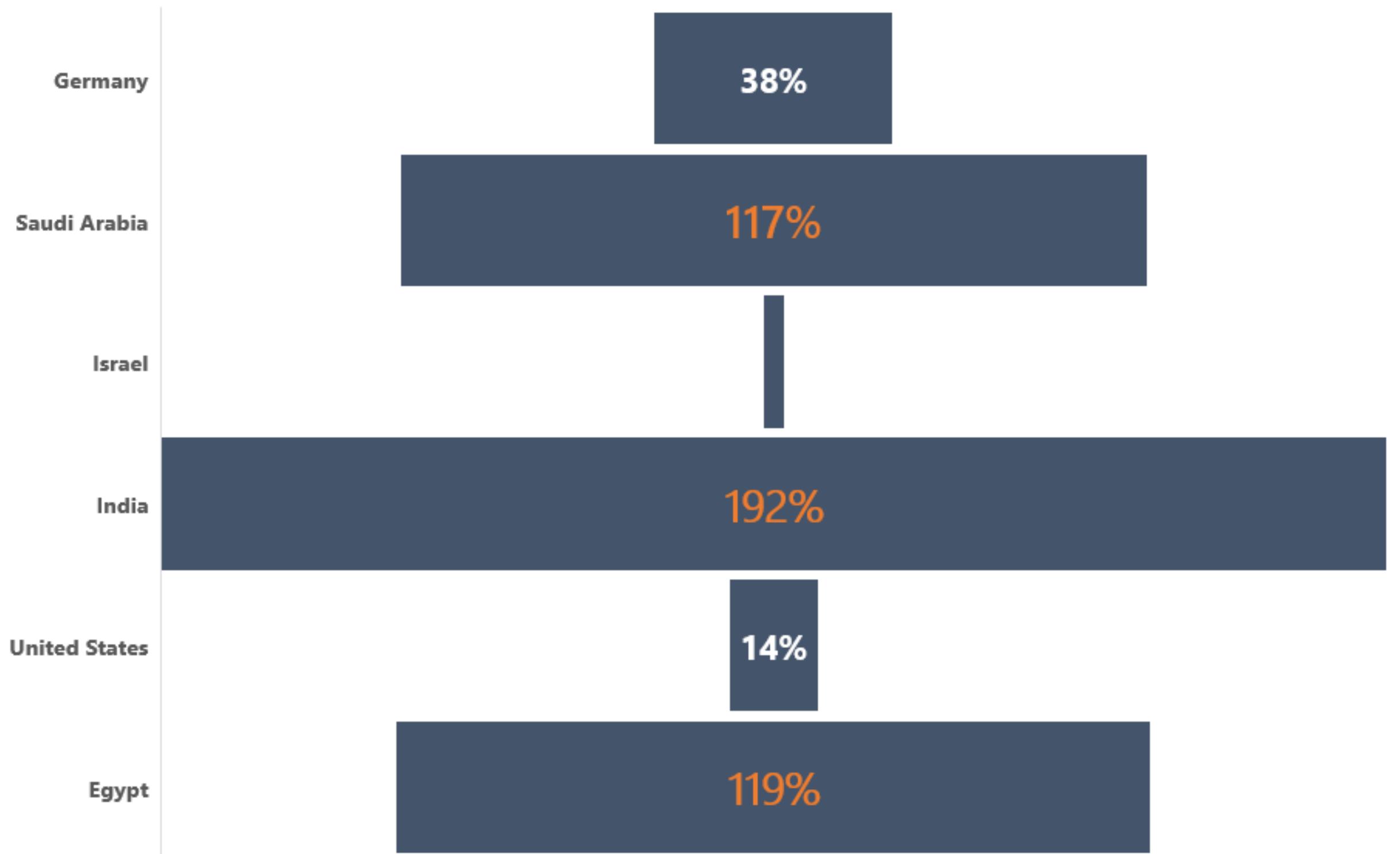


Thresholds:

- High level of GDP per capita is above 30,000 \$ per capita.
- Low level - below 30,000 \$ per capita.
- There is a positive correlation between high level of GDP per capita & renewable energies production.
- Affluent countries generate more renewable energies and produce more electricity per capita.

COUNTRIES

Change rate in GDP per capita - 2000 vs 2018



- We examined the variance in GDP per capita in 2000 vs 2008 as an indicator to developed and not developed countries.
- Saudi Arabia, India & Egypt present more than 100% increase in GDP per capita. Indeed, these countries prospered economically, very sharply during the years examined.

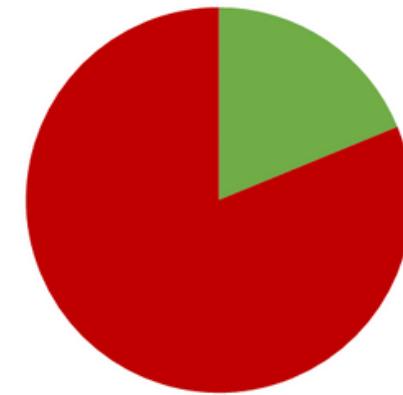


COUNTRIES

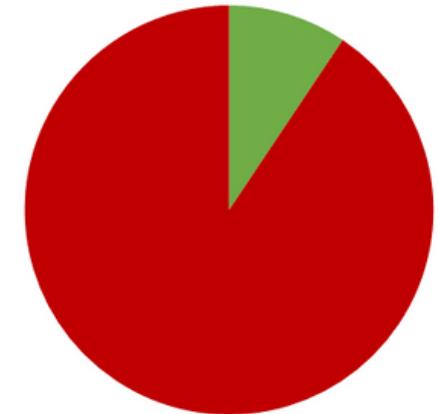
Electricity generation by source type

2000

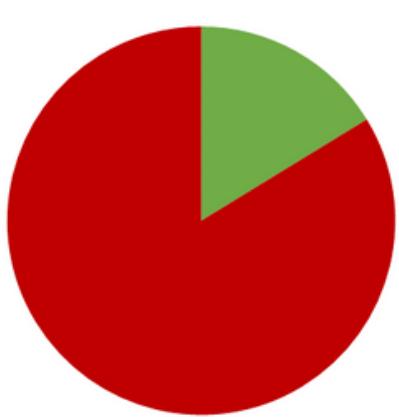
Egypt



Germany

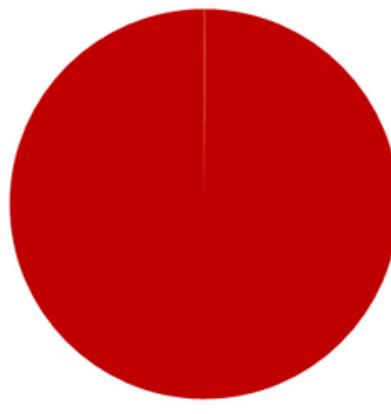


India

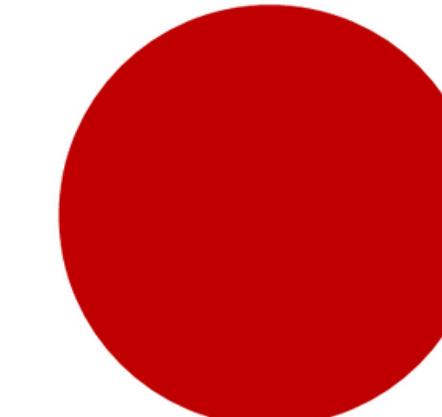


Renewable
Conventional

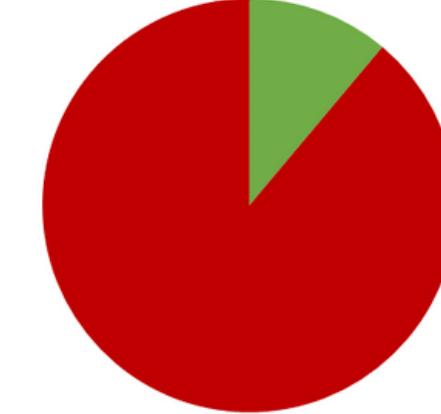
Israel



Saudi Arabia

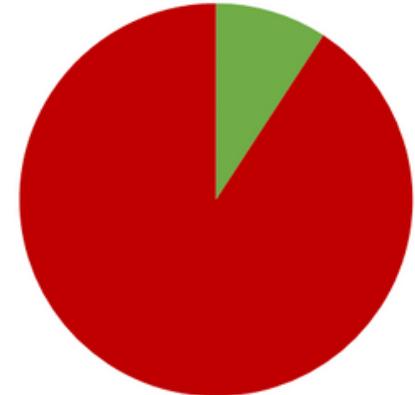


United States

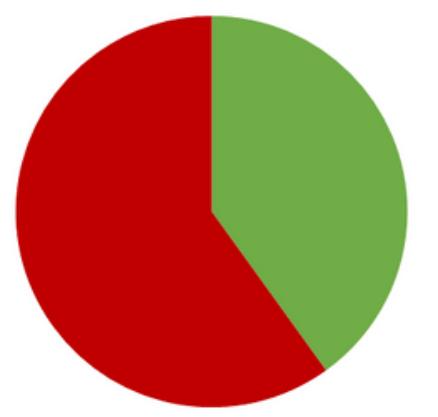


2018

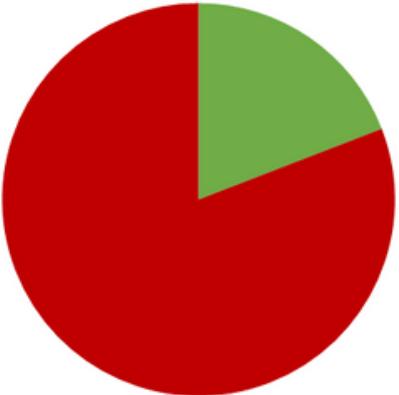
Egypt



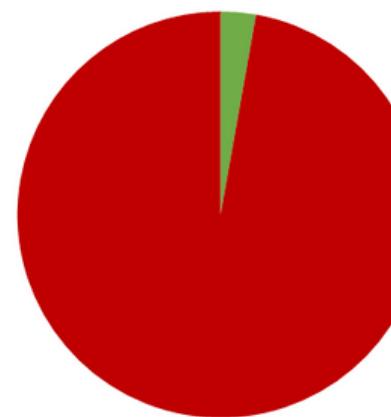
Germany



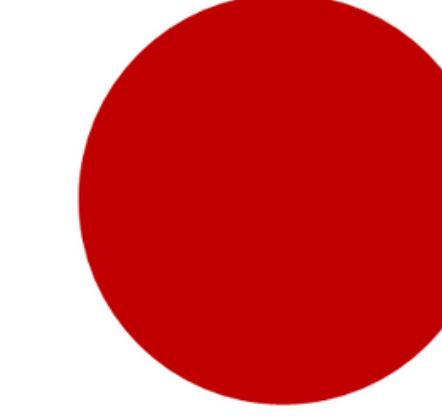
India



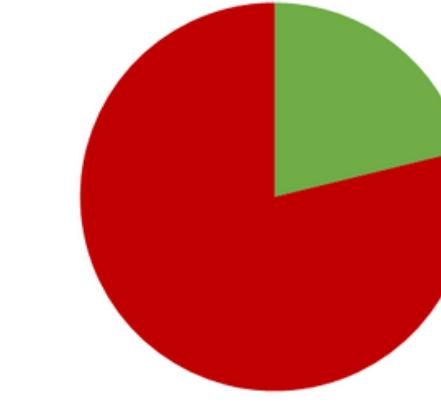
Israel



Saudi Arabia

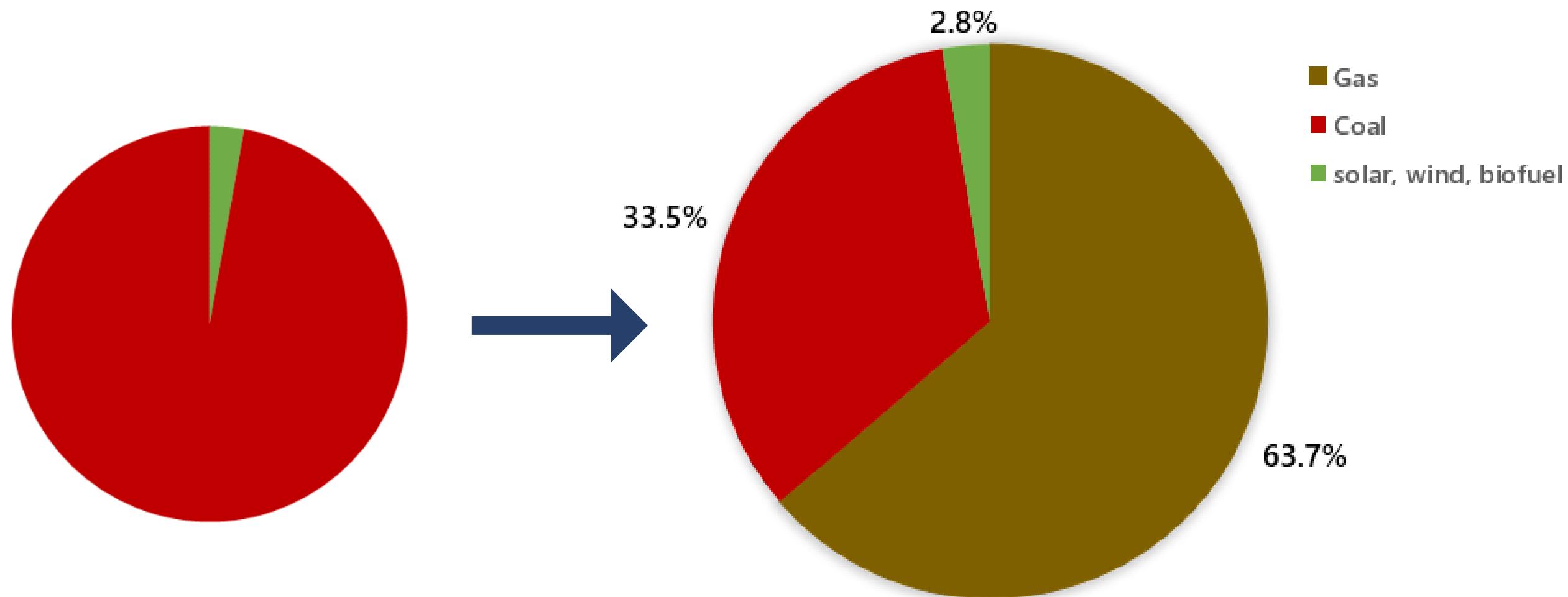


United States



COUNTRIES

Israel - Micro view 2018



- Israel relays mainly on natural gas as source of electricity generation (63.7%)
- Another significant source is coal with more than 30% from total production
- The national targets for electricity production from renewable energies signed by Israel are 30% by 2030
- In 2018 renewable energies was less than 3% from total electricity production.

At the current growth rate, will Israel achieve the national goal sets? What will it take for that?



KEY INSIGHTS



The world is moving towards cleaner, low-emission energies as source of electricity generation

Disasters such as the Fukushima in Japan can change dramatically the world production map.

There is a positive correlation among countries between standard of living and renewable energies production

Israel is with high level of kWh per capita - 8,000 kWh annually

The largest oil producers in the world increase the rate of crude oil production year by year

For now, Israel is still far from achieving the national target for 2030 regarding renewable energies. Overall, Israel is moving toward, as for other countries