



2015 Brazil Summit

Brazilian Electricity Sector Overview, Challenges & Opportunities

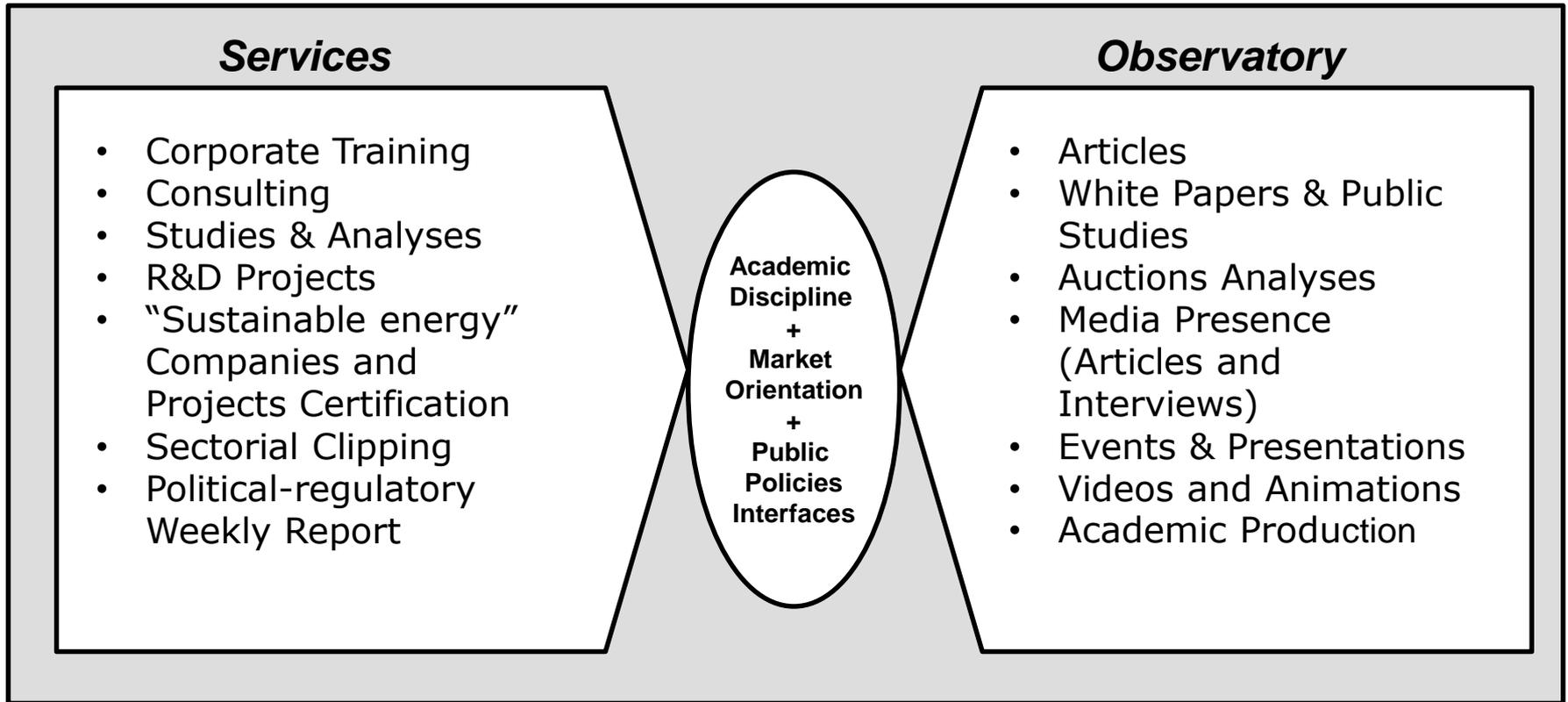
Brazil Summit 2015
Brazilian-American Chamber of Commerce
New York
April 20th, 2015

This document was prepared by Instituto Acende Brasil .

It may not be cited, reproduced or distributed without express written permission.

Instituto Acende Brasil is a **think tank** aimed at developing activities and projects to increase the degree of Transparency and Sustainability of the Brazilian Electrical Sector.

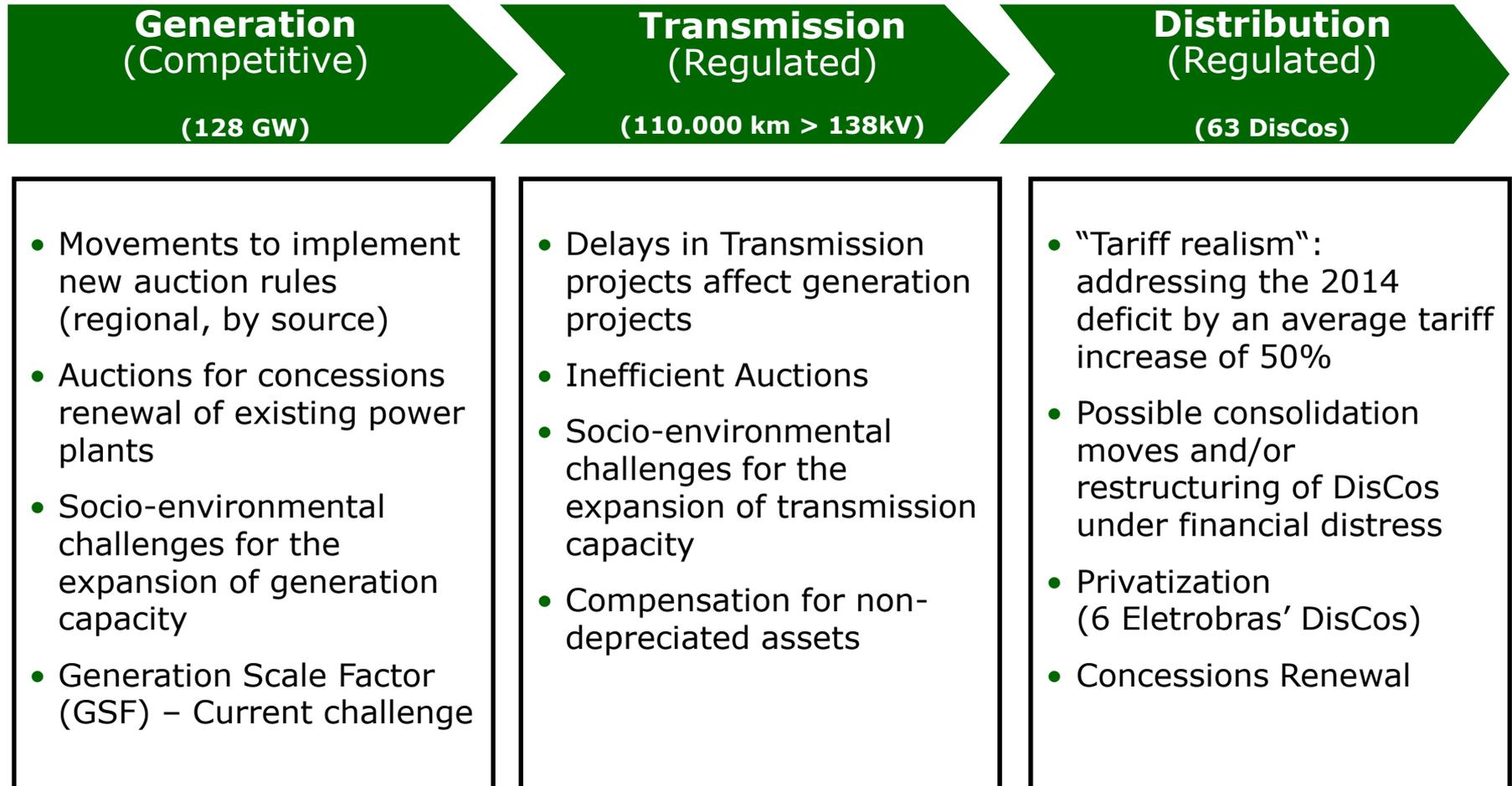
Based on numbers and facts, we think and analyze the industry with a long-term perspective, seeking to inform the Brazilian and international societies about the most important economic, political and institutional dimensions that shape the Brazilian Electrical Sector.



- Accenture
- AEI
- AES
- Ampla
- Andrade Gutierrez
- Angra Partners
- Brennand
- Brookfield Energia
- BTG Pactual
- Celpe
- Cemar
- Cemat
- Cemig
- CERR
- Chesf
- Coelba
- CPFL Energia
- Duke Energy
- EDF
- EDP
- Elektro
- Eletrobras
- Eletronorte
- Eletronuclear
- Endesa
- Energisa
- Enerpeixe
- Enersul
- Equatorial Energia
- Furnas
- GDF Suez
- Gerdau
- Iberdrola
- IPEA
- IPEA
- ISA CTEEP
- Itaipu Binacional
- KPMG
- Light
- MPX
- Neoenergia
- RGE
- Secretaria de Assuntos Estratégicos -
Presidência da
República do Brasil
- PwC
- Roland Berger
- Taesa
- TNC
- Tractebel Energia
- UTE Norte Fluminense
- Vale
- WWF

Brazilian Electricity Sector

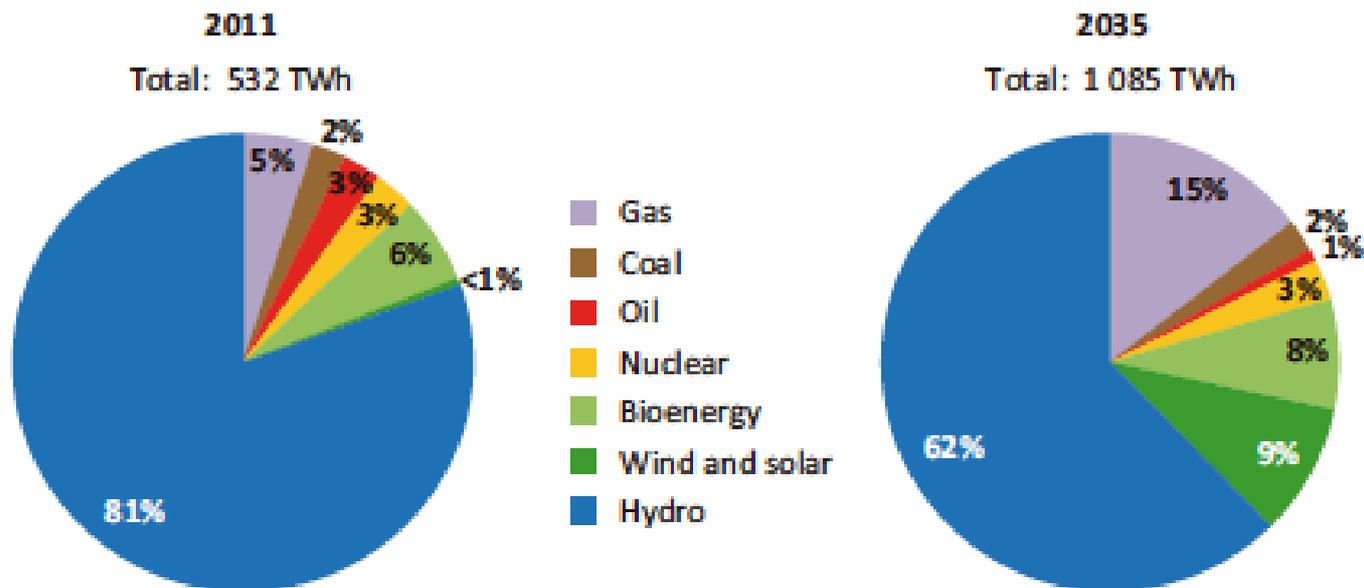
Value Chain Analysis



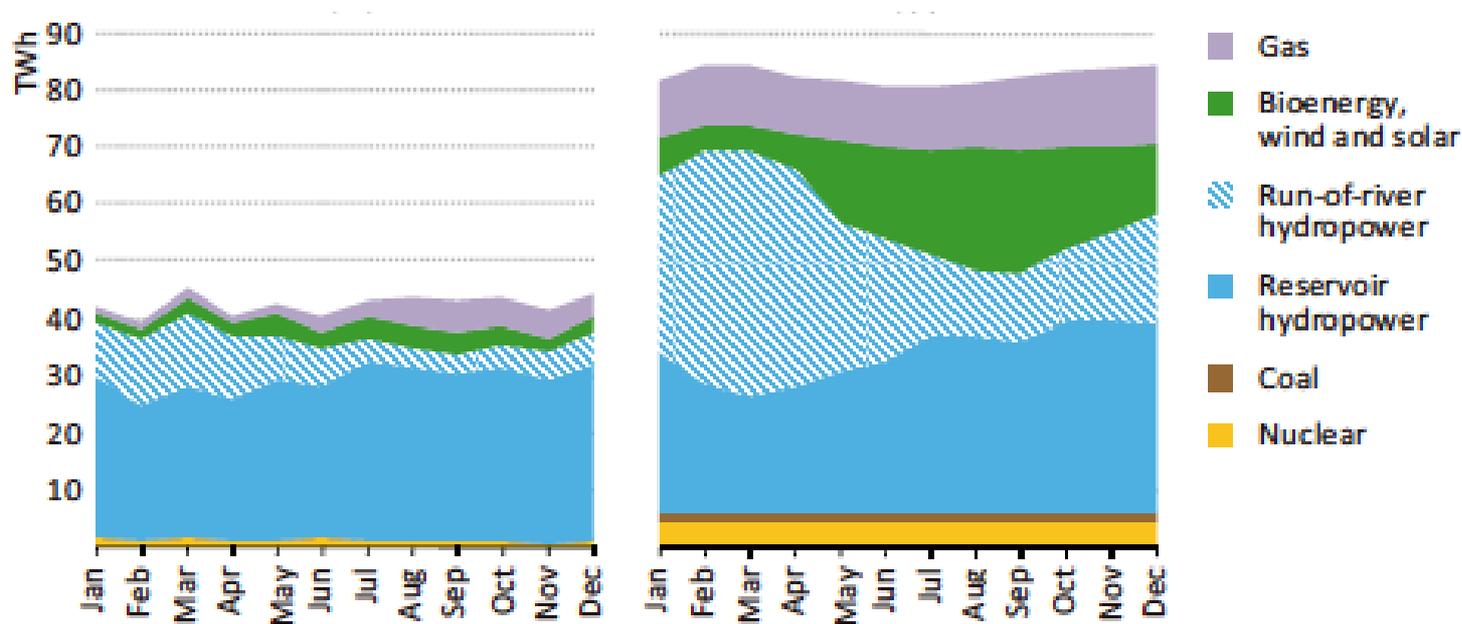
The share of energy produced from each **generating source**:

- the share of **hydroelectric** generation should **decrease**;
- the share of **thermoelectric** generation should **increase**;
- the share of renewable sources (such as **biomass, solar and wind power**) should also increase by 2035.

Brazil power generation by source



Brazil indicative monthly variations in power generation by source



Note: Calculations of bioenergy, wind and solar generation in 2035 are based on projected installed capacity, biomass harvest cycles and historical generation profiles, while those for run-of-river generation are based on projected installed capacity and river flow variations at the sites of planned hydropower projects.

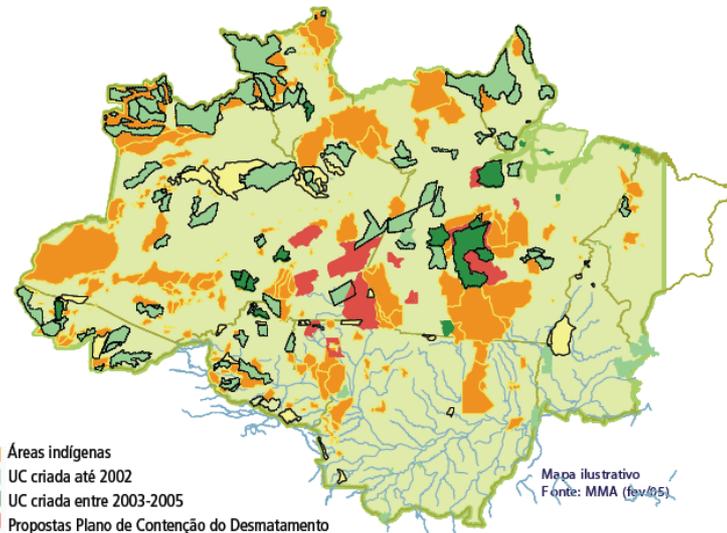
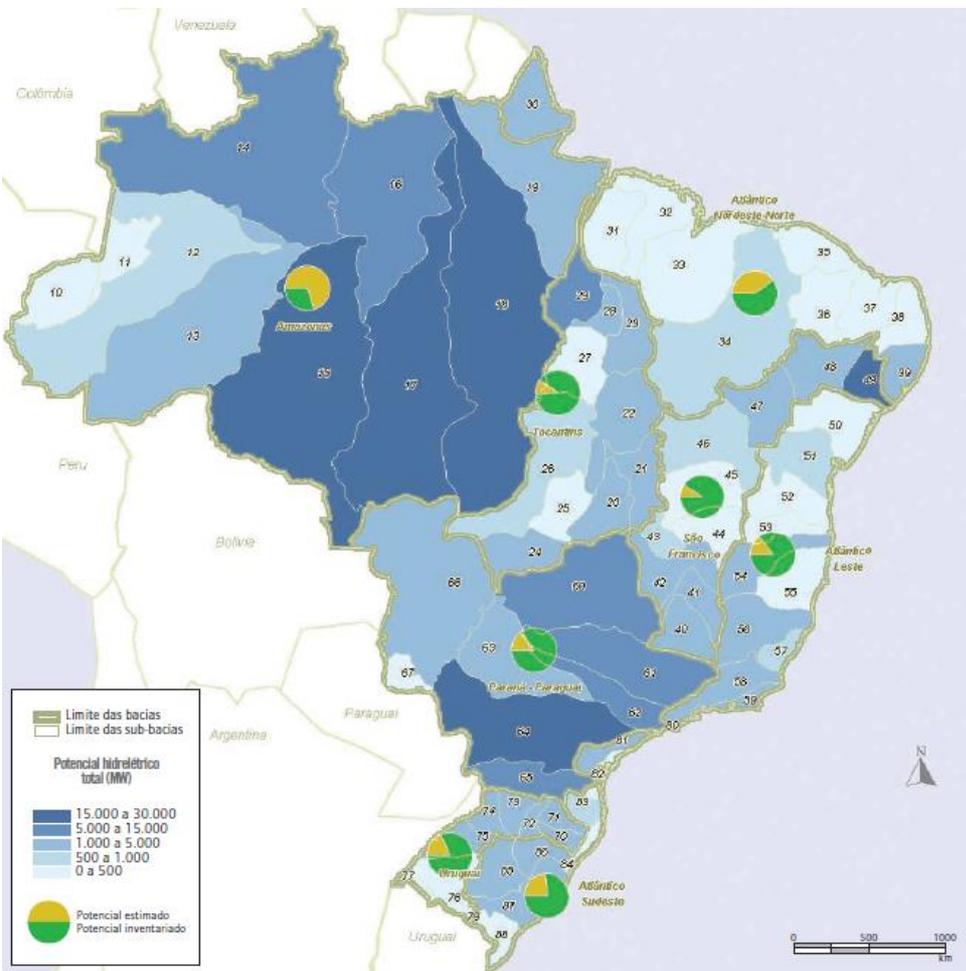
Hydroelectric potential of each water basin (MW)

A large part of the economically viable **hydroelectric potential** is located **far from the consumption centers**

And...

Out of the 19.673 MW projected in the “Plano Decenal de Energia 2021”, **16.089 MW (82%) are located in or near Indigenous Lands and/or protected areas**

Indigenous Reservations or Conservation Areas



Source: Aneel (2002) *Atlas de Energia Elétrica do Brasil*.

Source: MMA(2005)

One of the current bottlenecks for expansion of power production is access to natural gas supply



Petrobras has a virtual monopoly on the supply and transportation of natural gas

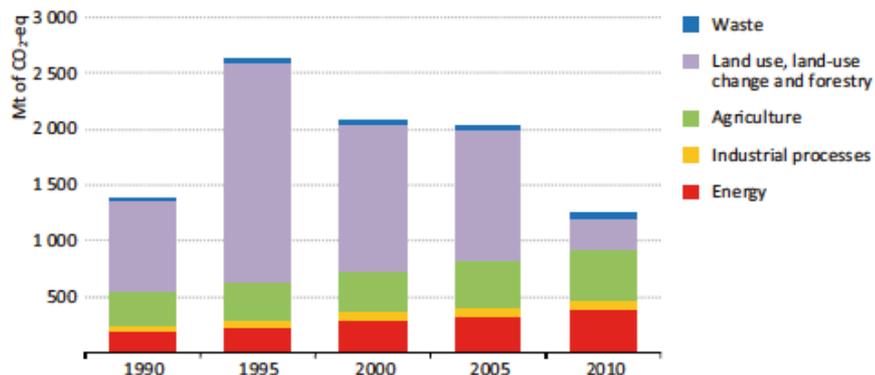
The Petrobras crisis accentuates the need for further liberalization of the gas market and increased private participation

Regular rounds of new oil and gas concessions are needed to increase production and foster competition

Alternative concession regime may be necessary to promote the exploration of unconventional reserves

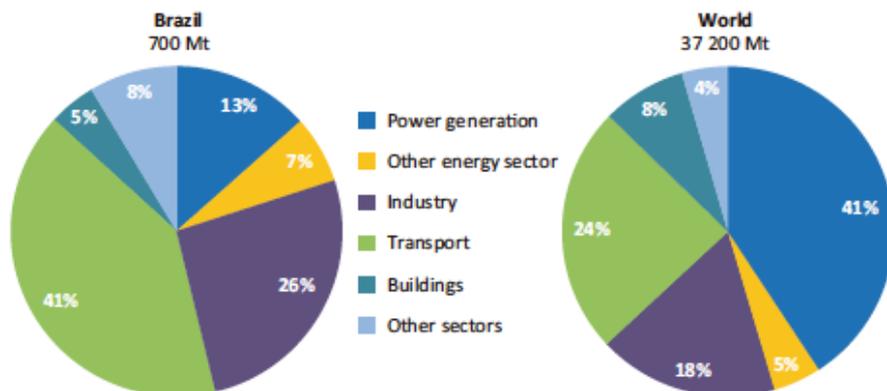
GHG emissions should not be a major **barrier** for the installation of new thermoelectric plants because their contribution to Brazilian emissions is very small.

Brazil greenhouse-gas emissions by source



Source: Ministry of Science and Technology (2013).

Energy-related CO₂ emissions by sector, 2035



Currently,

The **generation of electricity:**

- represents only **3.5%** of Brazilian emissions, and
- emits only **97 tCO₂e/GWh**, while the world average is of **580 tCO₂e/GWh**

In 2035,

The **generation of electricity:**

- Represents **13.0%** of Brazilian energy sector, and
- emits only **87 tCO₂e/GWh**, while the non-OECD average is of **435 tCO₂e/GWh**

Challenges and Opportunities Brazilian Electricity Sector

Opportunities

- ❑ The intense economic and political crisis is forcing the adoption of more orthodox policies
- ❑ If the new policies succeed, the economic slowdown may be reverted by 2016
- ❑ The expiration of concessions (Hydros and DisCos) provide opportunities to enter (or expand the position in) the market
- ❑ Generation and transmission auctions with long term PPAs and consolidation moves also help paving a positive outlook
- ❑ The increasing relevance of natural gas in the Brazilian matrix, combined with the need of private capital, will lead to numerous opportunities along the value chain

Challenges

- ❑ The following challenges require permanent institutional and regulatory efforts:
 - ❑ Socio-environmental obstacles for new generation and transmission projects
 - ❑ Tariff Policy and Regulation (Distribution and Transmission)
 - ❑ Weight of taxes and subsidies
 - ❑ Corporate governance in state-owned companies
 - ❑ Strength and autonomy of the regulatory agency
 - ❑ Auction's mechanism improvement

The Brazilian economy may benefit from more coherent policies, the business environment and its institutions are more mature, the regulated auctions are stable, new energy sources are becoming feasible or receiving incentives, GHG effects are not critical for the sector.

Private players must be prepared to manage the challenges while, simultaneously, seizing the market opportunities that will arise.

O Instituto Acende Brasil é um Centro de Estudos que visa a aumentar o grau de Transparência e Sustentabilidade do Setor Elétrico Brasileiro. Para atingir este objetivo, adotamos a abordagem de Observatório do Setor Elétrico e estudamos as seguintes dimensões:

Para saber mais acesse
www.acendebrasil.com.br



TARIFA E
REGULAÇÃO



AGÊNCIAS
REGULADORAS



GOVERNANÇA
CORPORATIVA



RENTABILIDADE



Brasil

O OBSERVATÓRIO
DO SETOR ELÉTRICO BRASILEIRO



IMPOSTOS E
ENCARGOS



OFERTA DE
ENERGIA



LEILÕES



MEIO AMBIENTE
E SOCIEDADE