Executive Summary

This is the revised and expanded second edition of the publication: **The Brazilian Electric Sector and Sustainability in the 21st Century- Opportunities and Challenges**. This report brings new and critical analysis about the Brazilian electric sector, which is primarily funded with public resources. The report also investigates the potential for alternative and more sustainable sources of electricity for the country.

The initiative to create this publication emerged from the realization that critiques regarding the social, economic and environmental viability of controversial dam projects, such as Belo Monte, needed to be complemented by arguments regarding the existence of better alternatives for meeting Brazil's energy needs. This publication shows that they do exist.

However, the federal government of Brazil needs to be open to urgently revising assumptions regarding future energy demand. Future growth scenarios should not be estimated exclusively on the basis of economic growth as reflected by Gross Domestic Product (GDP), disregarding essential questions regarding energy efficiency and the destination of electricity that is produced.

One example of this, as outlined in the report, is that currently about 8% of the electricity consumed in Brazil leaves the country in the form of iron ore, steel, aluminum, cast iron, and paper products that are exported with little value-added, scarce generation of jobs and high social and environmental costs.

The authors of this publication warn that it is necessary to give primacy to increasing energy efficiency and reducing energy losses. Furthermore, investing in energy efficiency is an essential contribution to technological innovation and industrial competitiveness, but government incentives for this are sorely lacking.

By 2020, the petroleum and gas sector in Brazil is scheduled to receive R$590 billion (US$295 billion) and the hydroelectric sector R$190 billion (US$95

billion) in subsidies from the Federal Government, while there are no specific financial commitments to energy efficiency, the authors inform. This imbalance in public investments contributes to the lack of competitiveness of Brazilian industry, amongst other negative impacts.

Brazil throws away an enormous quantity of energy that could be used for the country's development. Transmission losses in the country are close to 20% – one of the highest in the world. And this leads to direct impacts in the form of higher electricity bills for consumers, and a decrease in tax revenues due to the non-collection of electricity tariffs.

These transmission losses were verified by the Federal Accounting Court (*Tribunal de Contas da União*), but there are internal disagreements within the government regarding these losses that contribute to inertia in the search for needed solutions. If the government invested in increasing the efficiency of the transmission system in Brazil, there would be a significant reduction in the pressure to construct new hydroelectric dams in the Amazon region.

However, the Federal Government continues to pursue ambitious plans to accelerate the construction of hydroelectric dams in the Amazon in the coming years. The authors describe grave social and environmental impacts downstream and upstream - such as greenhouse gas emissions, losses of biodiversity and impacts to the livelihood and rights of local populations – associated with the current fever of dam construction in the Amazon. These impacts are underestimated or ignored in basin inventories and environmental impact assessments conducted by the government's electric sector and private corporations.

The authors emphasize the need to overcome misconceptions regarding hydroelectric dams as a source of clean, cheap and renewable energy. They warn that it is crucial to reverse current trends towards lowering social and environmental safeguards, including compliance with Brazilian legislation and international standards on human rights and environmental protection. They

outline the need to eliminate perverse incentives for the construction of dams such as carbon credits under the Clean Development Mechanism.

In the case of the Belo Monte and Tapajós Hydroelectric Complexes, a series of risk scenarios presented in this document demonstrate the lack of feasibility of both projects due to the influence of variables such as construction time, costs, carbon emissions and the market price of carbon credits. The result will be extraordinary public contributions to the development of projects through tax breaks, cross subsidies and the participation of state enterprises and pension funds whose investment portfolios are influenced by the federal government. This has already occurred in the case of Belo Monte.

An examination of the financing of big hydroelectric projects in this report reveals weaknesses in the risk analysis and social and environmental safeguard policies of public and private banks and insurance companies. Financing decisions are made merely on the basis of whether environmental licenses have been granted, yet such licenses typically demonstrate serious legal flaws within administrative procedures, in addition to violations of voluntary agreements, such as the Equator Principles and Brazil's Green Protocol.

If such underlying flaws continue in the licensing processes of dam projects, banks may bear the economic risks of such projects, and, according to the principle of strict liability in Brazilian environmental law, may be responsible for environmental damages, regardless of the formal existence of environmental licenses.

The enormous potential of solar and wind energy in Brazil is being largely ignored within public policies for the energy sector, according to this report. Based on available technologies, if solar energy was captured in less than 5% of Brazil's urban areas (or 0.01% of Brazil's territory), it would be possible to meet 10% of the current national electricity demand.

In the case of wind energy, the unexploited potential is 300 GW, almost three times the total installed capacity in the country today. However, the lack of a consistent set of policies to incentivize and upscale truly renewable energy, as well as regulatory barriers, present obstacles to the enormous opportunities for the expansion of solar and wind energy in Brazil.

In the analysis of the potential for biomass in the Brazilian electric matrix, the authors state that the use of sugar cane residue for the cogeneration of electricity presents an important alternative to petroleum products and other fossil fuels. The generation potential of this source could reach approximately 14,000 MW in 2021, which corresponds to the energy production of three Belo Monte dam projects.

Private investment in renewable energy in Brazil grew by 8% in 2011, reaching US$7 billion, mainly due to the expansion of wind energy. In global terms, investment in renewable energy reached US$237 billion dollars in 2011, surpassing the US$223 billion invested in the construction of new fossil fuel plants, indicating a positive growth trend for the renewable energy sector, which does not include hydropower.

But to take advantage of the opportunities and to overcome the obstacles mentioned above, it is necessary to increase transparency and open up democratic space for debate and dialogue between the government and society, which is not effectively occurring due to a lack of political will on the part of the Brazilian Government.