Climate Change and COVID-19: Complexity and New Challenges

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Abstract

The aim of this note is twofold. First, we analyze the challenges of climate change in the context of COVID-19. We then discuss the ongoing measures being taken by policymakers to reduce and combat the risks related to climate change. Our analysis suggests that fossil fuels still constitute a major source of energy, the main cause of high carbon dioxide (CO2) emissions. Several decisions need to be taken to reduce fossil fuel-intensive production and to replace it by alternative forms of energy production with more intensive use of renewable energy resources. This energy transition requires the actions of a range of actors (consumers, stakeholders, firms, regulators, policymakers, etc.).

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Climate change has become a serious reality and an increasingly urgent issue (uncontrolled fires in Australia, fires in San Francisco, multiple and repeated hurricanes in the US, etc.). Indeed, as the world heats up, it has led to many more warnings about the need for change and immediate measures to reverse the trend. However, despite ongoing efforts to reduce carbon dioxide (CO2) emissions, and the drive to introduce new, less fossil-fuel intensive technologies and renewable energies, there is still widespread use of fossil fuels and coal in key industries in developed and emerging countries that remains a major source of carbon emissions (Figure 1).

From Figure 1, we can see that among all carbon-based energies, oil is by far the largest emitter of C02 into the atmosphere.

In this context, several meetings and discussions (COP21, COP26, G20 meetings, etc.) have attempted to extract ongoing and perfectible commitments to change or to reform current production models, giving rise to a number of promises and encouraging signals, despite the lack of international coordination between authorities and policymakers (the US with the Trump administration, India, China, etc.).

However, the recent coronavirus pandemic or COVID-19 health crisis has hampered this effort to tackle climate change. Indeed, COVID-19 seems to have had both positive and negative impacts on the change process. What are the main challenges? What are the opportunities? Which post-COVID-19 rules are expected to inform efforts to tackle climate change?

1. An overview of CO2 emissions and sources of climate change

Oil has been an important production factor and oil-economy relationship has evolved over the time (Jawadi, 2019). However, this was not costless and its impact on climate change is becoming increasingly evident. The consumption of fossil fuels, in particular, has had a decisive impact on the production and emission of carbon dioxide (CO2) into the atmosphere. Greenhouse gases include carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O), all naturally occurring and resulting from human activity. The main pollutants are nitrogen oxide, sulfur dioxide, carbon monoxide and total unburned hydrocarbons. These forms of CO2 emissions that rise into the atmosphere are more

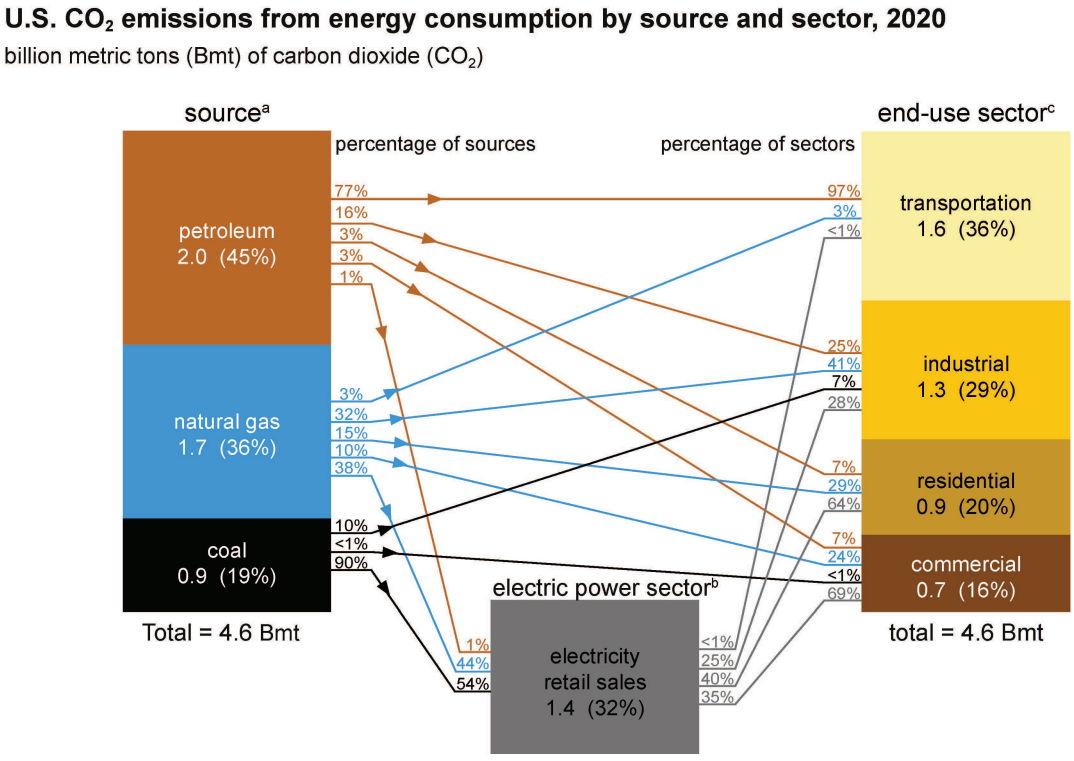

Figure 1: Overview of CO2 emissions

Source: EIA https://www.eia.gov/energyexplained/energy-and-the-environment/where-greenhouse-gases-come-from.php

apparent in developed and large emerging economies, as shown in Figure 2.

To better characterize this phenomenon of CO2 emissions, it is important to recall that the technology currently applied to produce oil and gas from various facilities results in two main types of gas emissions, namely:

- Flue gases, consisting of carbon dioxides and minor amounts of carbon monoxide, nitrous oxide, N2O, SO2, and unburned hydrocarbons (methane and volatile organic compounds (VOCs)).
- Hydrocarbons, consisting of methane and primarily aliphatic VOCs emitted into the atmosphere or escaping from hydrocarbon processes through fugitive emissions.

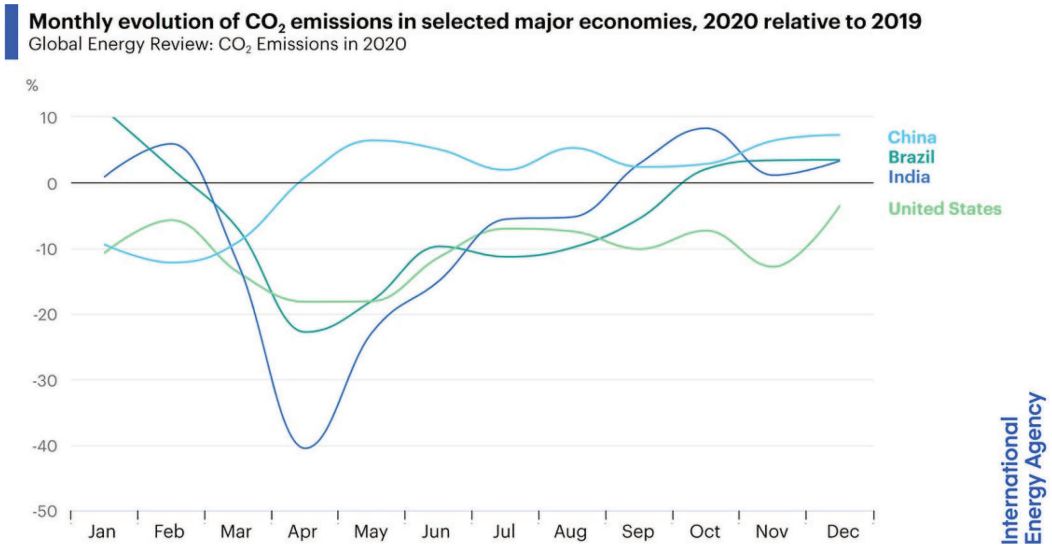

Figure 2: Evolution of CO2 in large economies

Source: https://www.iea.org/news/after-steep-drop-in-early-2020-global-carbon-dioxide-emissions-have-rebounded-strongly

According to Masnadi et al. (2018), the production, transportation and refining of crude oil into fuels such as gasoline and diesel accounts for ~15-40% of the lifecycle of GHG emissions of fuels transportation. It is thus critical to reduce emissions from oil production.

Despite the advent of electric cars, the still largely thermal vehicle fleet is almost entirely dependent on liquid petroleum products and there are limited prospects in the short term for the substitution of many of the uses of petroleum (e.g., electricity generation).

It should also be noted that, again according to this report, despite investment to improve efficiency, energy intensive oil and gas extraction in OECD countries increased by about 33% between 1980 and 2018.

Finally, the climate impact of conventional oil extraction is increasing as oil fields age due to reservoir depletion. Indeed, in the United States, the oil and gas sector is the second largest fixed sector emitter of greenhouse gases. In other fossil fuel exporting countries, such as Russia, Norway and Canada, over 20% of all national GHG emissions come from the oil and gas sector.

Generally speaking, four main sources contribute to CO2 emissions from the oil and gas industry:

- Engine, turbine and heater exhaust.
- Gas flaring.
- Well testing.
- Other carbon emissions such as CO2 from enhanced oil recovery operations.

Further, due to the lack of pipelines and gas processing facilities, up to 30% of the gas produced is flared or used to (directly) fuel hydraulically driven equipment that then vents the gas into the atmosphere.

For hydrocarbons, methane and volatile organic compounds (VOCs) are emitted from multiple sources: unburned fuel gas and diesel, tank emissions without a vapor recovery unit, offshore loading, venting, fugitive emissions (leaks and spills), gas flaring and well testing.

2. A complex climate change-COVID-19 relationship

The relationship between climate change and COVID-19 is serious and complex. Indeed, COVID-19 had a positive then negative impact on climate change. The positive impact was most likely due to reductions in production and the lockdown restrictions imposed by several governments in March-May 2020. Both impacted traffic across the world that lowered CO2 emissions to relatively low levels as traffic slowed down (see Figure 2). However, the positive effect was quite short lived as the vaccine and subsequent return to more or less normal life led to intense fossil energy production as industries tried to catch up on the pandemic-induced slowdown, particularly in India, China, Brazil and the US, while CO2 emissions again reached high levels. Further, during the pandemic and lockdown, many people adopted teleworking, which led to greater use of energy, electricity, etc. Thus, the climate change-COVID-19 relationship is clearly complex and ambiguous.

3. Climate change policies in the aftermath COVID-19

To enable people to live in a safe and clean environment, more policies and rules are required to reduce global CO2 emissions. It is now more necessary than ever to substitute fossil fuels by sources of low-carbon, renewable energy. Accordingly, decarbonizing policies are needed, involving higher taxes on pollution coupled with subsidies for the intensive production of alternative energy sources. Despite the economic recession induced by COVID-19, the challenge is to adopt safer,

more sustainable and economic renewable energy sources through more nuclear power for example, recycling innovations, and hybrid systems.

Obviously, pursuing search in renewable energy sources is essential. However, global governance and efficient coordination across major developed and emerging countries is also crucial to achieve the requisite transformation of our energy system and the energy transition needed. Indeed, the environment belongs to us all and we are all responsible and important actors (consumers, regulators, firms, investors, policy-makers, etc.). Of course, the conclusion of the COP26 meeting that enabled 196 countries to come to a common commitment is ambitious (keeping global warming under 2° by 2100; the commitment of 120 countries to stop deforestation by 2030; the promise by 100 countries to reduce the carbon dioxide (CO2) emissions by 2030; the decision of 40 countries, including Poland, Chili and Vietnam, to give up carbon, etc.). Further, the commitment of large cities and states to limit or stop the circulation and sale of fossil fuel-intensive cars is a key step. The agreement signed by 39 countries to stop public funding for fossil fuel projects by 2022 is a promising and much needed measure, especially if said funding is used instead for renewable energy projects and clean technologies.

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