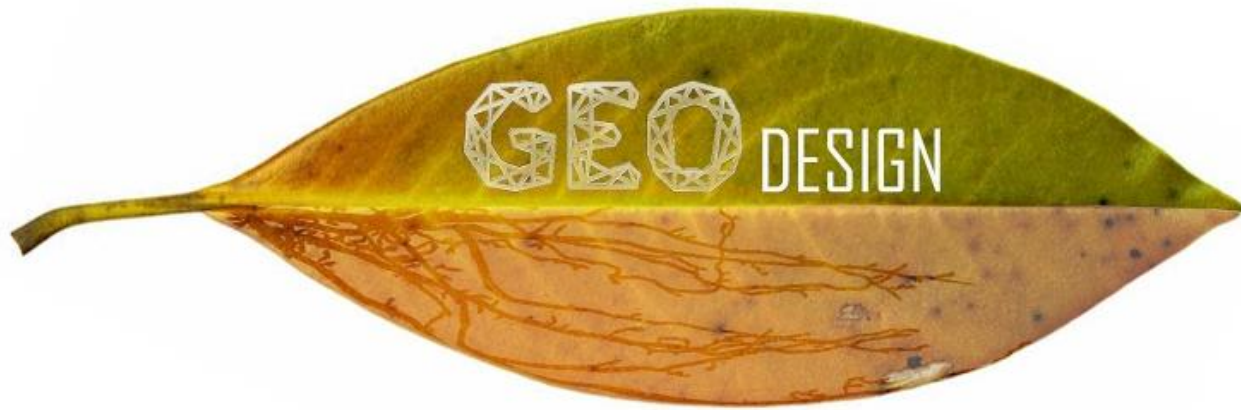


# Brazil

## Presentation 3



*Presented by*  
Ana Flavia Rocha  
Leticia Carvalho

# Brazil's Geography



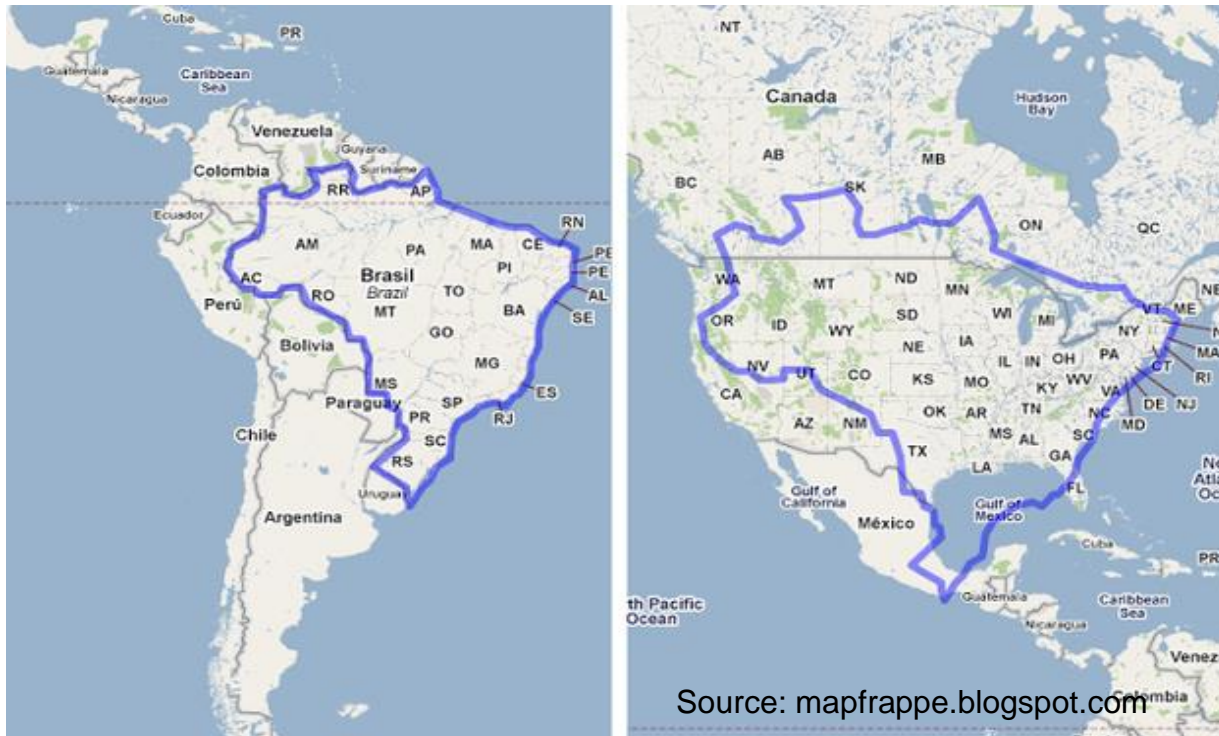
**The biggest watershed in the world is located in Amazon Rainforest area**



# Surface Area Comparison

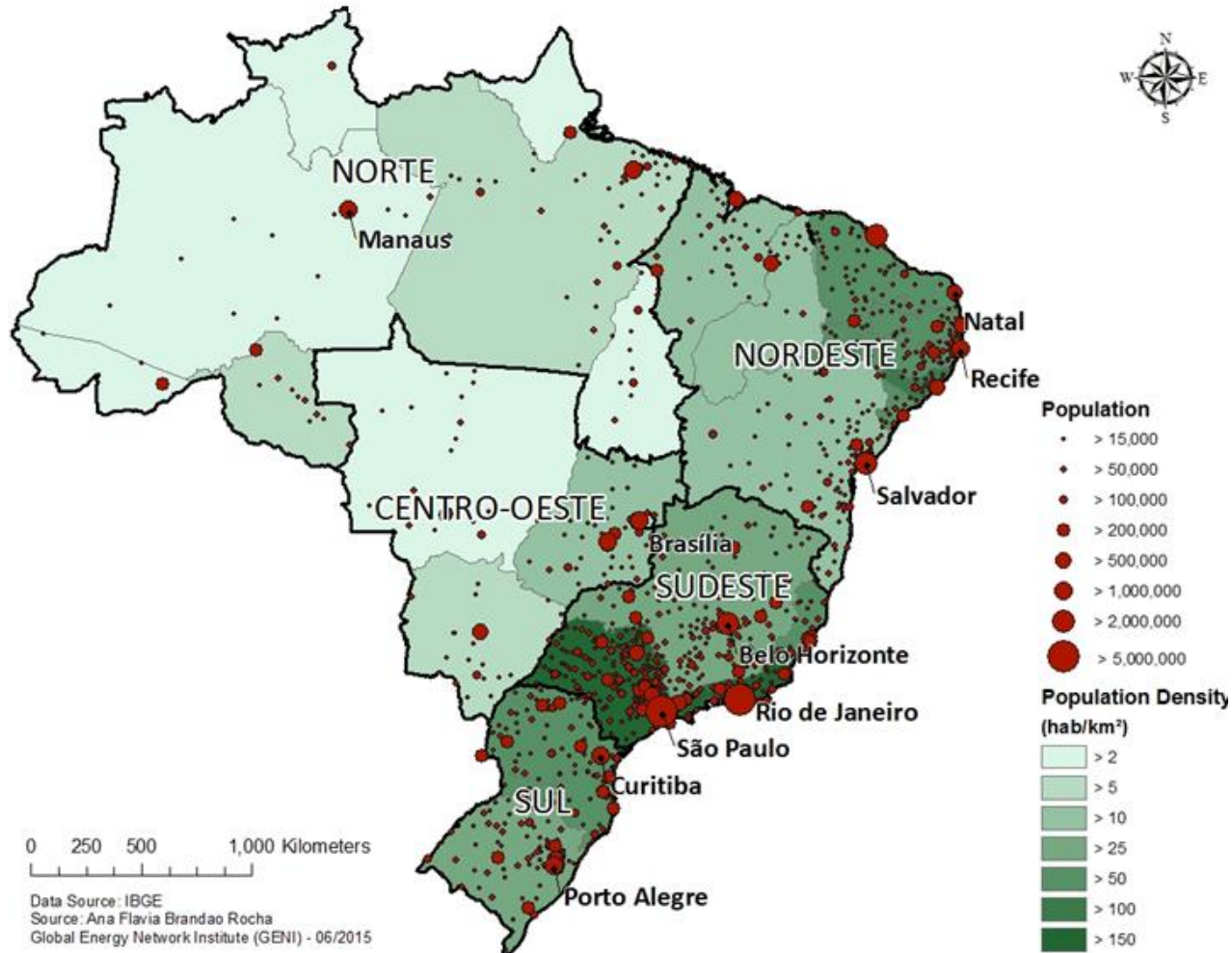
United States ( million sq km)	Around 9.8
Brazil ( million sq km)	Around 9.5

Source: World Bank Data



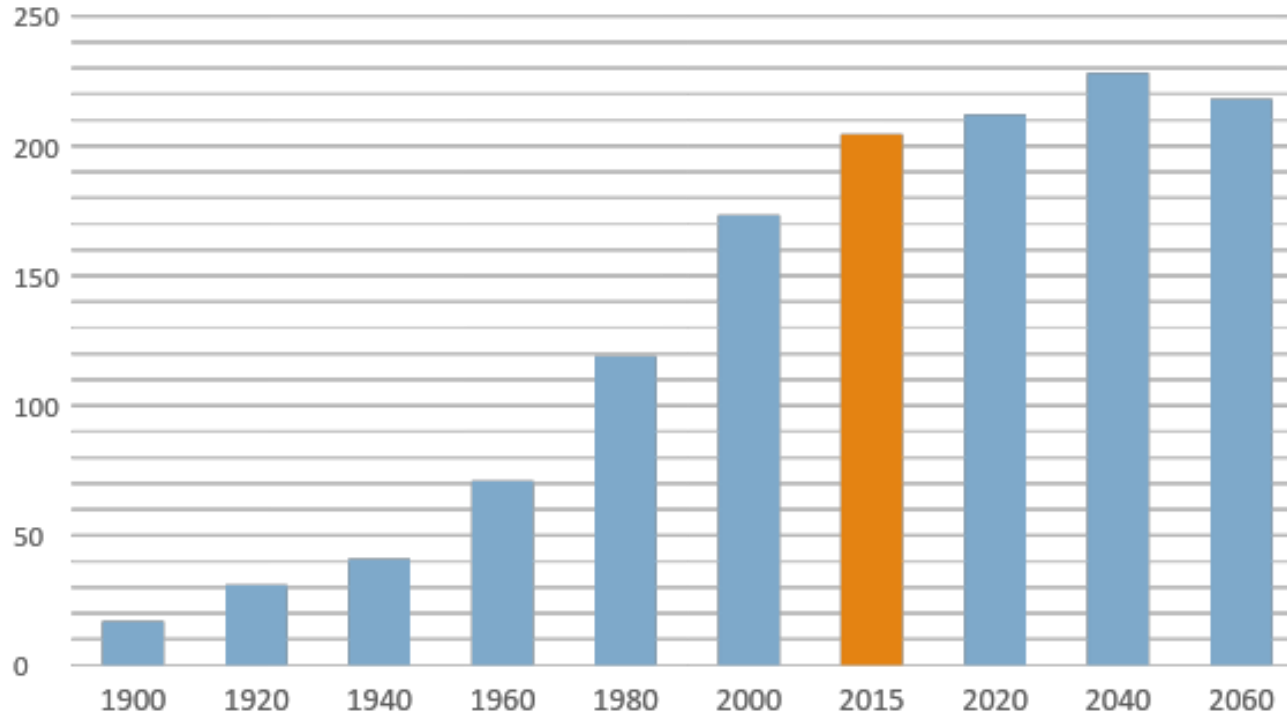
**United States is the third biggest country in the world and Brazil is the fifth**

# Demographics



The majority of the population is located in the Southeast of the country

# Population Growth

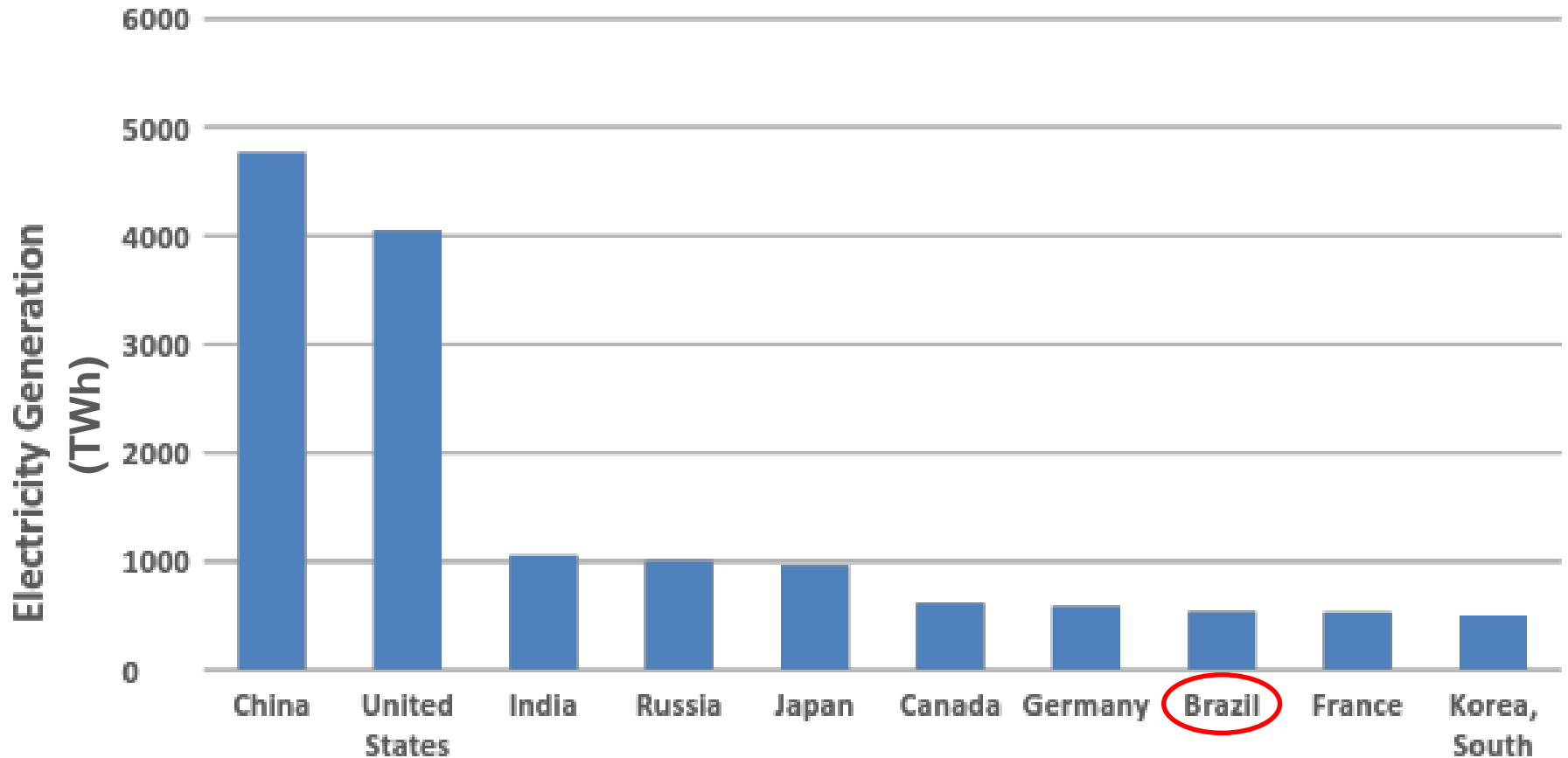


Source: Brazilian Institute of Geography and Statistics (IBGE) - 2013

- By the year of 2050 the Brazilian population will exceed 250 million people.
- In 2014, the population growth rate was 0.86%

# Electricity Net Generation

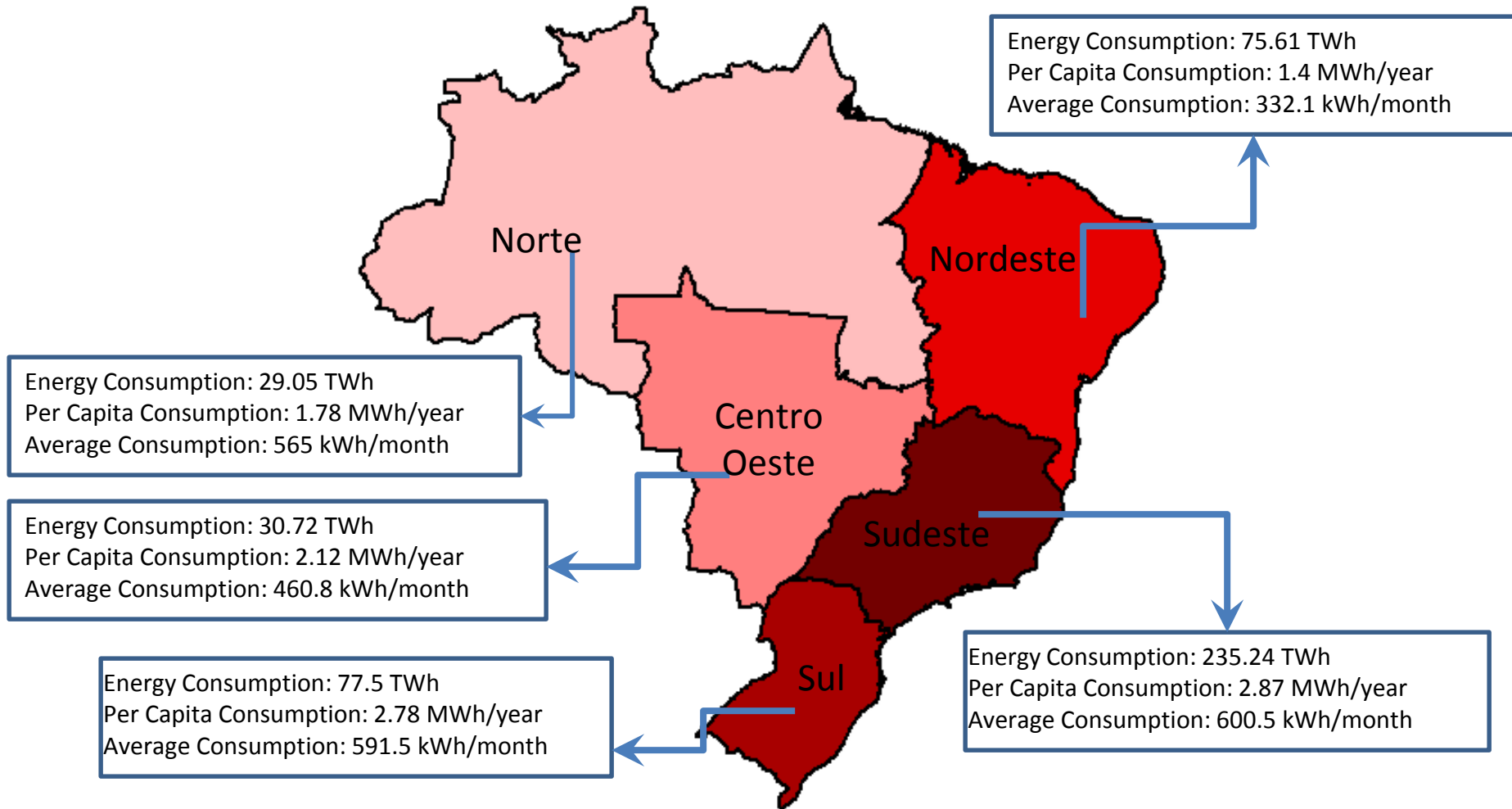
## Top 10 Countries in Electricity Generation



Source: EIA (Energy Information Administration)

**Brazil ranks eighth in total electricity generation at 538 TWh**

# Electricity Consumption per Region

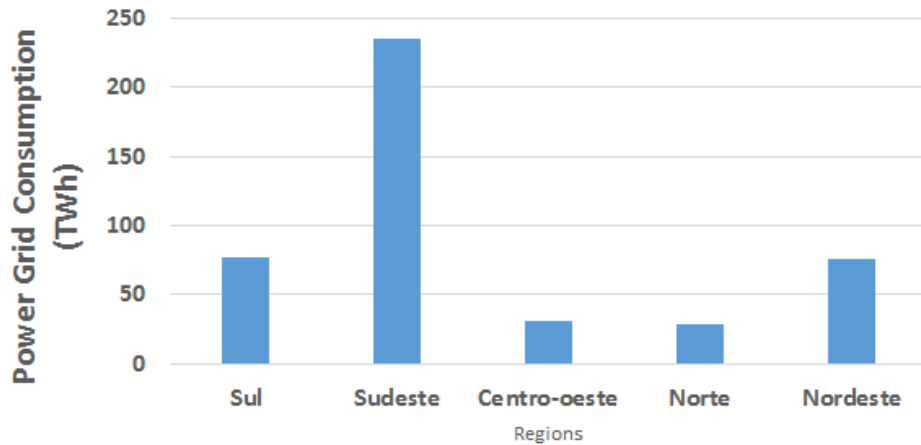


Source: EPE (Empresa de Pesquisa Energética) - 2012

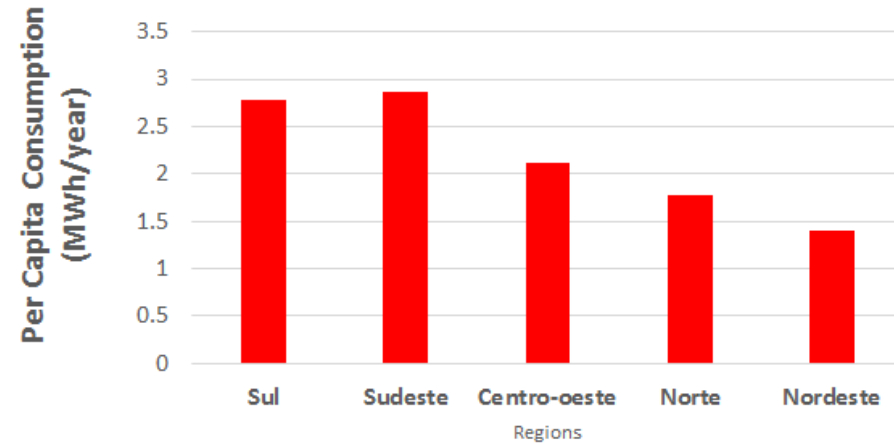


# Electricity Consumption per Region

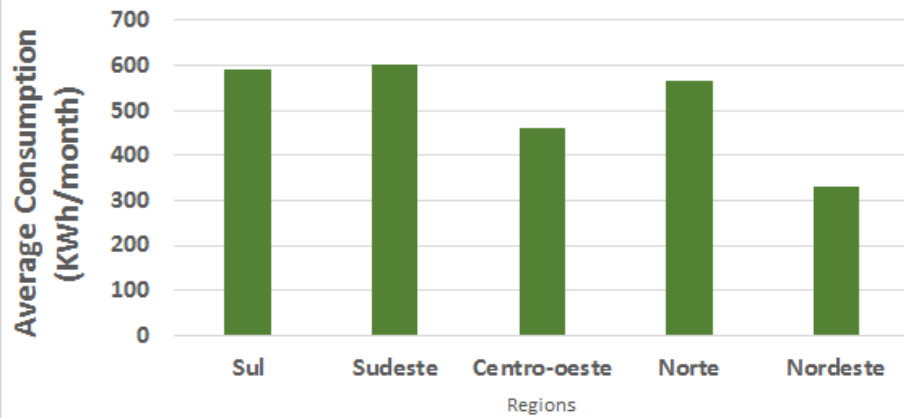
### Energy Consumption



### Per Capita Consumption



### Average Consumption

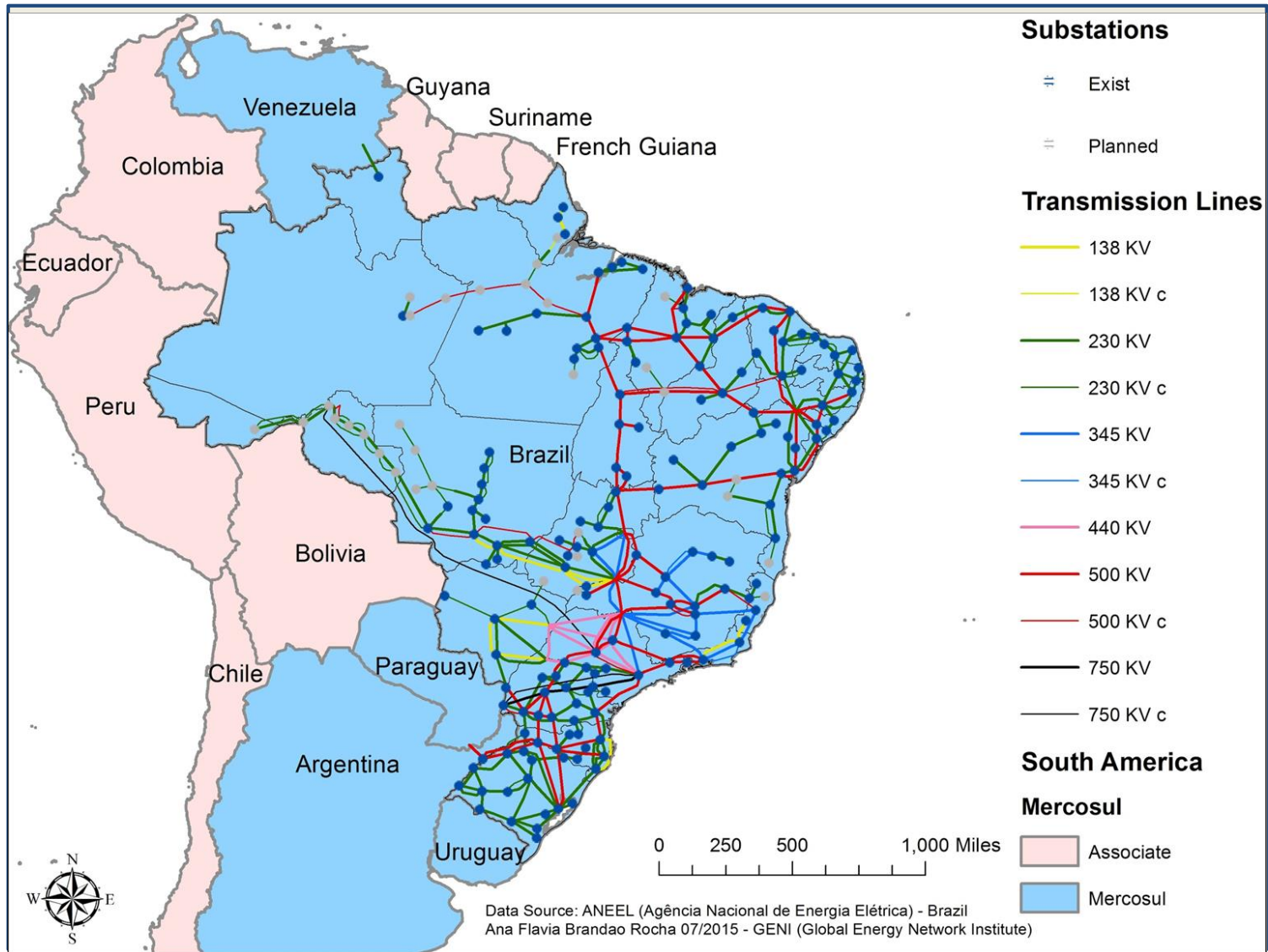


**Southeast Brazil is the highest consumer of electricity in the country**

Source: Source: EPE (Empresa de Pesquisa Energética) - 2012

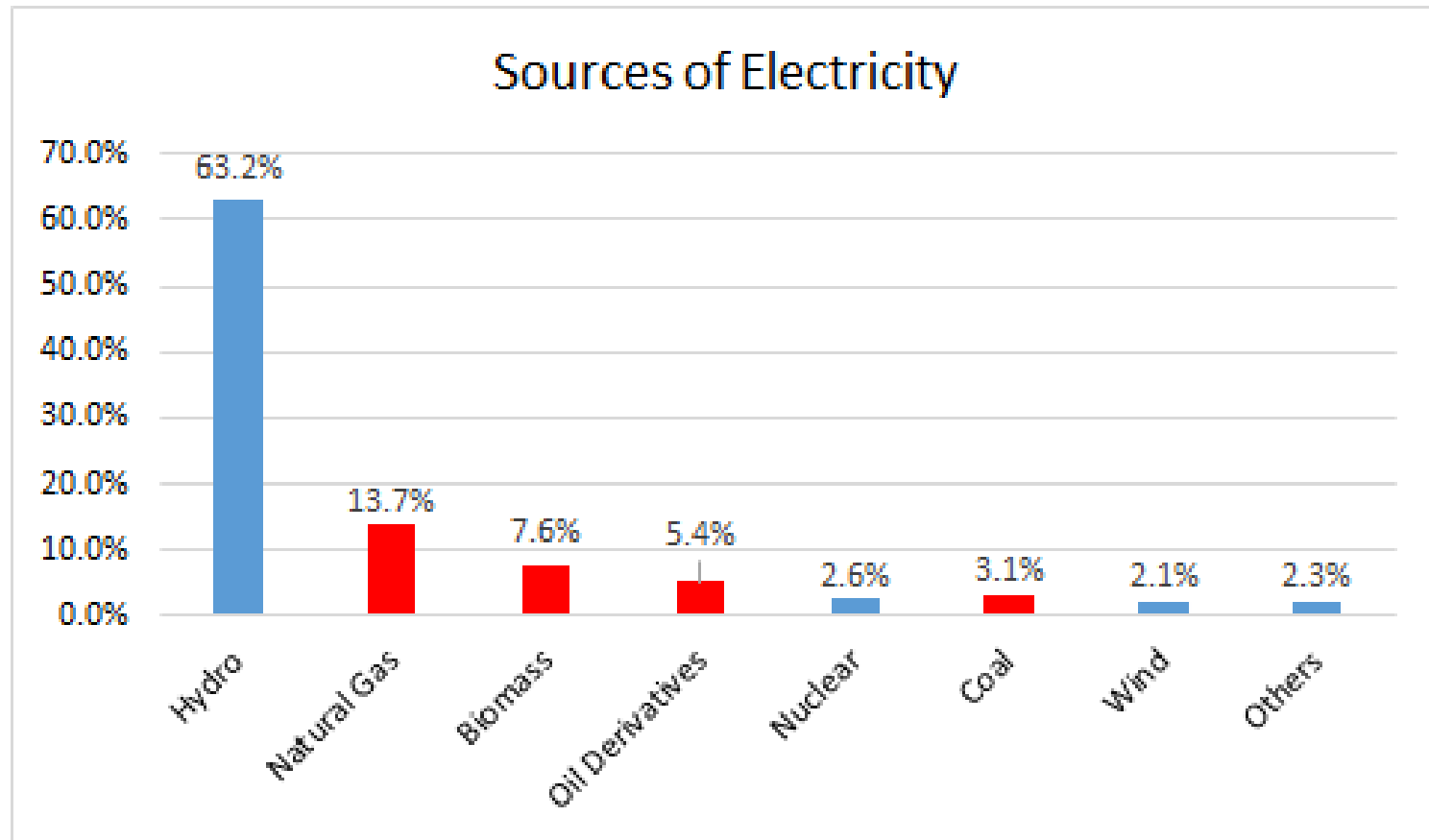


# Transmission Lines



**Interconnected National Transmission Network**

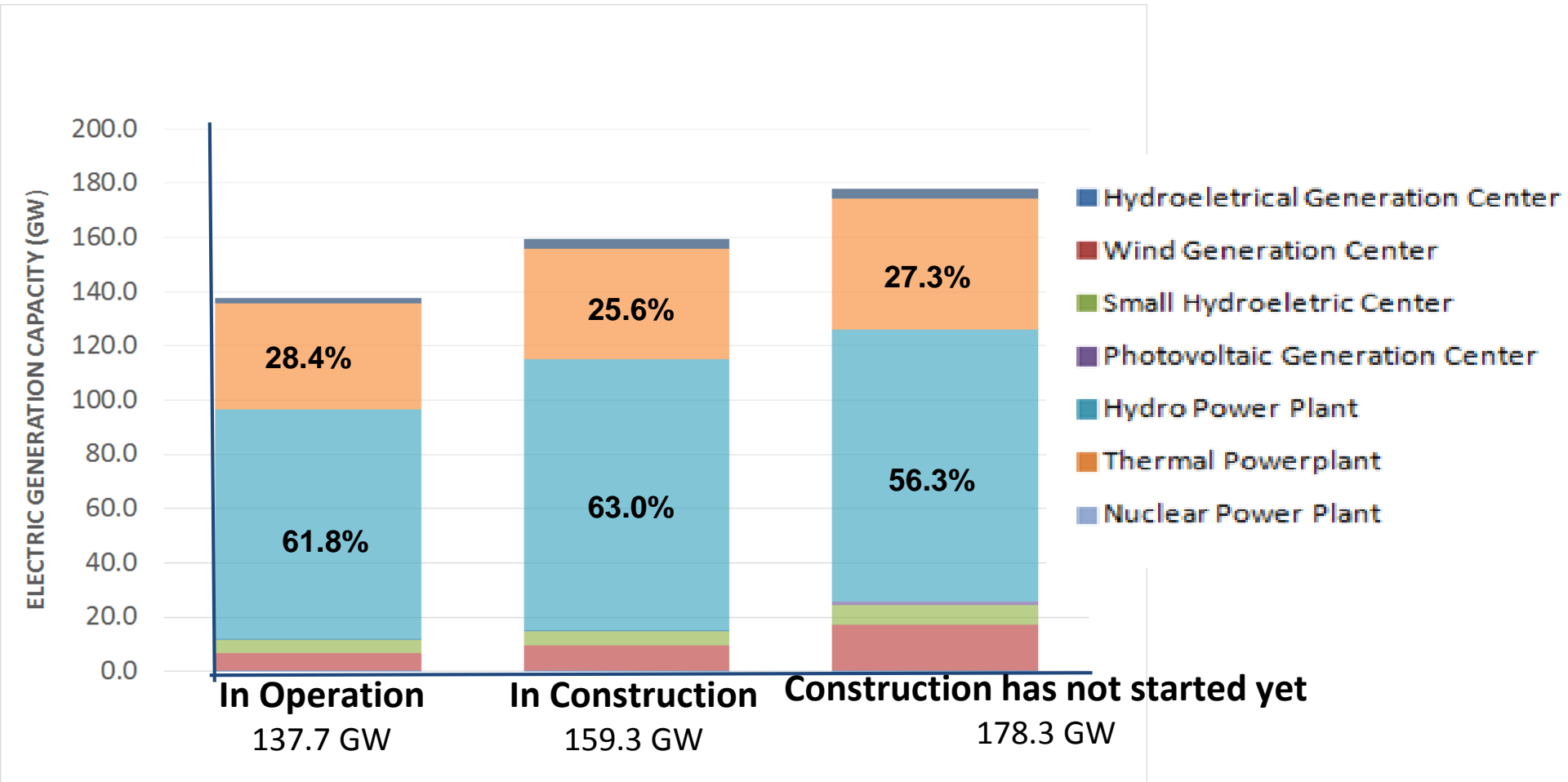
# Sources of Electricity in Brazil



Source: ANEEL (Agência Nacional de Energia Elétrica)

**Most of the energy in Brazil is produced by Hydro, making the energy matrix vulnerable because of dependence on rainfall.**

# Electric Generation Capacity



**Projected dependence on hydro will decrease because of a more diversified energy portfolio**

Source: ANEEL (Agência Nacional de Energia Elétrica) - 2015



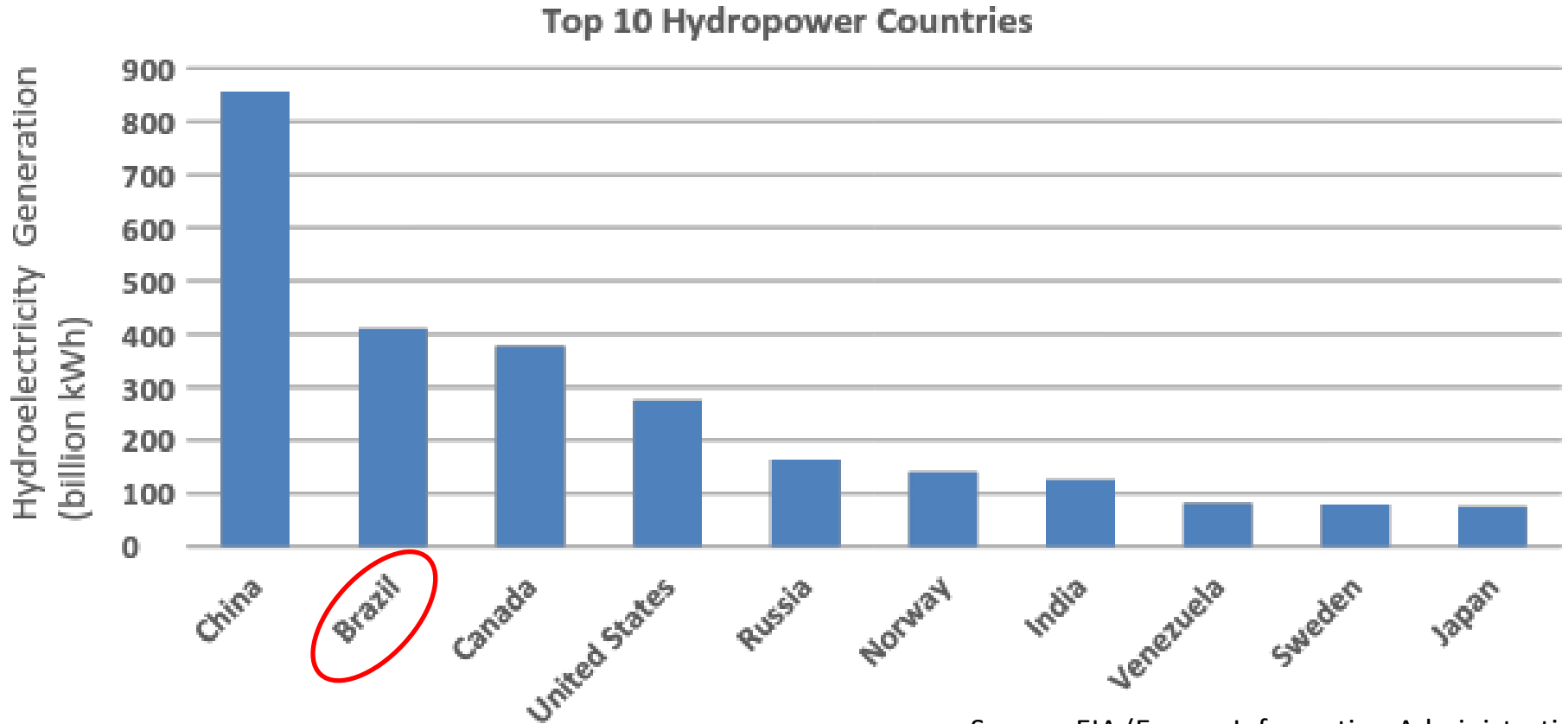


# Hydropower

Source: eoi (escuela de organizacion industrial)



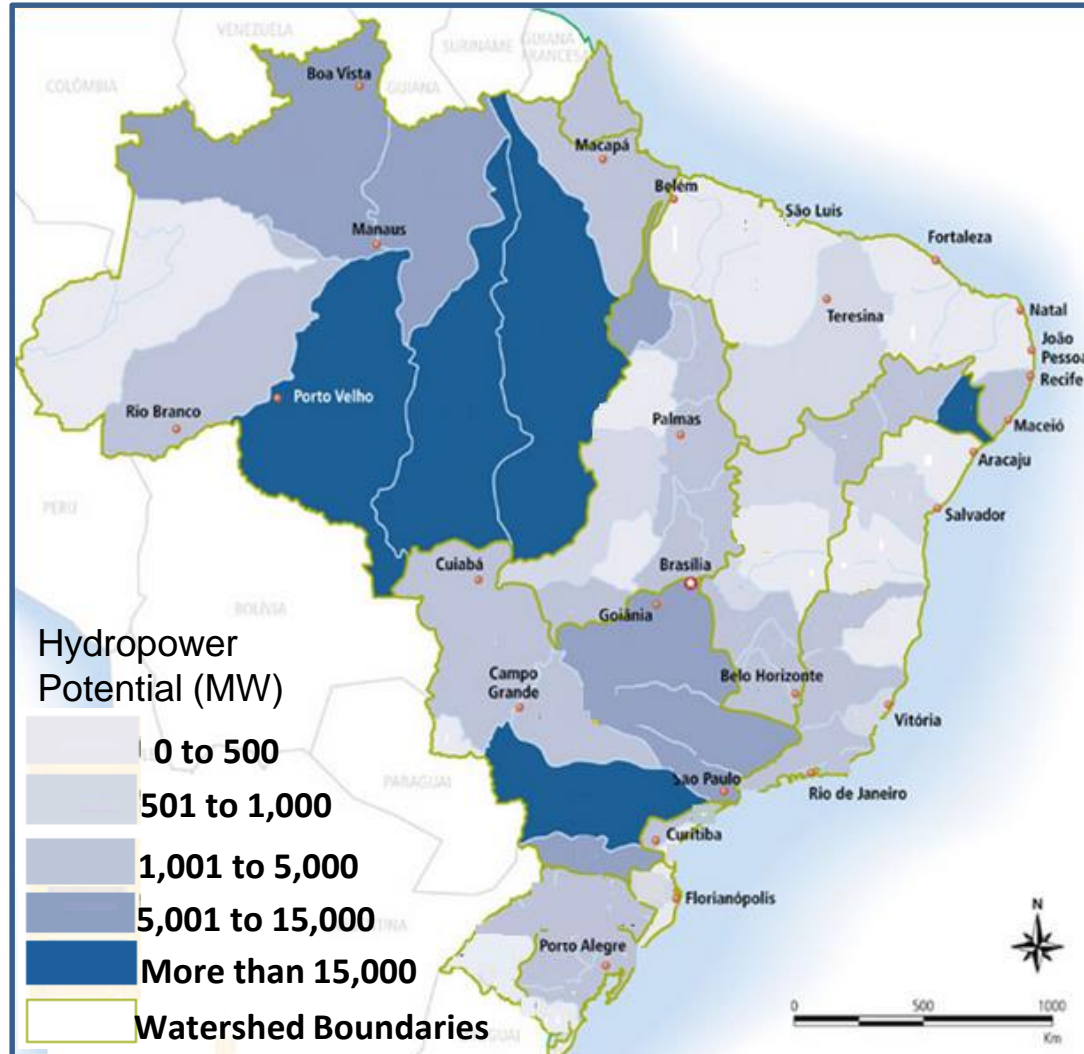
# Hydroelectricity Generation



Source: EIA (Energy Information Administration)

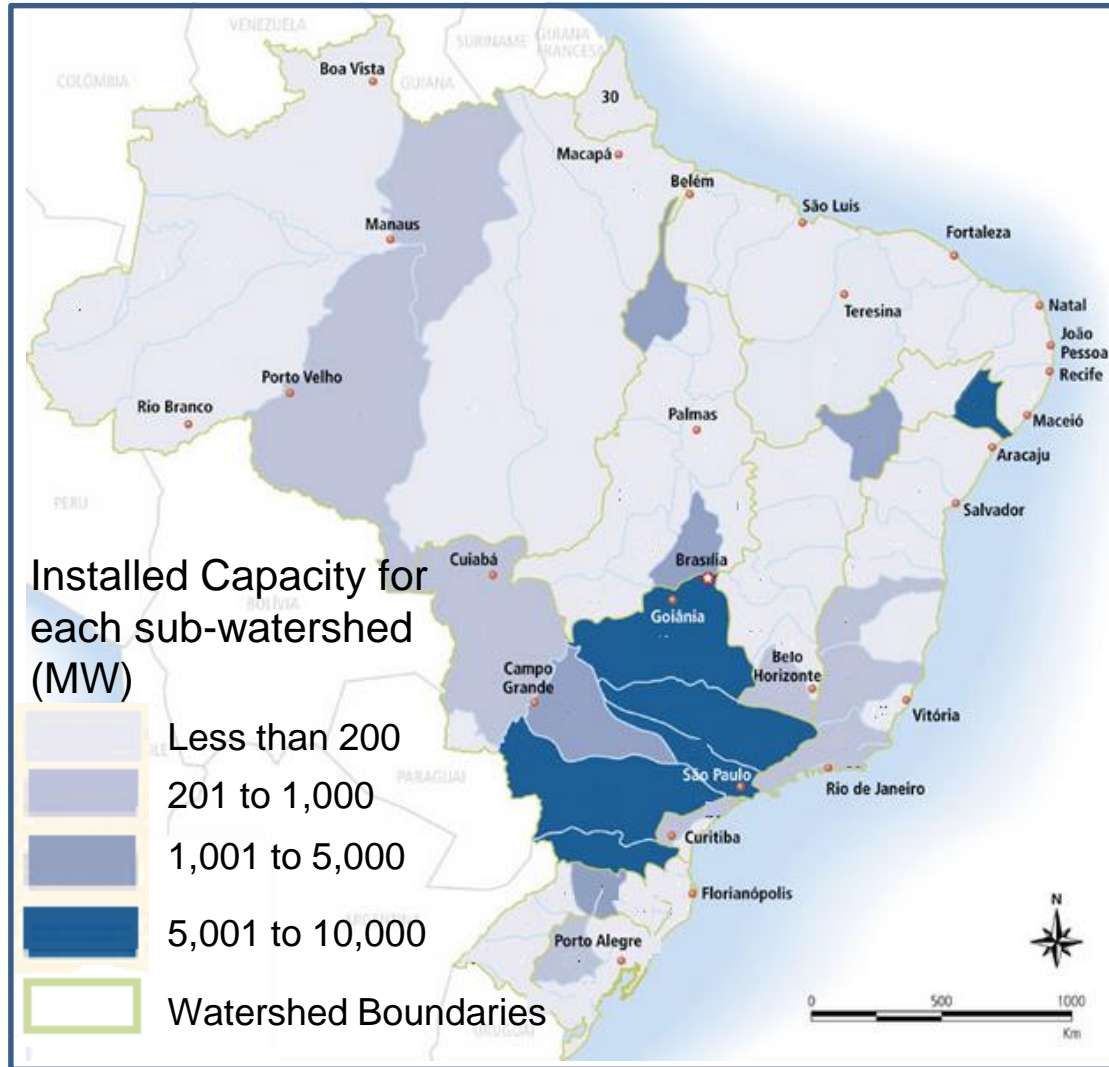
**Brazil is the second largest producer of hydroelectricity at 411 TWh per year**

# Hydropower Potential



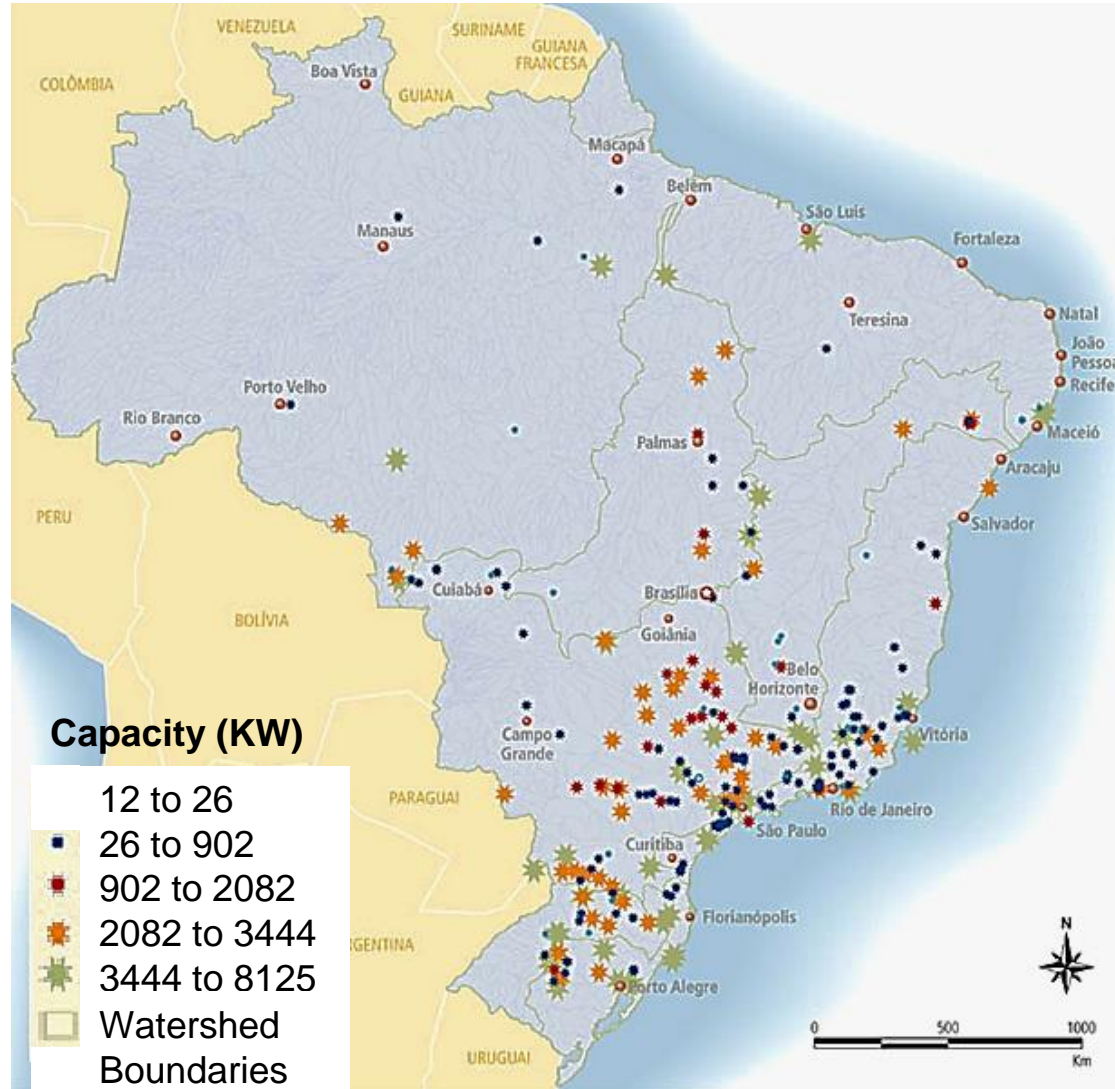
The most promising area for hydropower production is in northern Brazil.

# Installed Capacity



**Most of the hydropower development has been near to the major population centers**

# Hydropower Plants



**Southeastern Brazil has the most Hydropower Plants**



# Hydropower Plants

Operating		
Kind	Quantity	Capacity (MW)
Hydroeletrical Generation Center	507.00	341.72
Small Hydroelectric Center	476.00	4,807.37
Hydro Power Plant	199.00	85,073.22
In Construction		
Kind	Quantity	Capacity (MW)
Hydroeletrical Generation Center	1.00	0.85
Small Hydroelectric Center	36.00	424.52
Hydro Power Plant	11.00	15,269.14
Construction Have not Started		
Kind	Quantity	Capacity (MW)
Hydroeletrical Generation Center	42.00	28.15
Small Hydroelectric Center	129.00	1,825.55
Hydro Power Plant	4.00	447.00

94.3%

HGC: Installed capacity less than 1 MW  
 SHC: Installed capacity between 1 and 30 MW  
 HPP: Installed capacity higher than 30 MW

- **Hydro Power Plants generate most of the power in Brazil.**

Source: ANEEL (Agência Nacional de Energia Elétrica - 2015)

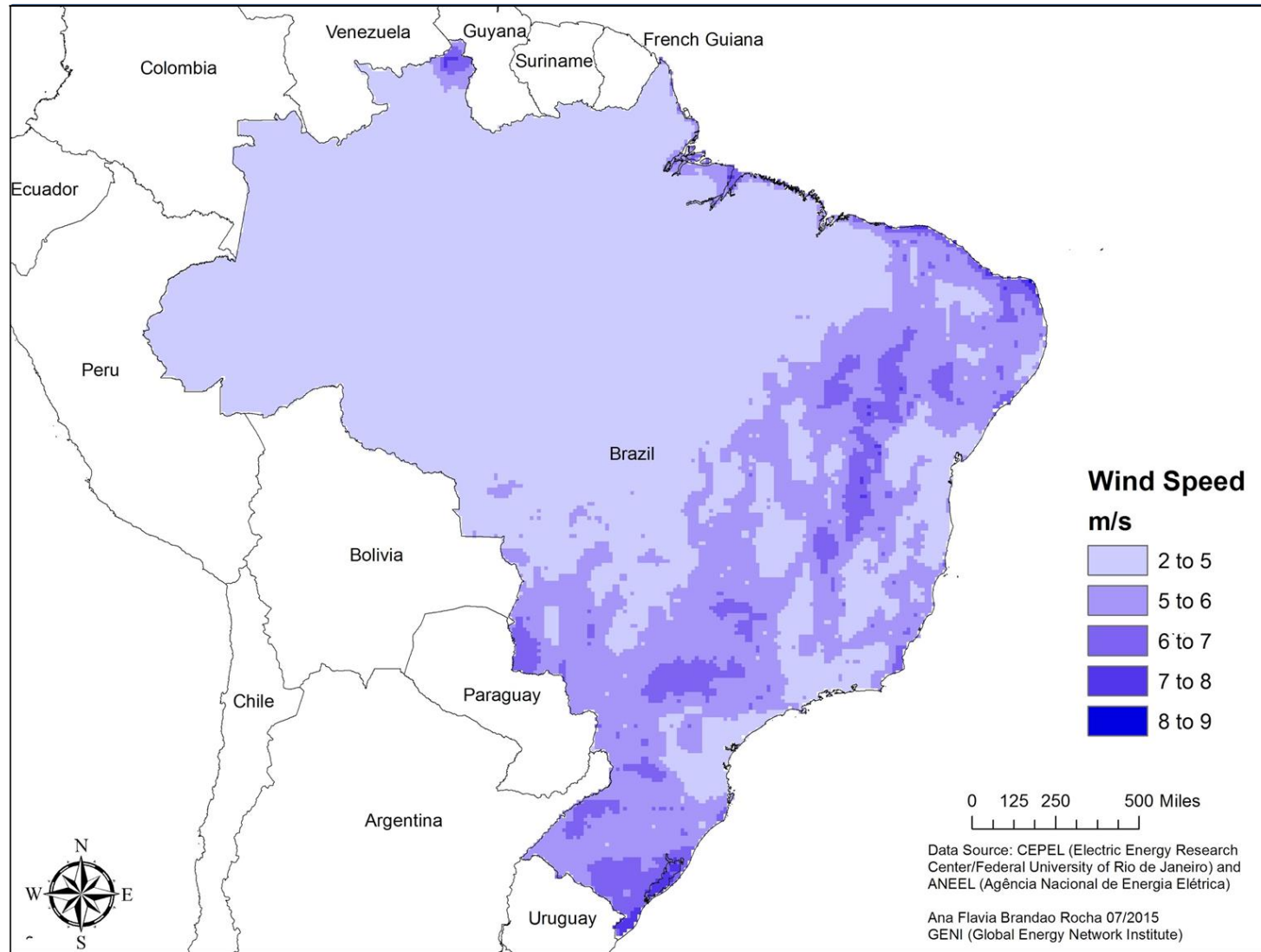


# Wind Energy

Source: Ambiental Energia



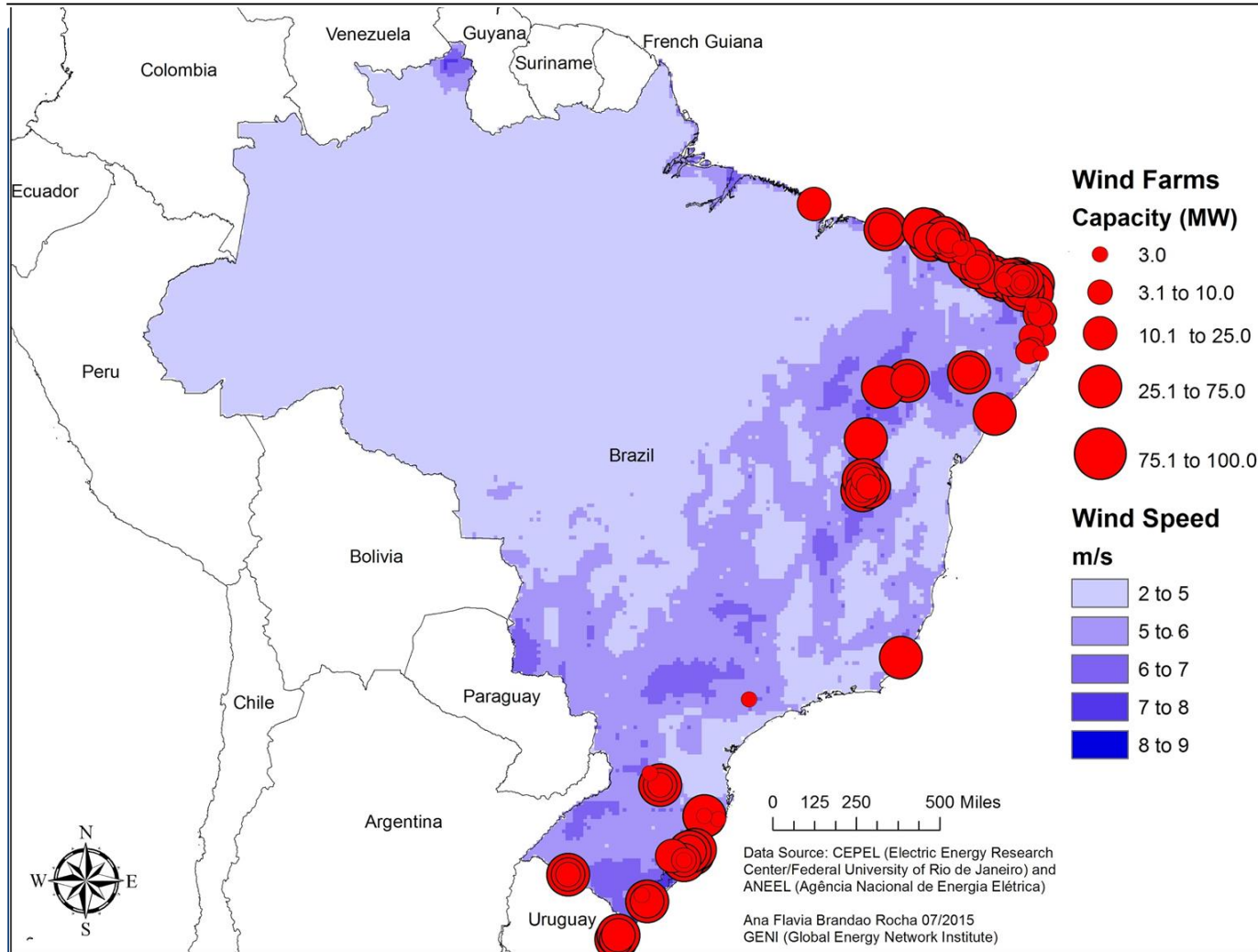
# Wind Energy Potential



The wind energy potential in Brazil is around 140 GW

Source: Ministério de Minas e Energia

# Wind Farms in Brazil

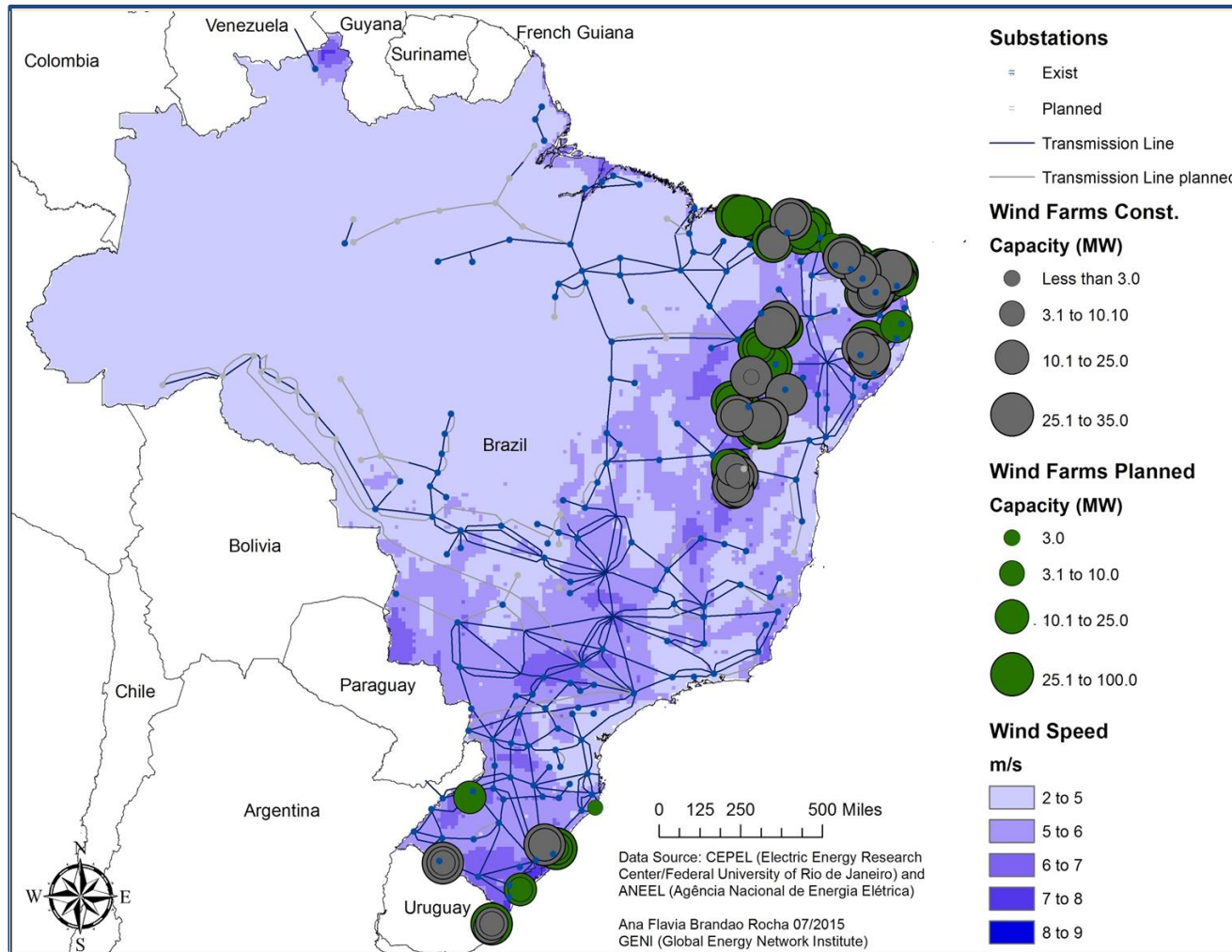


**There are 264 wind generation centers in operation that can potentially produce 6.45 GW of energy**

Source: ANEEL (Agência Nacional de Energia Elétrica)



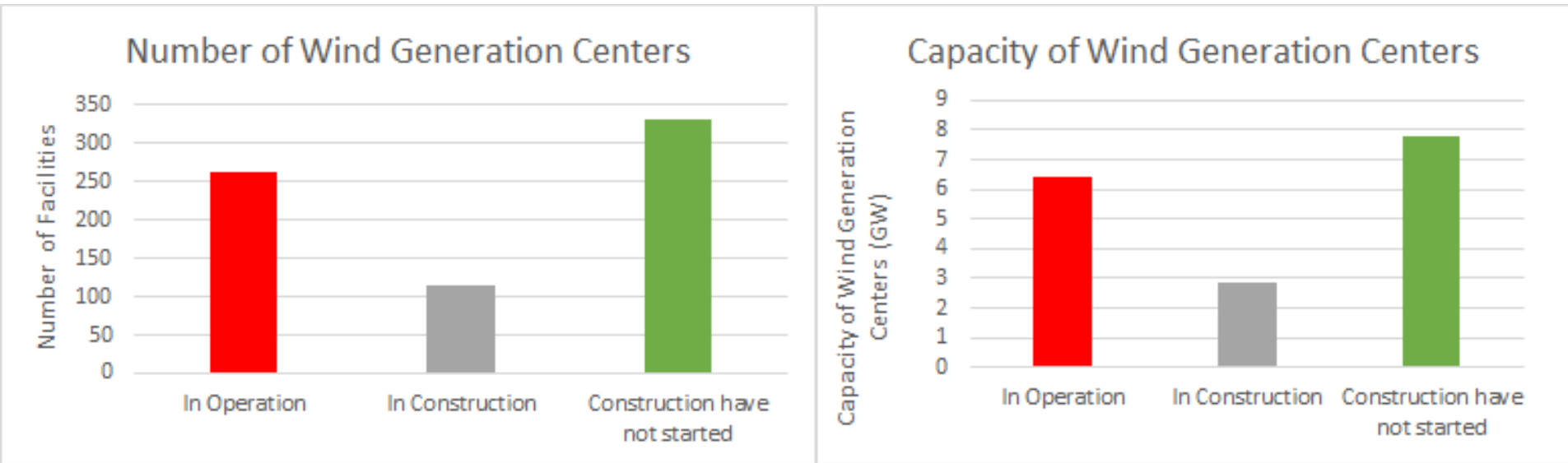
# Constructing and Planned Wind Farms



- There are 115 wind generation centers in construction resulting in 2.83 GW of energy.
- Also, there are 331 potential wind generation centers that can produce up to 7.79 GW of wind energy.

Source: ANEEL (Agência Nacional de Energia Elétrica)

# Wind Generation in Brazil



**There will be a total of 710 wind farms with a generation capacity of 17.07 GW.**

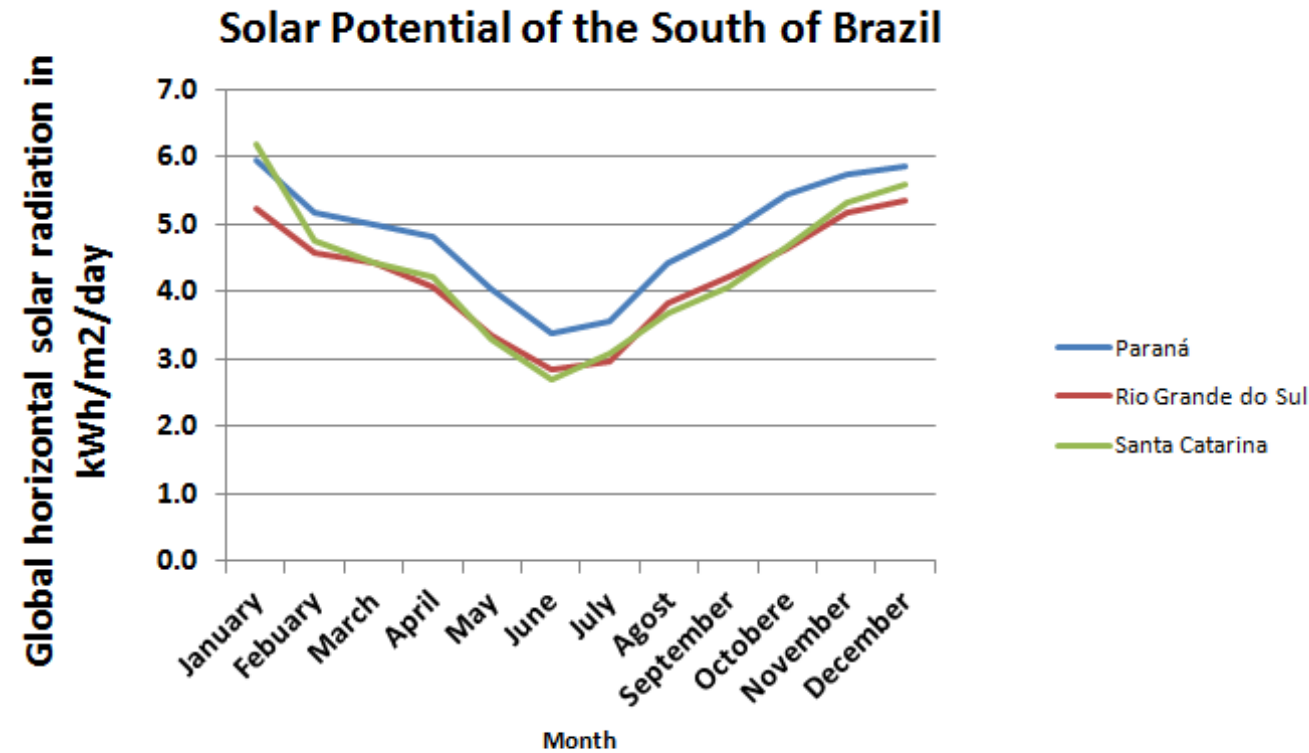
Source: ANEEL (Agência Nacional de Energia Elétrica) - 2015



# Solar Energy



# Solar Energy Potential of the Southern Region



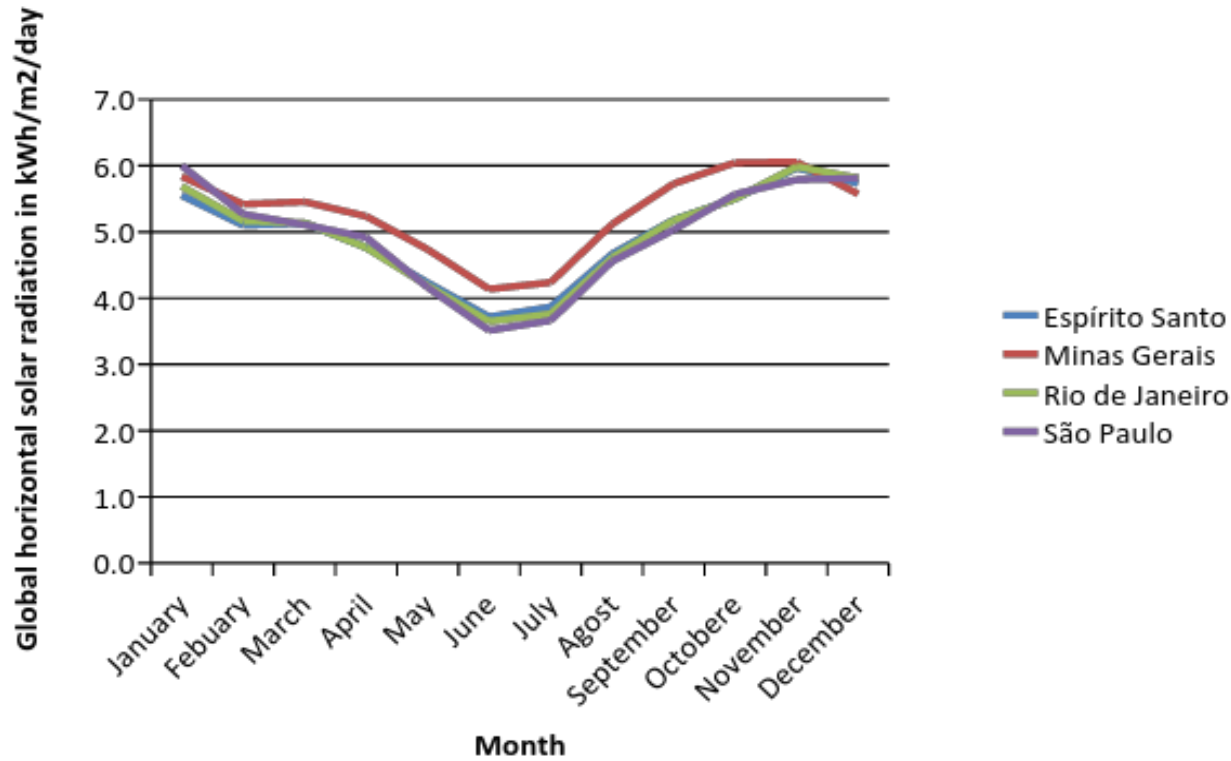
**Potential in the Southern Region changes more than any other.**

Source: INPE (National Institute for Spatial Research) and LABSOLAR (Laboratory of Solar Energy/Federal University of Santa Catarina)



# Solar Energy Potential of Southeastern Region

## Solar Potential of the Southeast of Brazil

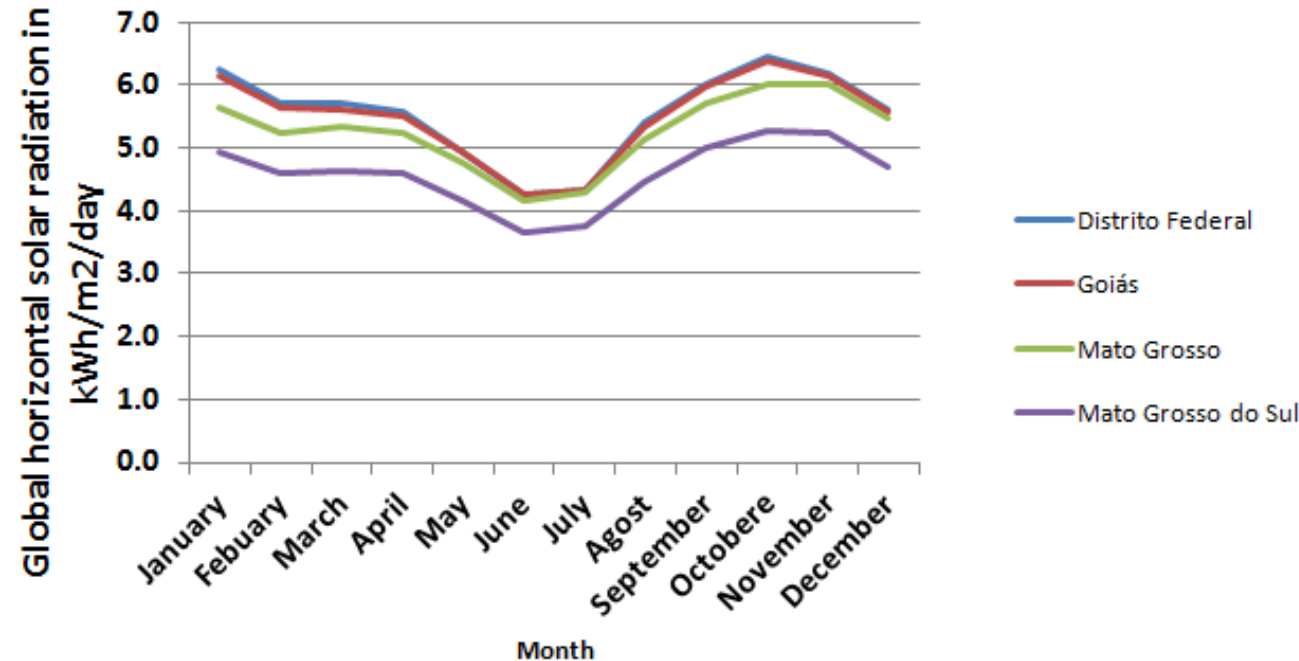


**Minas Gerais has the highest solar potential in this area**

Source: INPE (National Institute for Spatial Research) and LABSOLAR (Laboratory of Solar Energy/Federal University of Santa Catarina)

# Solar Energy Potential of Center Region

## Solar Potential of the West Center of Brazil

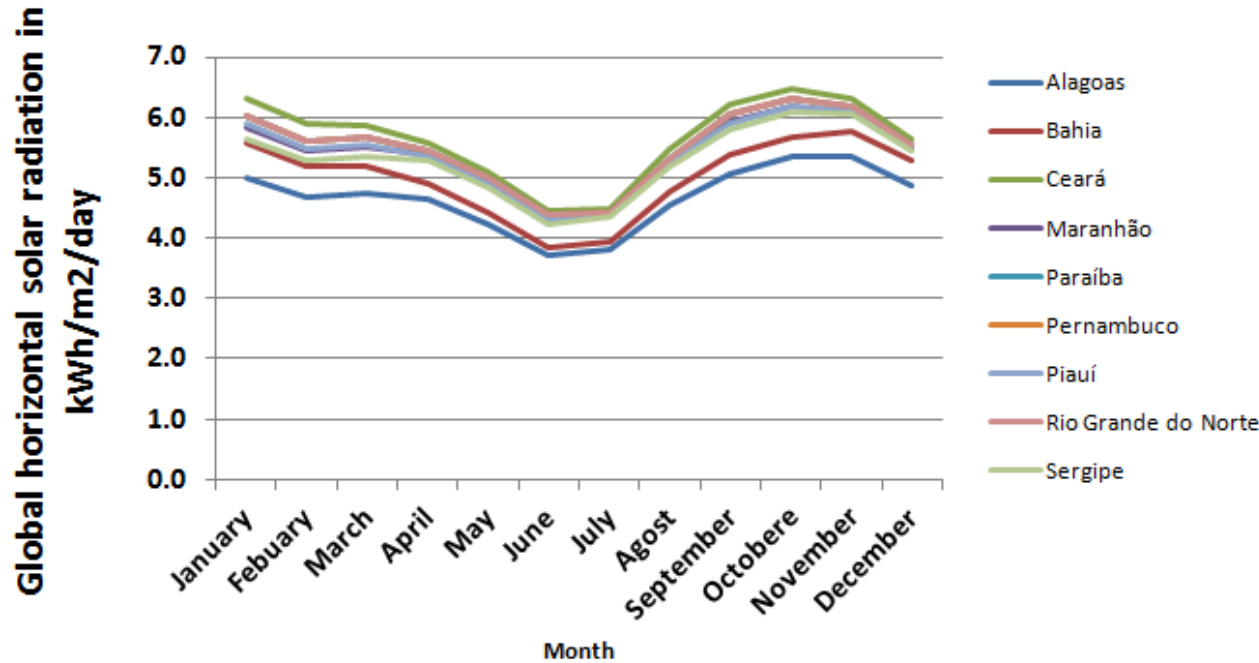


**Distrito Federal has the highest solar potential in this area**

Source: INPE (National Institute for Spatial Research) and LABSOLAR (Laboratory of Solar Energy/Federal University of Santa Catarina)

# Solar Energy Potential of Northeastern Region

## Solar Potential of the Northeast of Brazil



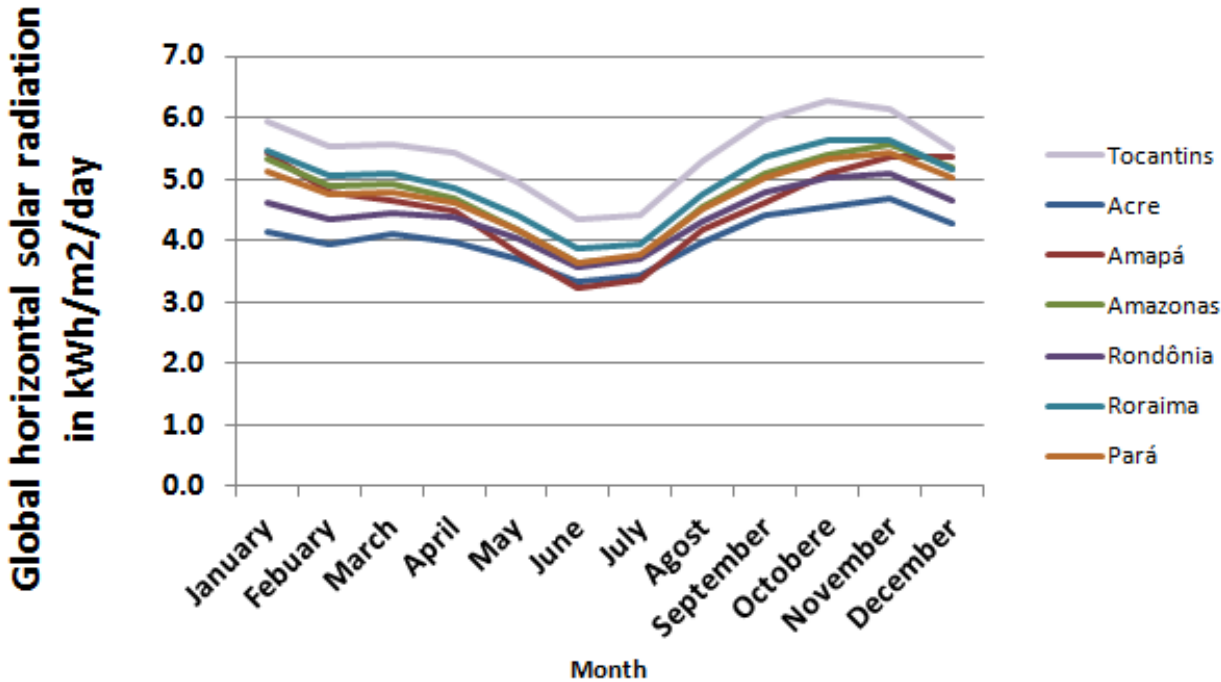
**Ceara has the highest solar potential in this area**

Source: INPE (National Institute for Spatial Research) and LABSOLAR (Laboratory of Solar Energy/Federal University of Santa Catarina)



# Solar Energy Potential of Northern Region

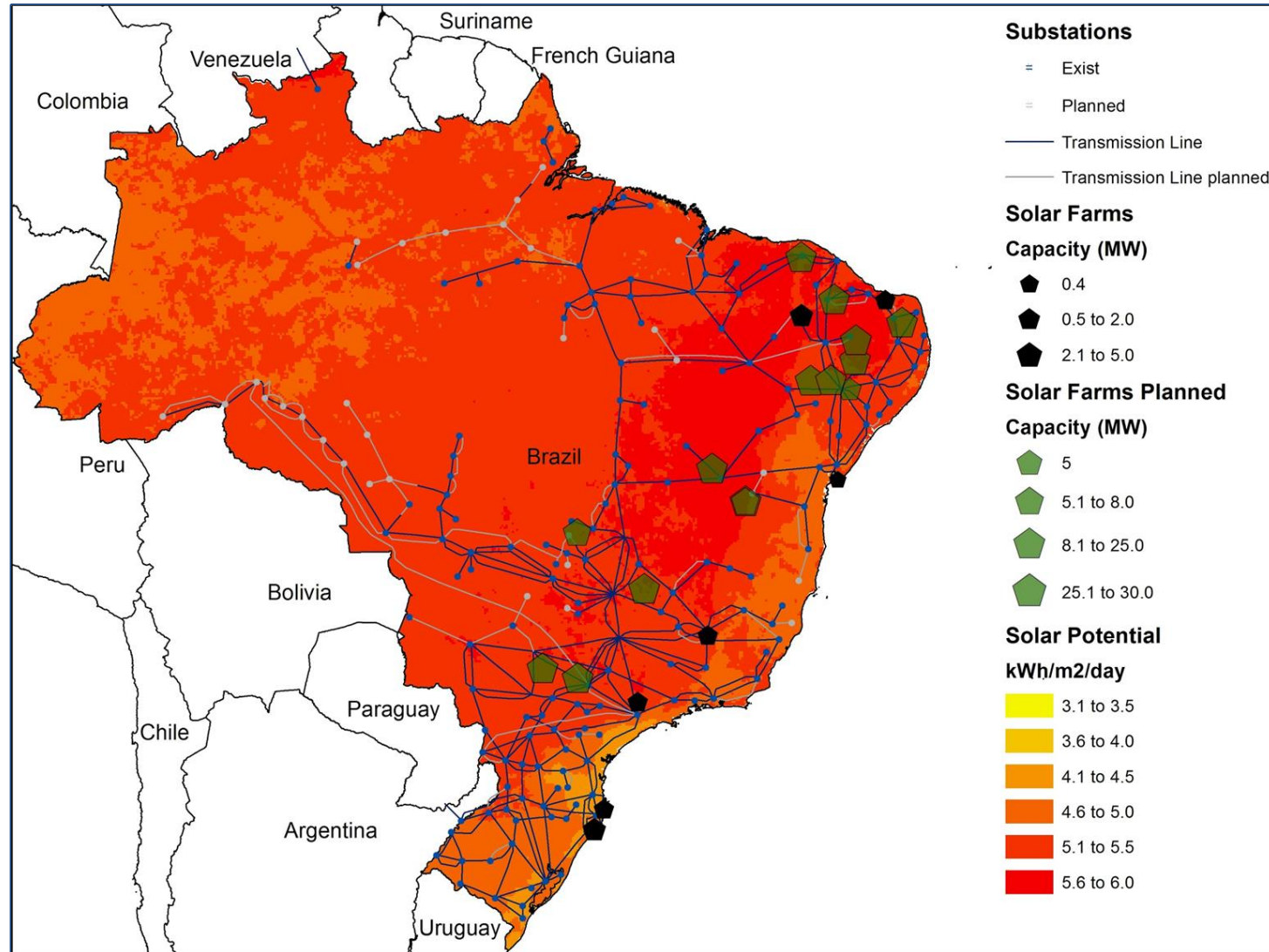
Solar Potential of the North of Brazil



**Tocantins has the highest solar potential in this area**

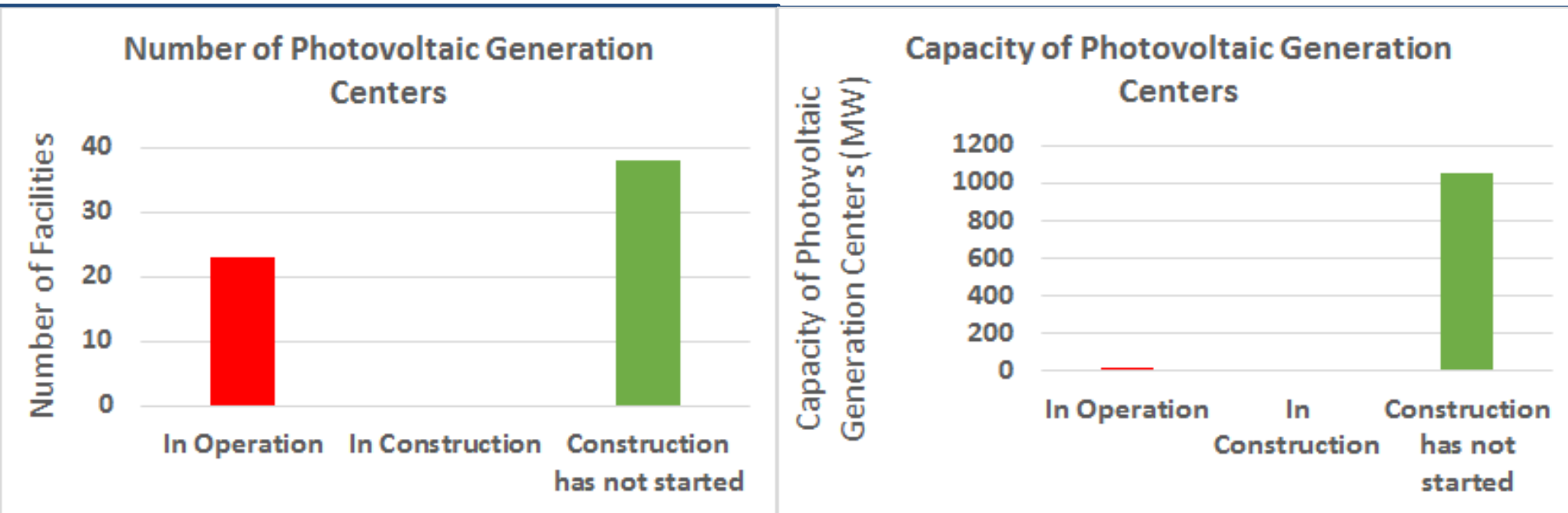
Source: INPE (National Institute for Spatial Research) and LABSOLAR (Laboratory of Solar Energy/Federal University of Santa Catarina)

# Solar Farms in Brazil



**Brazil has a high solar energy potential however, there are only a few solar farms in operation, producing 11.2 MW.**

# Photovoltaic Generation Centers



There will be a total of 61 solar farms with a generation capacity of 1.06 GW.

Source: ANEEL (Agência Nacional de Energia Elétrica)- 2015