We are *not on track* to meet the Paris Agreement's objectives. What should we do?

World Energy Markets
Observatory 2024 | 26th Edition

Capgemini

IN COLLABORATION WITH

Hogan Lovells | vaasaETT | Enerdata

10

Electricity Consumption is not *rising* as predicted in Europe

COLETTE LEWINER
Energy & Utilities Expert

Colette Lewiner is a worldwide Energy expert with more than 40 years of experience, and deep knowledge from industrial operations, IT consulting and Companies management and governance. She is also an Independent Director on boards of public or private Companies.

Key Points

1. Net zero Carbon scenarios forecast a very significant increase in electricity consumption
2. This will result in an increased electricity percentage in the energy mix.
3. In addition, new large electricity needs will arise from the Artificial Intelligence development
4. In contradiction with above, electricity consumption in Europe in 2023 was lower than in previous years.
5. The article below analyses this phenomenon and concludes that the energy transition is lagging

Introduction

All the net-zero-carbon scenarios for 2050 forecast a very significant increase in electricity consumption, which is set to quadruple in 30 years.

To combat the growth in greenhouse gas emissions linked to energy consumption, the growth in energy demand has to be limited and fossil fuels must be replaced by renewable electricity (hydro, solar and wind) and low-carbon nuclear electricity. The overall result is an increased electricity percentage in the energy mix.

In addition, the technological transition will involve massive use of data needed to develop artificial intelligence, and in particular generative artificial intelligence. The increase in the number of data centres needed to process this data will result in a sharp rise in electricity consumption.

However, electricity consumption in Europe in 2023 was lower than in previous years!

This is in contradiction with the forecasts described above.

The article below analyses this phenomenon and concludes that the energy transition is lagging.

This is confirmed by the low growth, over the last twenty years, of the electricity penetration rate in total energy consumption in Europe and North America.

France: Electricity consumption

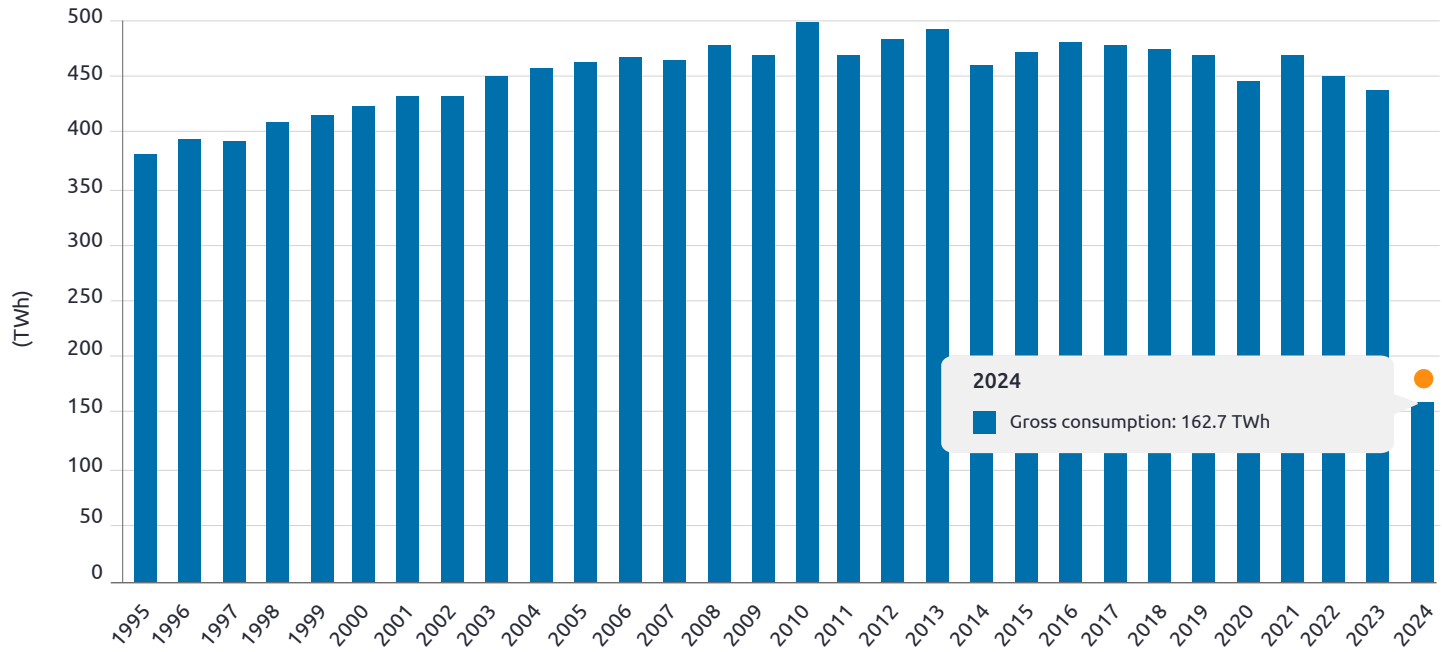
In 2023, electricity consumption in France, corrected for temperature effects, was equal to that of 2007.

This is contrary to forecasts which estimate that global electricity consumption would increase by a factor of four by 2050.

This drop in consumption is linked, on the one hand, to the persistence of individual behaviors to control electricity consumption initiated in 2022 under the pressure of very high prices and fears about the security of electricity supply (see WEMO 2023). On the other hand, the French economy, in general, has been stagnant (growth of 0.9%) and the activity of the industrial sector, which consumes electricity, has decreased slightly.

FIGURE 1

French electricity consumption corrected from temperature effects



As a result, spot electricity prices were negative on certain days and a few nuclear power plants were shut down (for nuclear fuel savings) because they were not needed on the grid.

If this situation persists, the return on investment for the construction of new nuclear power plants will deteriorate.

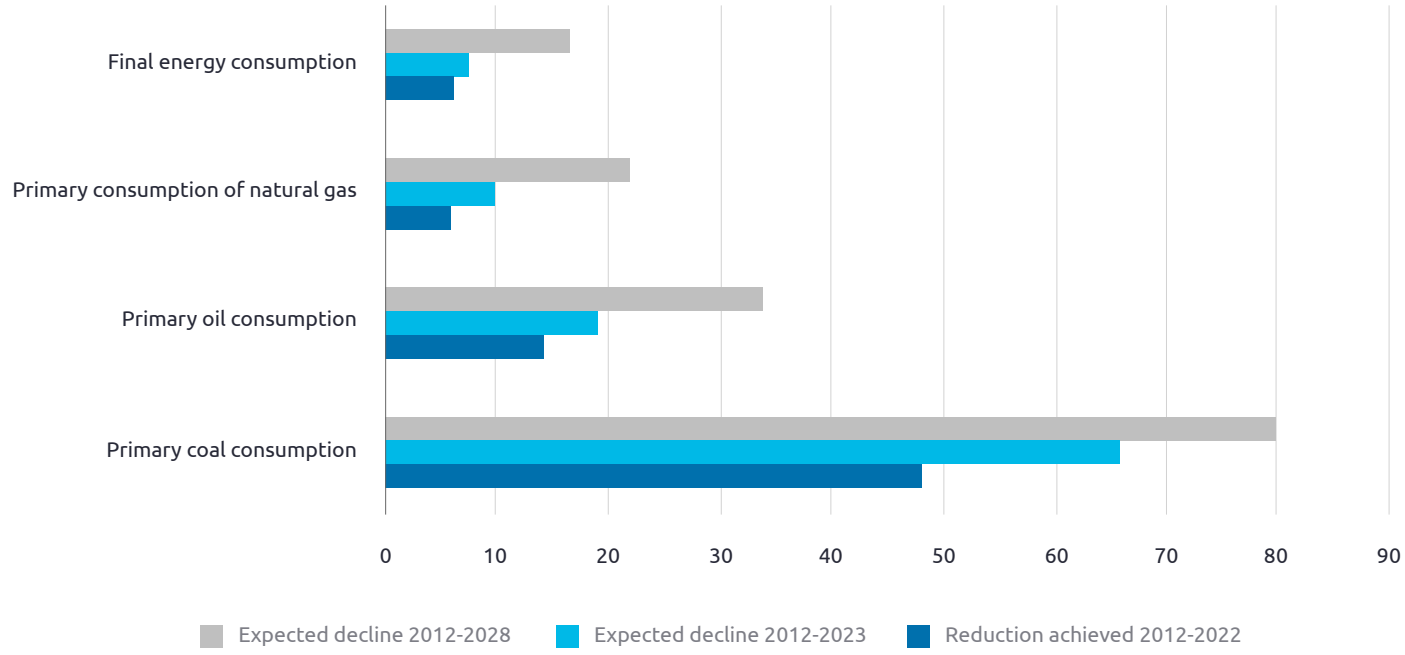
This is, theoretically, also true for wind and solar farms which are, like nuclear electricity, very capital-intensive electricity generation technologies. However, these renewable energies often benefit from subsidies or guaranteed sales prices.

The non-growth in electricity consumption and the stability of the penetration rate of electricity consumption in total energy consumption (see figure 3) reflect a significant delay in achieving the objectives of the energy transition (see figure 2).

For example, certain industrial sectors could be decarbonized by using electricity instead of gas or coal (in ovens, for example). However, this requires heavy investments that manufacturers are hesitant to decide on in periods of low growth and low energy prices.

FIGURE 2

Energy transition perspective



EU electricity consumption

EU electricity demand fell by 3.4% (-94 TWh) in 2023 compared to 2022 and was 6.4% (-186 TWh) lower than 2021 levels (when the energy crisis began). It reached its lowest level in 20 years!

As for France, slowdowns in European economies are mainly accountable for the decrease in demand. The industrial slowdown was responsible for two-thirds of the net reduction in EU electricity demand in 2022.

According to the IEA report[1], overseas subsidies such as those included the U.S. Inflation Reduction Act of 2022 (IRA) and Japan's Green Transformation Policy "are influencing production curtailment, plant closures, and the pausing and diverting of investment."

Rate of electricity in the total energy consumption

The share of electricity consumption in total energy consumption differs between developed and developing countries.

Since electricity production and distribution require significant and capital-intensive infrastructures, the electricity penetration rate is higher in developed countries than in developing countries (see figure 3).

The evolution over the last 20 years shows a very small increase in the share of electricity consumption in total energy consumption in developed countries, such as those in Europe and the United States, and a much stronger increase in developing countries. For example, from 2000 to 2022 this rate increased modestly in Europe from 18.6% to 21.5% and from 19.8% to 22.3% in North America. Meanwhile, in Asia, it increased from 13.6% to 24.2% and from 12.5% to 16.6% in the Middle East. However, during these years this share remained low (around 10%) in Africa.

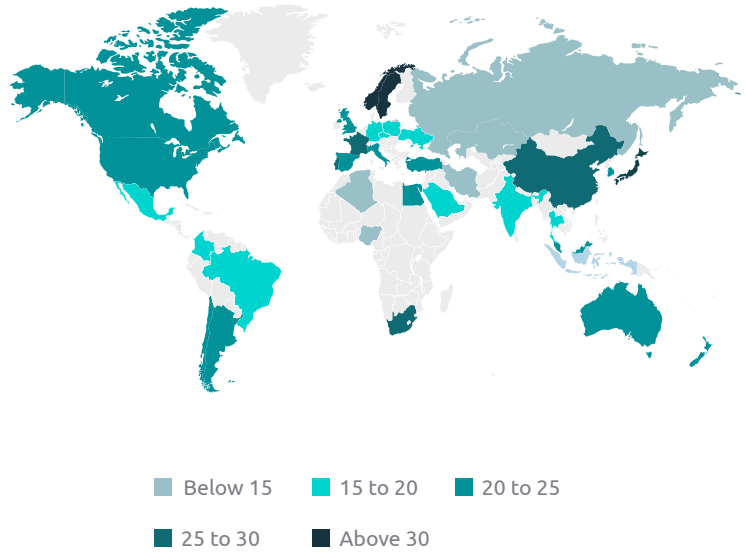
This shows that economic development goes hand in hand with an increase in the electricity penetration rate. Therefore, we can predict that the global increase in electricity consumption will mainly come from developing countries.

Let's hope that this electricity will be produced from clean energy sources. If that is the case, it would be an important decarbonization factor. If not, it would have a very negative impact in the fight against climate change.

FIGURE 3

Share of electricity consumption in total energy consumption by region

Share of electricity in total final energy consumption - 2022



Source: www.enerdata.net

1 IEA...

About Capgemini

Capgemini is a global business and technology transformation partner, helping organizations to accelerate their dual transition to a digital and sustainable world, while creating tangible impact for enterprises and society. It is a responsible and diverse group of 340,000 team members in more than 50 countries. With its strong over 55-year heritage, Capgemini is trusted by its clients to unlock the value of technology to address the entire breadth of their business needs. It delivers end-to-end services and solutions leveraging strengths from strategy and design to engineering, all fueled by its market leading capabilities in AI, cloud and data, combined with its deep industry expertise and partner ecosystem. The Group reported 2023 global revenues of €22.5 billion.

Visit us at

www.capgemini.com/wemo

Scan to download
this year's report

The information contained in this document is proprietary. ©2024 Capgemini. All rights reserved.

Capgemini