Power generation from renewable sources in Brazil has declined over the past 15 years. Renewable sources generated 84% of all electricity in 2001 but this share has fallen to 74% in 2015. Fossil fuels have increased their share, with thermal power plants fueled by natural gas and coal. Furthermore, grid losses increased from 14% (2001) to 17% (2015) of all electricity produced in the country.

The Brazilian electricity matrix is still relatively low carbon compared to the world average, with 78% of the installed capacity based on renewable sources against 30% worldwide. Large hydropower plants currently represent 61% of the Brazilian grid. However, this share is declining with carbon intensive facilities (natural gas, oil and coal products) growing in importance.

Fossil fuel powered generation increased three-fold from 2001 to 2015 (from 52 TWh to 151 TWh). Within this picture, natural gas had an eight-fold increase in this period, from 10 TWh to 80 TWh.

In this same period, the power from renewable sources grew 56%: 277 TWh in 2001 to 431 TWh in 2015. The largest absolute contribution came from biomass, which grew from 7 TWh to 47 TWh. Wind power, however, was the fastest growing power source, from zero in 2001 to 22 TWh in 2015.

Installed capacity adds up to 152 GW nationwide (May 2017), with an additional 11 GW expected to be added within the next five years. The highest growth rate is expected to come from wind power stations, with an increase of 36% in its installed capacity.

1. From 2001 to 2015, grid losses summed up 1,151 TWh, while the power produced with fossil fuels burn totaled 1,172 TWh.
2. IEA WEO 2016.
3. BEN 2016. Large hydropower represented 91% of installed capacity in 2001.
4. BEN 2016. The data includes public utilities and self-producers.
CHALLENGES FOR THE POWER SECTOR

The Brazilian NDC has various commitments for the power sector. Up to 2030, the country's power matrix might comply with these mandates, but there are concerns regarding the growth in the number of hydropower plants. The NDC requires that they provide around 63% of the electricity consumed in 2030, meaning the need to build new hydropower plants, which is a point of dissent among different stakeholders, especially regarding those in the Amazon Region. This is a conflict that needs to be addressed in the short term.

Another challenge of the post-2030 period is the phase-out of fossil fuel power plants. Fossil fuel plants in Brazil may function for over 50 years. It is usual that old power stations are either refurbished or replaced by new technologies. To plan the power sector to meet the Paris Agreement, Brazil needs to establish now the deadlines to decommission each one of the already existing plants as well as those under construction.

CO2 EMISSIONS FROM POWER GENERATION

The carbon intensity of a power supply is a reliable snapshot of a country's energy matrix. The Brazilian carbon intensity is still low, but it has increased considerably since 2011, as seen in the figure below. This is a worrying trend, as it moves opposite to the rest of the world.

BRAZIL: POWER SECTOR CARBON INTENSITY


WORLD: POWER SECTOR CARBON INTENSITY

Source: IEA WEO 2016.

5. Brazilian Carbon Intensity was 141 gCO2/kWh against 515 gCO2/kWh worldwide, in 2014.
6. For example, to have at least 23% of power generation from non-hydro renewable, such as biomass, solar and wind.
7. This is the case of the Belo Monte Power Plant, on the Xingu River, which is the subject of many legal actions, due to environmental, social and ethnical (indigenous people) impacts and damages.
8. Two of the oldest and operating fossil fuel power plants are located in Rio de Janeiro (Santa Cruz, owned by Furnas/Eletrobras), with 932 MW firstly built in the 60’s, and in São Paulo (Piratininga, owned by EMAE), with 472 MW originally built in the 50’s. Both currently burn natural gas in combined cycle facilities.
9. One example is the research by Instituto Escolhas (Choices Institute), “Impacts of Changes to the Brazilian Electricity Matrix”, available in the form of an iterative platform at escolhas.org.