

Ad hoc Expert Group Meeting on
**Domestic Requirements and
Support Measures in Green Sectors:
Economic and Environmental Effectiveness and Implications for Trade**

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**Notes on Domestic Requirements
and Support Measures for
Renewable Energy Sources in Brazil**

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Key messages

- Industrial policy for renewables calls for new rationale.
- Brazilian support to renewables focus on local investment and R&D.
- Local conditions matters.

General remarks

Green economy

From an economy of scarce resources to an **economy of plenty resources:**

- Avoid consuming all fossil energy resources: CDM, carbon tax, ETS etc.
 - Search of alternative resources: oriented R&D and industrial development
- ⇒ Renewables industrial policy cannot cope with current market signals neither with foreseeable cost benchmarks.

Local content for local fuels

Renewables deal with locally heterogeneous fuels and social and technical conditions:

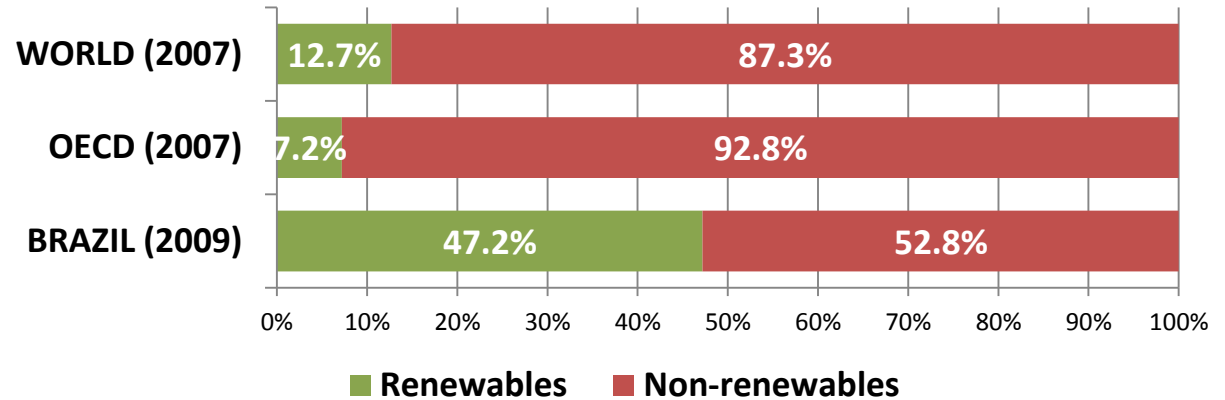
- Biofuels: soil, climate, alternative land uses
- Wind power: climate, “not in my neighborhood”
- Solar: insolation, silicon quality

⇒ R&D efforts and knowledge of natural local features are a precondition to long run industrial development.

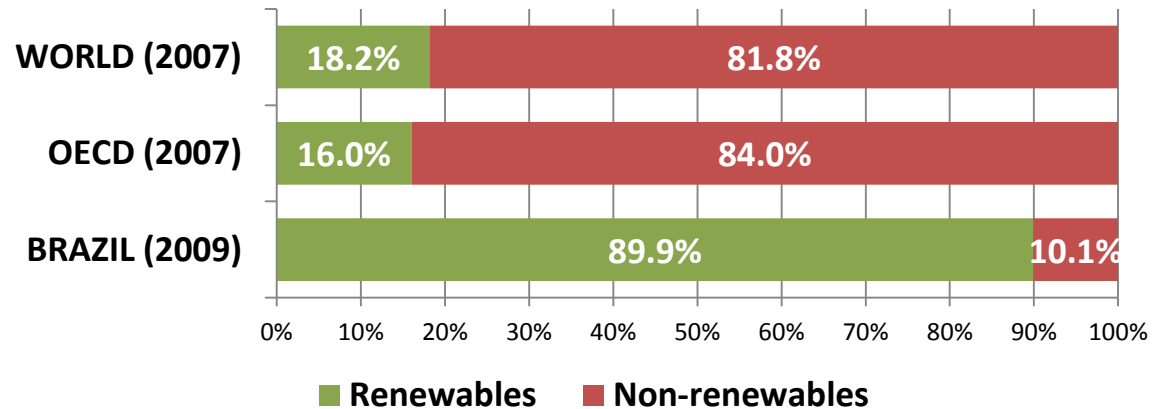
Brazilian experience with renewables

International and Brazilian Energy Mix

Total energy



Electricity

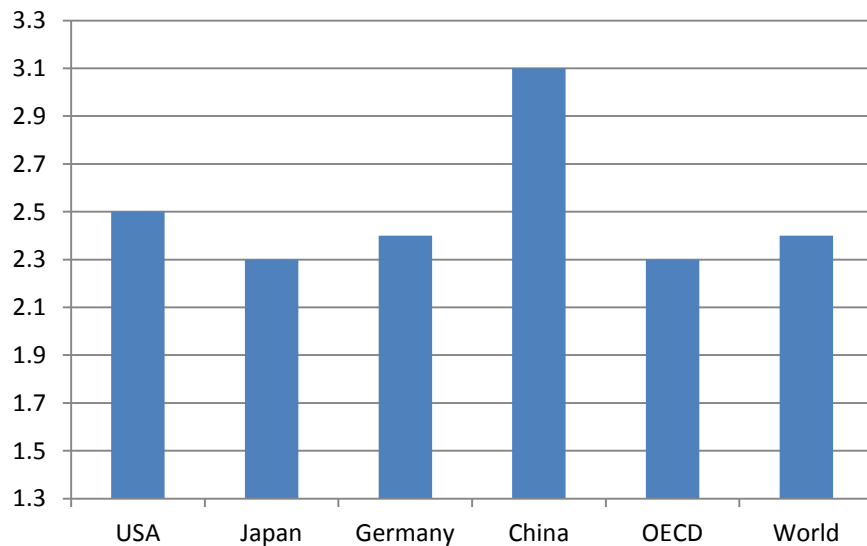


Source: IEA

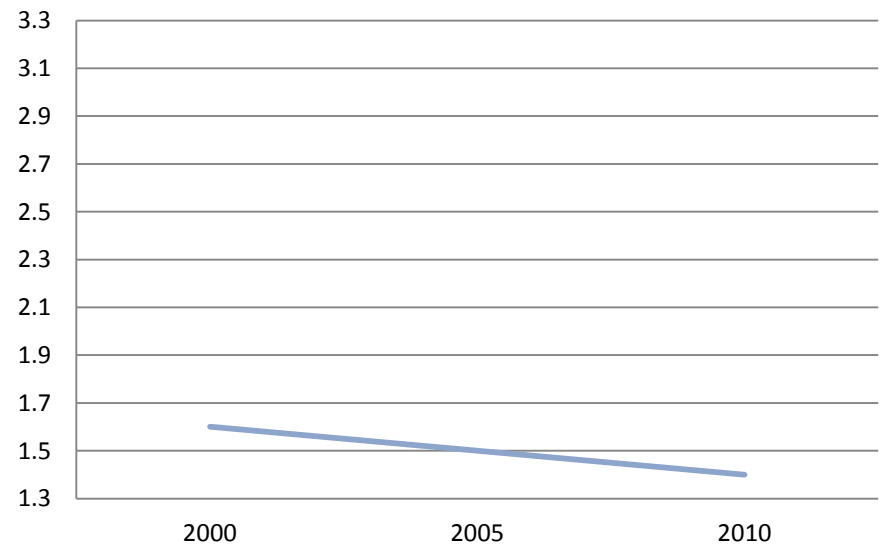
Bioelectricity = 5.5% of total electric generation

Total energy carbon emissions intensity, tCO₂/toe

Selected countries and regions, 2008



Brazil, selected years



Source: IEA, Mining and Energy Ministry (Brazil)

Ethanol Production in Brazil: long term Productivity growth



Source: UNICA.

PAIIS

Joint Plan for Innovation in Sugarenergy and Sugarchemicals, offers US\$ 550+ from main public development institutions (BNDES and Finep) to support dozens of R&D projects for the **whole industrial chain**: 2nd generation bioethanol, bagasse treatment, enzymes, catalyzers, biotech, new products (“alcoholchemistry”), biorefineries etc.

Cost competitiveness of wind power

Wind power is **reaching grid parity quickly** (US\$ 55 MWh). Currently, is second only to hydro power, which is among the lowest cost sources worldwide.

Considering seasonal complementarity between rain and wind regimes, it has become a competitive source for national grid as a whole.

Investment attraction

SUZLON
POWERING A GREENER TOMORROW

Vestas

ALSTOM

IMPESA
wind

 **acciona**

Gamesa 

WEG


Fuhrländer

 **GEVISA**

WOBLEN  **ENERCON**
WINDPOWER

SIEMENS

Impsa's IWP-100

First Brazilian developed wind turbine
customized to especial wind conditions of
Northeast sites:

- More stable wind blowing (no gust)
- Adapted IEC61400-1 (Design Requirements of Wind Turbines)
- Direct Drive Permanent Magnet Generator
- Federal (Finep) grants of US\$150 mi (2009/12)

Metallurgical route to silicon purification

- Renewable electricity made from renewable electricity with charcoal.
- Lower scale intensity.
- Less consumption of chemical and other expensive raw materials.