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# OPPORTUNITIES AND CHALLENGES OF DISTRIBUTION NETWORK IN BRAZIL



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# *GENERATION*

# INSTALLED CAPACITY

**INSTALLED CAPACITY<sup>1</sup> : 165.619 MW**

Renewable: 138.013 MW (83,3%)

Non-Renewable: 27.605 MW (16,7%)



**HYDRAULIC ENERGY**

105.210 MW

63,5%



**GAS/OIL/COAL**

25.615 MW

15,5%



**WIND POWER**

15.064 MW

9,1%



**NUCLEAR**

1.990 MW

1,2%



**PHOTOVOLTAIC ENERGY**

2,084 MW

1,3%



**BIOMASS**

14.787 MW

8,9%



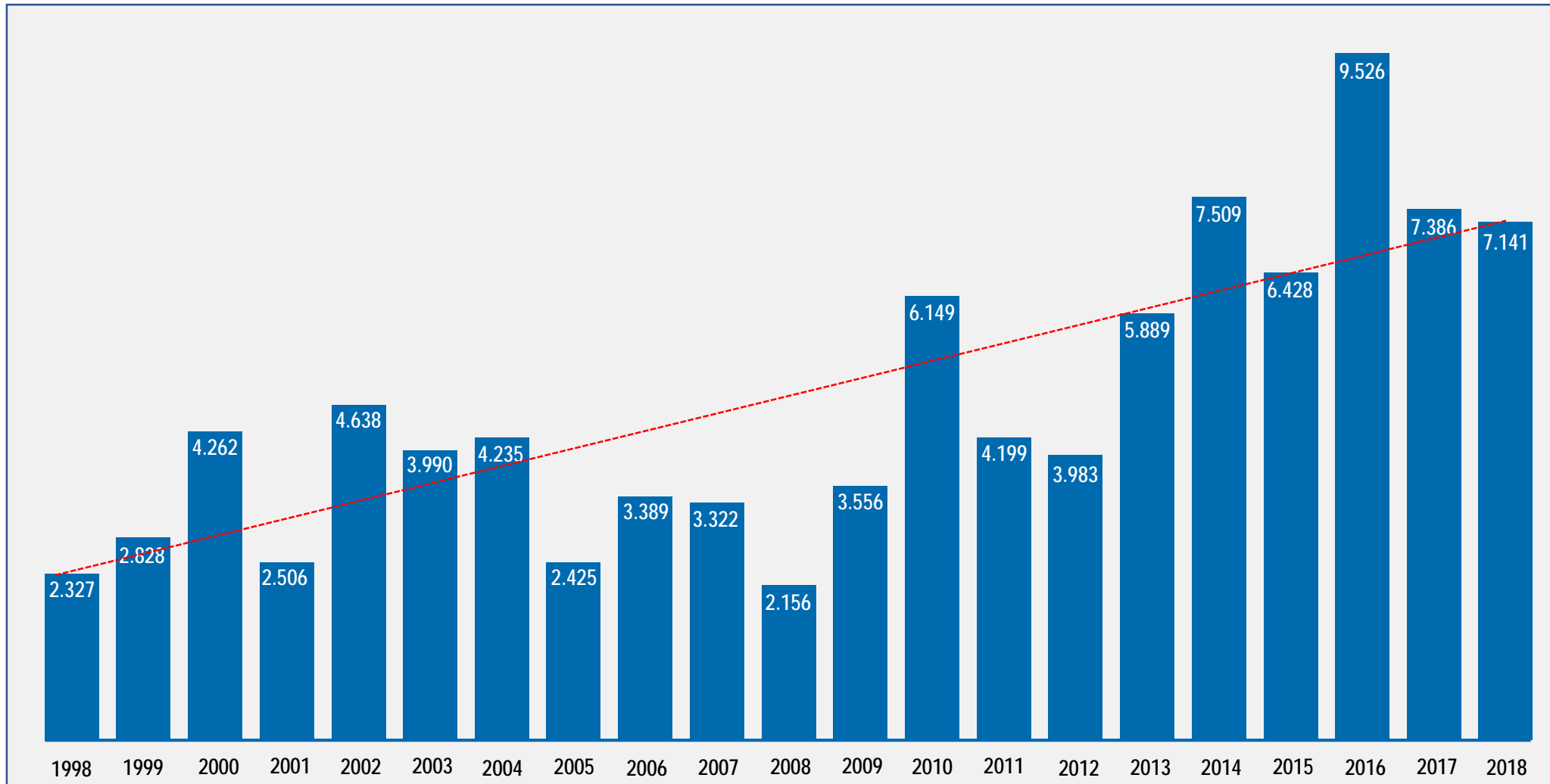
**DISTRIBUTED ENERGY**

**868,6 MW**

**0,5%**



# INSTALLED CAPACITY- ANNUAL INCREASE



# INVESTMENTS IN GENERATION

(2009-2018 ACR)

ANNUAL INVESTMENT  
IN GENERATION



U\$ **3,99 billion**



(2018 - 2023)



**HIRED PROJECTS**

337 PLANTS

22 MIL MW OF

INSTALLED CAPACITY

**66% Renewable resources**

U\$ **25 billion**

in investments



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# *DISTRIBUTED ENERGY*

# SOLAR IRRADIATION WORLDMAP

## DAILY IRRADIATION –ANNUAL AVERAGE




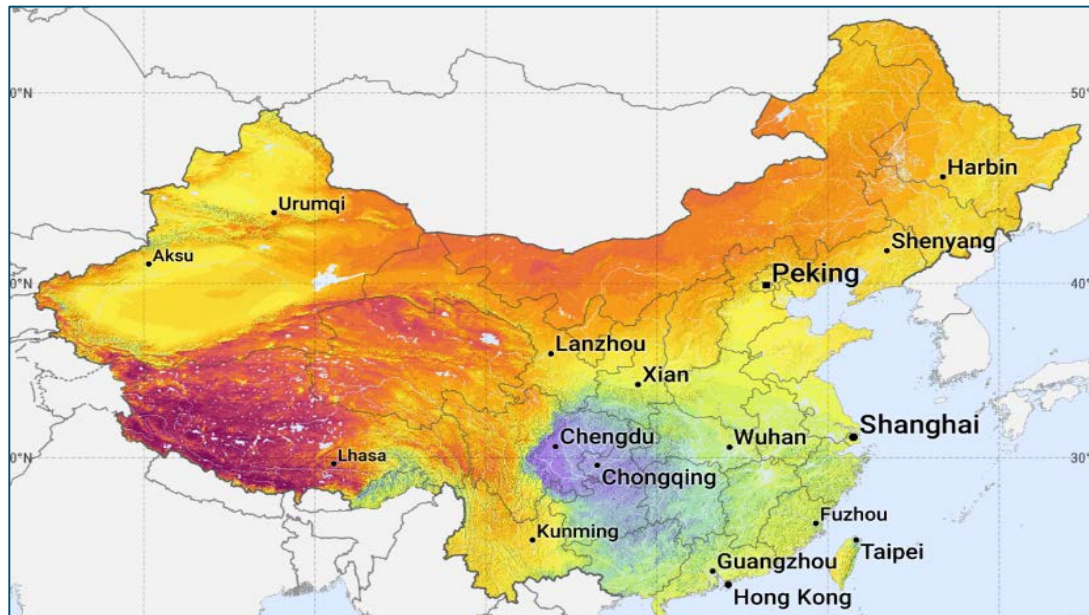
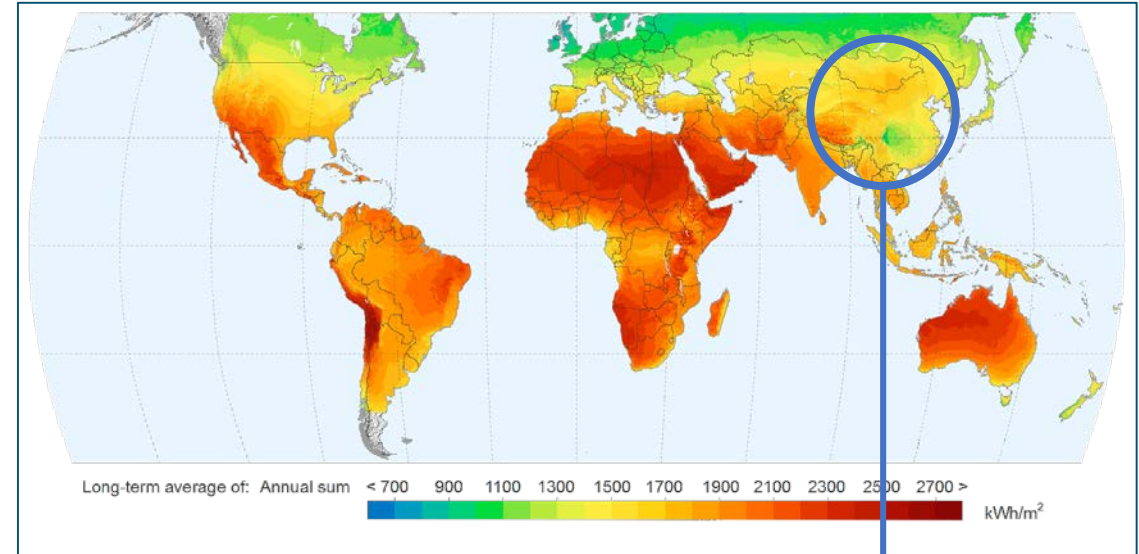
Germany: 900-1.250 kWh/m<sup>2</sup>/year



France: 900-1.650 kWh/m<sup>2</sup>/year



Spain: 1.200-1.850 kWh/m<sup>2</sup>/year



China: 900-2.100 kWh/m<sup>2</sup>/year



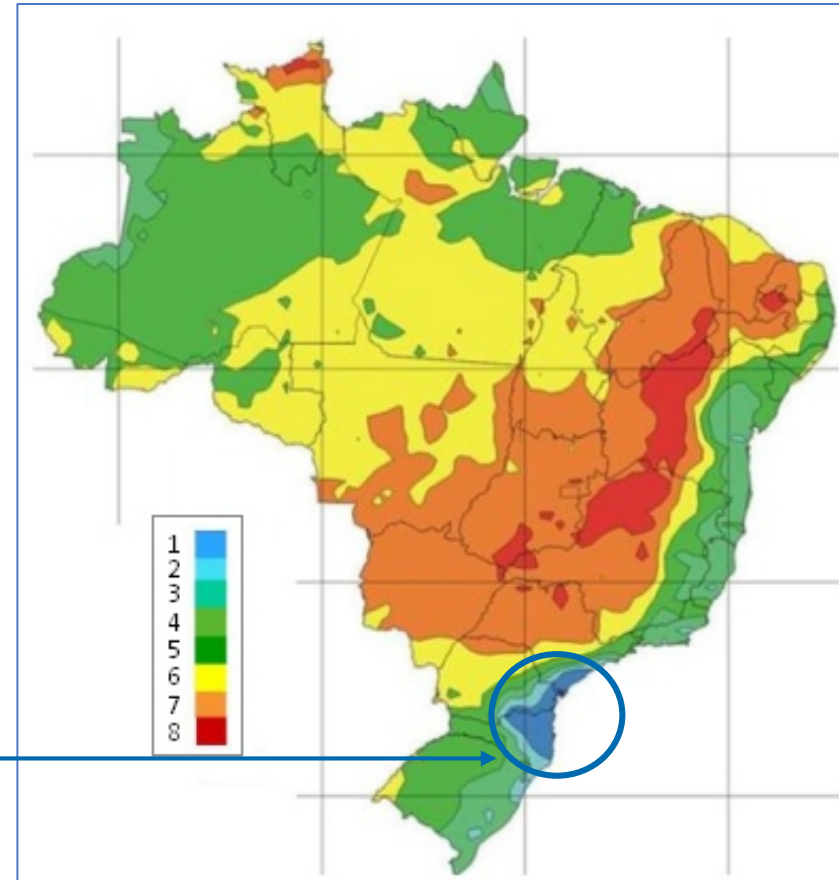
# SOLAR IRRADIATION MAP- IN BRAZIL

## DAILY IRRADIATION- ANNUAL AVERAGE

More than the majority of European countries

1.500 e 2.400 kWh/m<sup>2</sup>/year

THE LOWEST IRRADIATION RATE IN BRAZIL IS STILL SUPERIOR TO THE HIGHEST IRRADIATION RATE IN GERMANY





# MICRO AND MINI DISTRIBUTED GENERATION OVERALL DATA



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## 868,6 MW

é a potência instalada em GD

## 84,7%

da GD vem da fonte solar (kW)

## 74,1%

das conexões são residenciais

## 25 Anos

é a vida útil dos painéis solares



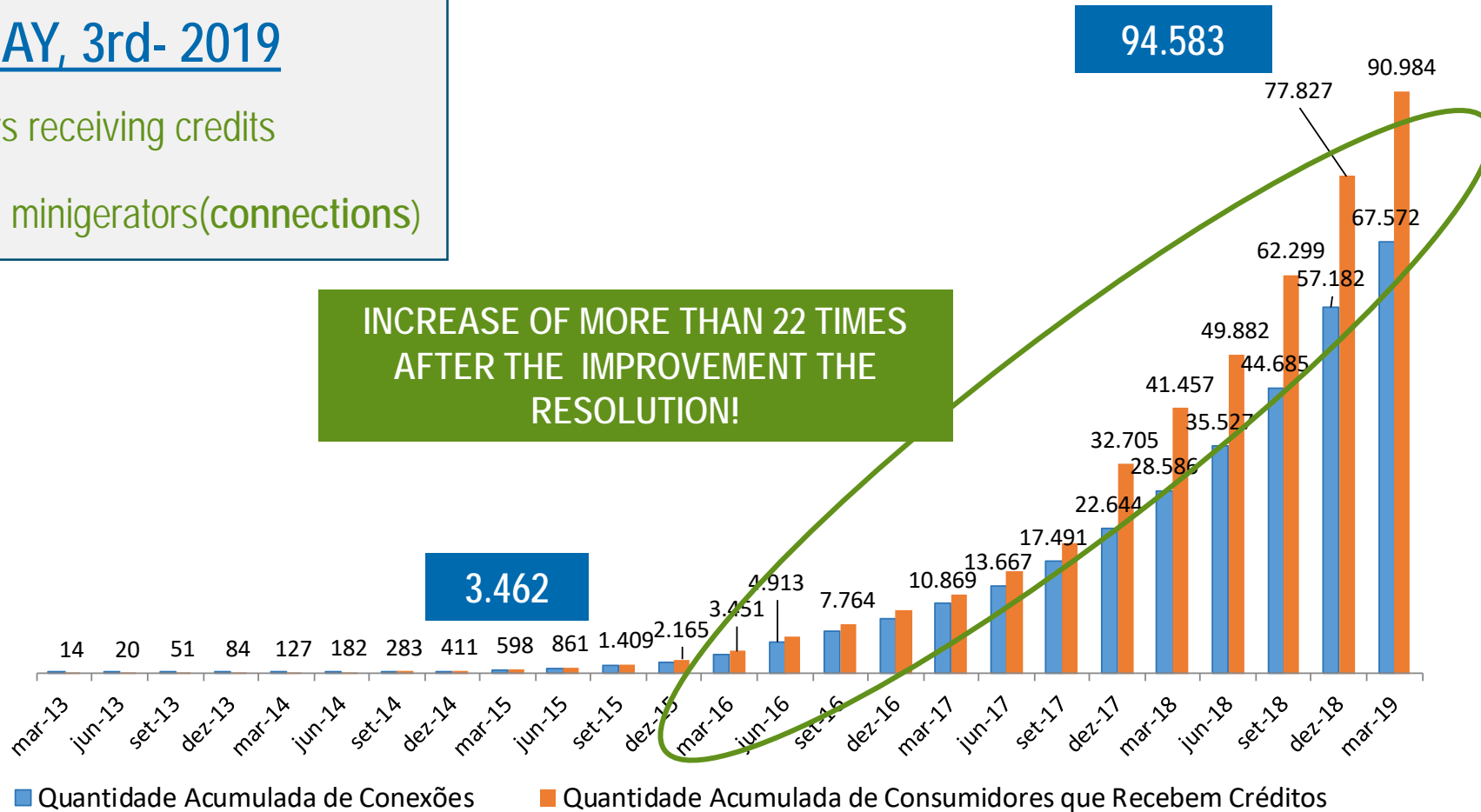
# MICRO AND MINI DISTRIBUTED GENERATION EVOLUTION OF DISTRIBUTED GENERATION

ON MAY, 3rd- 2019

96.560 consumers receiving credits

71.993 micro and minigerators(connections)

INCREASE OF MORE THAN 22 TIMES  
AFTER THE IMPROVEMENT THE  
RESOLUTION!



# MICRO AND MINI DISTRIBUTED GENERATION

## WHAT IS MICRO AND MINI DISTRIBUTED GENERATION?

Small generation systems scattered in the power grid.

Usually connected directly to consumers.

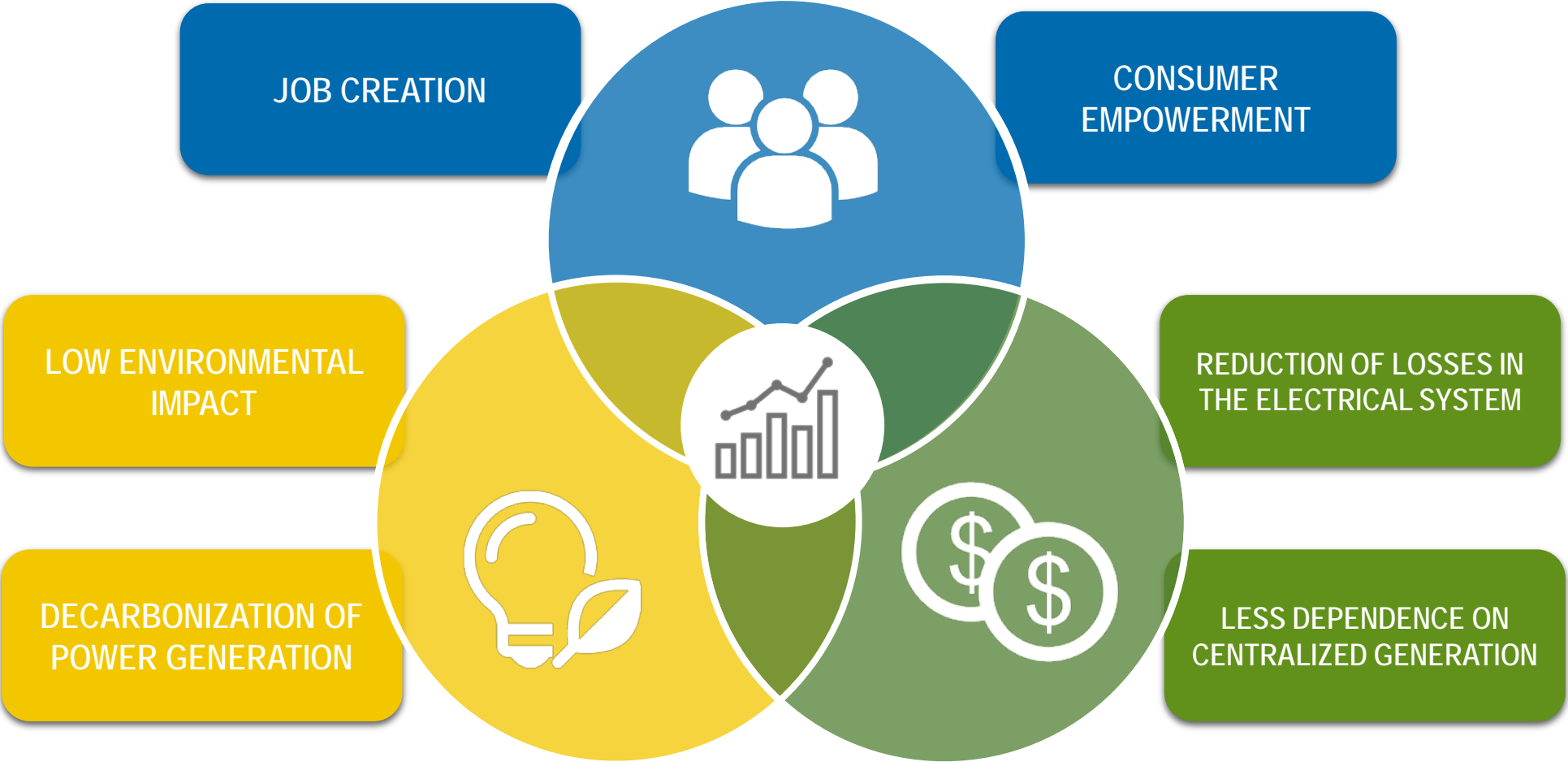
Renewable sources (solar, wind, biomass, waste, etc.)



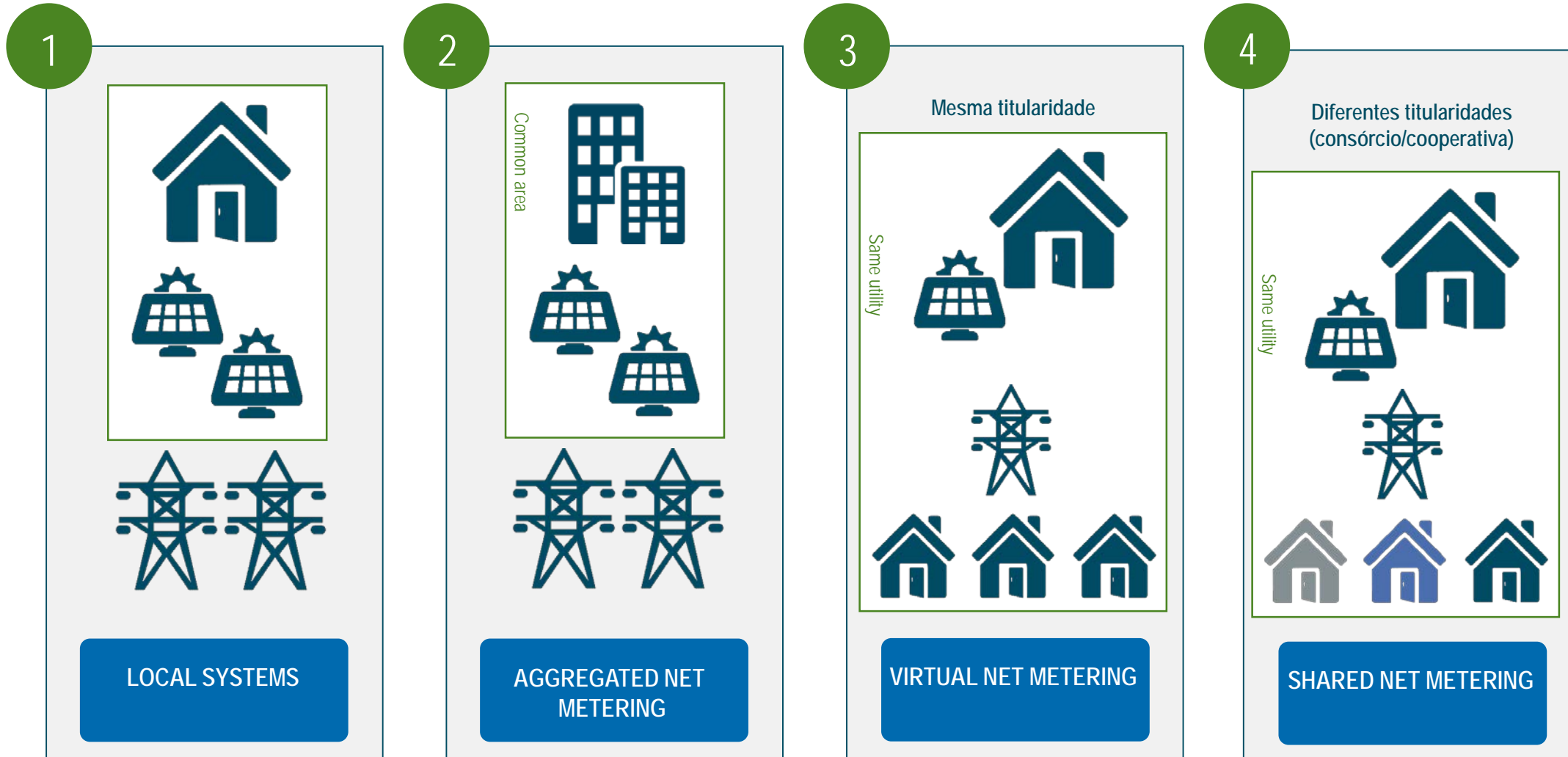
# ADVANTAGES OF MICRO AND MINI DISTRIBUTED GENERATION



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# RESOLUTION 482/2012 – MODALITY





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*INNOVATION*

# POPE BENTO XVI- INAUGURATION CEREMONY (2005)



# POPE FRANCISCO- INAUGURATION CEREMONY (2013)





# SELFIE CROWD (2016)





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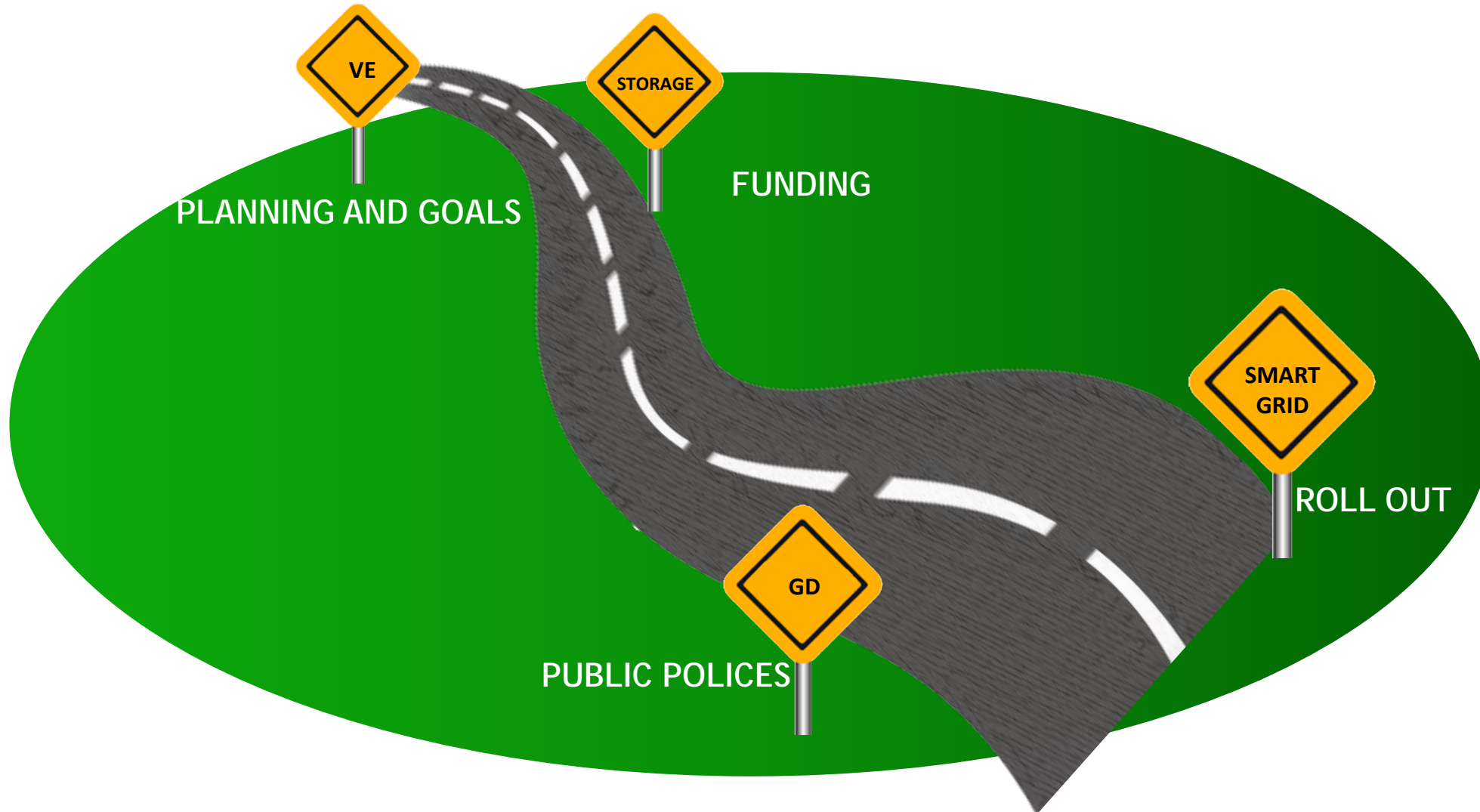


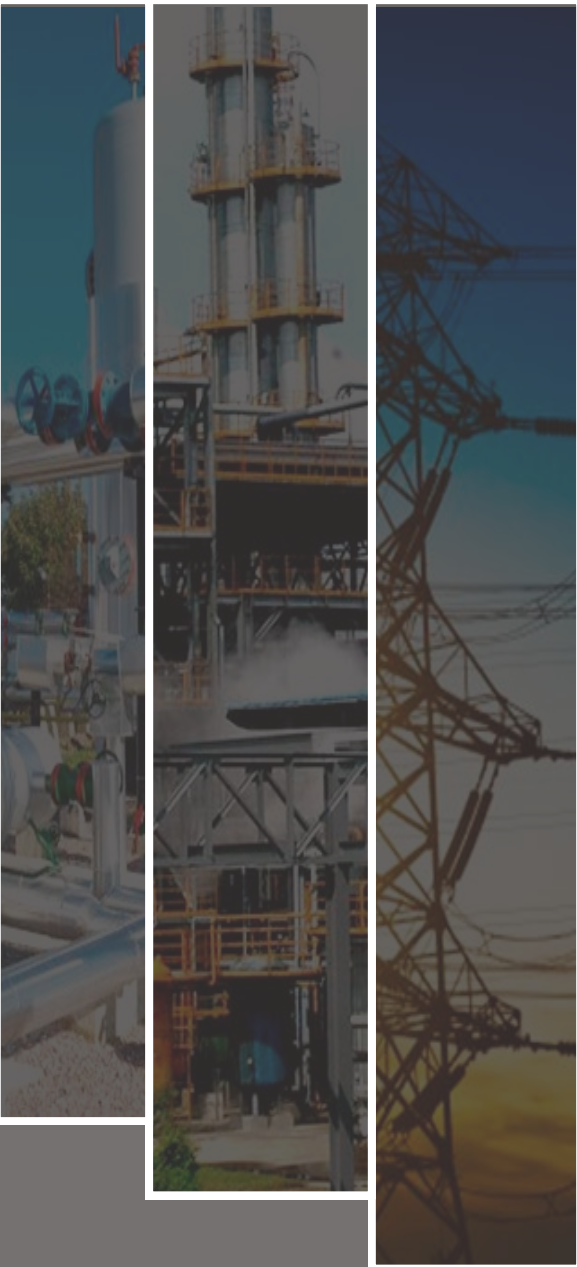
## Quotation

// We are on board of a technological revolution that will fundamentally transform the way we live, the way we work and the way we relate to others.

In its scale, scope and complexity, that transformation will be considered different from anything human being has experienced before //

# CHALLENGES AHEAD IN BRAZIL





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GENERAL DIRECTOR

