FINANCING RENEWABLE ENERGY SOURCES IN BRAZIL

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DEVELOPMENT BANKS, USD BILLION (2013)

Source: Luiz Pinto and Marcos Reis, Lemann Center for Brazilian Studies Working Paper
BNDES FINANCING (DISBOLURREMENTS) FOR GREEN ECONOMY

(BILLION USD)

Source: Sabrina Furtado, Instituto PACS
GREEN ECONOMY SHARE IN TOTAL BNDES DIBURSEMENT

Source: Sabrina Furtado, Instituto PACS and BNDES
BNDES FINANCING (DISBURSEMENTS) FOR GREEN ECONOMY, 2014

- Non Conventional Renewable Energy and Energy Efficiency: 27.80%
- Hydro (above 30 MW): 18.90%
- Public Transportation: 12.90%
- Railroad and Maritime Freight Transportation: 5.40%
- Water and Sewer Management: 4.10%
- Forests: 2.30%
- Solid Waste Management: 1.50%
- Climate Change Adaptation and Natural Disaster Risk Management: 1.30%
- Agriculture Improvements: 0.20%
- Others: 0.20%

Source: Sabrina Furtado, Instituto PACS
## INVESTMENT IN RENEWABLE ENERGY SOURCES

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td><strong>1</strong></td>
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<tr>
<td>Investment in renewable power and fuels (not including hydro &gt; 50 MW)</td>
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<tr>
<td>Investment in renewable power and fuels per unit GDP¹</td>
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<tr>
<td>Geothermal power capacity</td>
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<tr>
<td>Hydropower capacity</td>
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<tr>
<td>Solar PV capacity</td>
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<tr>
<td>CSP capacity</td>
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<tr>
<td>Wind power capacity</td>
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<tr>
<td>Solar water heating capacity²</td>
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<tr>
<td>Biodiesel production</td>
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<tr>
<td>Fuel ethanol production</td>
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</tbody>
</table>
Two Contracting Markets

COMPETITIVE GENERATION

Supply prices resulting from auctions

Regulated Contracting Market

D: retailers/captive consumers
CL: free consumers (above 3 MW)
C: traders

Supply prices freely negotiated

Free Contracting Market

CL
C

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CALL FOR POWER PLANT PROJECTS
Main technical requirements for participation

Reduction of Construction and Institutional Risks:

• A project's technical and environmental viability must be ensured to participate in the power auction.

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ANEEL REGISTRY</th>
<th>PRIOR ENVIRONMENTAL LICENSE</th>
<th>ELECTRICAL CONNECTION INFORMATION</th>
<th>ENERGY PRODUCTION CERTIFICATE</th>
<th>LAND USE CONTRACT</th>
<th>FUEL SUPPLY CONTRACT OR TERM OF COMMITMENT</th>
<th>WATER USE GRANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROPOWER PLANT (HPP and Small Hydro)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
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<tr>
<td>THERMAL POWER PLANT (BIOMASS and FOSSIL)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>WIND POWER PLANT</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SOLAR PV PLANT</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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</tr>
</tbody>
</table>

Source: EPE
The power plant investors that win the auction sign contracts with all the electricity distribution companies that have requested electricity. (The amount of energy covered by each contract is proportional to the participation of each electricity distribution company in the total power requested)

Reduction of the credit risk: Client Diversification

Reduction of Market Risk: stable revenue even with an unfavorable market environment
The entrepreneur with the PPA look for financing to build the power plant.
1) BNDES Direct Financing

Private Financial Institution is responsible for the credit analysis and financing condition and take non-payment risk

2) BNDES Indirect Financing

3) Private Financial Institutions
PROJECT FINANCE - BNDES

Timeline

- Auction
- Contracts Signed/Bridge Loan Approved
- LT Loan Approved
- Completion
- End of Concession

Long Term Loan:
- Hydro: 30 years
- Wind: 20 years
- Solar: 15 years

3 Months
6 Months
30 Months to 60 Months
... 30 years total

Equity (20-35%)
Bridge Loan
Long Term Loan (65-80%)
Infrastructure Bonds (10-15%)

Source: BNDES

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FINANCING INFRASTRUCTURE HOLDINGS AND SPC’S

Brazilian Infrastructure Bonds and infrastructure investment funds – benefits for non-resident investors:
(i) zero Income Tax rate
(ii) zero IOF (Financial Operation Tax)

Government Banks/Funds may co-invest with strategic and financial investors, either directly in the SPC’s or through the holding company’s equity, taking minority equity stake

Source: BNDES
HYDRO POWER IN BRAZIL

Source: EPE

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WIND POWER DEVELOPING IN BRAZIL

Operating and contracted

Installed Capacity [ MW ]

Sources: ANEEL and EPE

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BIOMASS DEVELOPING IN BRAZIL

Sources: ANEEL and MME

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Installed Capacity [MW]

Operating and contracted
1\textsuperscript{ST} AUCTION  
OCT, 2014

SUBMISSION  
400 PROJECTS  12,262 MWp

TECHNICAL QUALIFICATION  
332 PROJECTS  10,092 MWp

RESULTS  
31 PROJECTS  1,048 MWp

AVERAGE PRICE  
8.8 US$ cents/kWh

2\textsuperscript{ND} AUCTION  
AUG, 2015

SUBMISSION  
382 PROJECTS  12,528 MWp

TECHNICAL QUALIFICATION  
341 PROJECTS  11,261 MWp

RESULTS  
30 PROJECTS  1,044 MWp

AVERAGE PRICE  
8.4 US$ cents/kWh

3\textsuperscript{RD} AUCTION  
NOV, 2015

SUBMISSION  
649 PROJECTS  20,953 MWp

TECHNICAL QUALIFICATION  
493 PROJECTS  15,864 MWp

RESULTS  
33 PROJECTS  1,116 MWp

AVERAGE PRICE  
7.8 US$ cents/kWh
POWER AUCTIONS RESULTS
2005 - 2015

TOTAL
950 PLANTS – 78,934 MW

34 AUCTIONS
- 20 New Energy Auctions
- 3 Structural Projects Auction
- 8 Energy Reserve Auction
- 3 Alternative Source Energy Auction

RENEWABLE SOURCES
CONTRACTED 59,843 MW [76%]

NEW RENEWABLES
CONTRACTED 24,202 MW [31%]

Source: EPE

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Thank you

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