Climate Change: Bridging Texas and São Paulo

by Oswaldo Lucon

UPON MY arrival from Brazil to lecture at the Teresa Lozano Long Institute of Latin American Studies on energy and climate policies, I found in Texas interesting possibilities for long-term research and collaboration with my home state of São Paulo. Both have a huge policy influence in their countries, which makes comparisons inevitable. Texas has the second largest economy in the U.S., with a gross product equivalent to two-thirds of Brazil's. São Paulo has the largest economy and population in Brazil, indicators that make it comparable to Argentina (see Table 1).

Considering the advantages of a new and greener economy, Texas and São Paulo have many possible opportunities ahead for change and collaboration, sharing their best practices, creating new and durable jobs, and developing a positive environment for state-of-the-art technologies. If this happens, there may be significant positive spillovers to the national contexts.

Pursuing economic growth coupled with increased carbon emissions poses a threat to humankind. As a result of following practices established during the Industrial Revolution and with the idea that they have a right to pollute based on historical and/or per capita contributions (Figure 1), countries like China, India, Brazil, and other emerging economies are now emitting as much or more carbon into the atmosphere as their developed counterparts (Figure 2). According to the U.S. Department of Energy (2011a), non-OECD (developing nations) energy-related emissions of carbon dioxide exceeded OECD (developed countries, or literally, the Organization of Economic Cooperation and Development) for emissions in the year 2007 by 17%. In their reference case scenario, energy-related carbon dioxide emissions from non-OECD countries in 2035 will be about double those from OECD countries. These projections are, to the extent possible, based on existing laws and policies, but may change significantly if laws and policies aimed at reducing greenhouse gas emissions are altered or new ones are introduced. Discussing the effect of global warming on the world economy, the UK *Stern Review* (2006) states that the window of opportunity to reduce emissions at the expense of 1%–3% of the GDP is open only for the next two decades; otherwise, economic losses may reach 20% by 2050. From conceiving a policy to having its ultimate environmental goal—that is, to stabilize global carbon atmospheric concentrations at safe levels (around 450 parts per million CO_2) and to reach an average temperature of no more than 2 degrees Celsius (36 degrees Fahrenheit)—there are several delays to consider. It is a long and winding road from raising awareness to proposing, enacting, and enforcing legislation, then to developing and implementing the necessary technologies at large scale, then to effectively reducing emissions and stabilizing temperatures (Goldemberg and Lucon 2009).

Moreover, taking into consideration that growing in a global market requires being innovatively competitive, this approach seems ineffective.

After an increase of 9.2% in 2009, China's economy grew 10.3% in 2010, and is expected to increase 8% this year. India's favorable demographics, with over 30% of its population below age 15 and a comparatively higher intellectual level, look set to support the country's consumption and economic growth in the long run. The Brazilian economy rebounded robustly in 2010 with 7.5% growth thanks to strong domestic demand and heavy government investment (Fei et al. 2011). In the U.S., President Obama has rightly said in the State of the Union Address that *rules have changed* (White House 2011). Beyond a threat to the U.S. welfare, limits to growth have now exceeded the earth's carrying capacity, bringing new and still not well understood rules to the economy's game. Public expenditures are also higher with effects from climate change (e.g., induced migration control, responses to natural disasters, and increases in healthcare costs). Moreover, oil-producing regions are not infrequently unstable in geopolitical terms, entailing additional burdens to governmental budgets all over the world.

Many regions in the world are vulnerable to extreme weather events and other associated impacts. Unfortunately, this is the case with Texas and São Paulo, where agriculture, cities, coastal areas, and ecosystems are environmental hotspots that adequate policies will necessarily have to address accordingly and with a growing intensity (IPCC 2007). The São Paulo metropolitan area has around 25 million people within a 75-mile radius of the city center, exposed to air pollution, heat islands, flash floods, and dengue fever outbreaks. Many of Texas's urban regions were designated as having some of the worst air quality in the nation (Pew Center 2007). Houston is a perfect laboratory for climate change: wetlands, buildings, and infrastructure exposed to rises in sea level, floods, and hurricanes. Forest fires and water deficits are now widespread in both states. Biodiversity losses are impossible to evaluate in monetary units. Texas, the leading crude oil producing state in the nation, is becoming a net importer of such fuel, and natural gas also may not last for long.

The role that Texas and São Paulo can play in this scheme can be prominent if they opt for alternative pathways rather than those based on maintaining or increasing the addiction to oil. This is not an easy task. Texas produces and consumes more electricity than any other state, and per capita residential use is significantly higher than the national average (Pew Center 2007). In São Paulo, massive oil and gas fields were recently discovered offshore—with a magnitude comparable to those of Iraq or Venezuela—which could lead to a more carbon-intensive economy (Lucon and Goldemberg 2010). If Texas and São Paulo were countries, they would be the seventh and forty-third, respectively, on the global list of top fossil-fuel-related CO_2 emitters (see Table 1).

Yet, our states can exchange their best practices. Opinion polls conducted across Texas demonstrated unexpectedly strong public consensus for a new commitment to renewables. Electric vehicles and car-sharing schemes, common in the Austin area, may contribute toward reducing urban pollution and greenhouse gas emissions. While wind energy in São Paulo is virtually unexplored (especially offshore), Texas leads the U.S. in wind-powered generation capacity, with more than 2,000 wind turbines in West Texas alone. Despite the historic role of Texas in fossil fuel development and use, the Renewable Portfolio Standard (RPS) enacted in Austin in 1999 is widely viewed as having launched a new chapter in energy development in the Lone Star state, triggering a massive increase in the supply of renewables that is being provided at prices highly competitive with conventional sources. The program has proven so successful and so popular that the Texas Legislature overwhelmingly endorsed a major extension and expansion of the legislation in 2005 (Pew Center 2007).

São Paulo can contribute to expanding the Texas fleet of alternative-fueled vehicles (100,000, or 12.9% of the U.S. total in 2008). The Brazilian state produces one-fifth of the world's ethanol, with surpluses that could raise the average blend of 6.7% in Texas (in 2009 ethanol consumption was 19.2 million barrels, while gasoline's was 289.5 million barrels, according to the U.S. DoE 2011b). Biomass-based electricity technology (e.g., sugarcane in São Paulo) can mutually benefit our states as well, increasing energy security, improving air quality, and mitigating carbon emissions via the substitution of fossil fuels. This will benefit both regions, curbing greenhouse gas emissions and providing energy security.

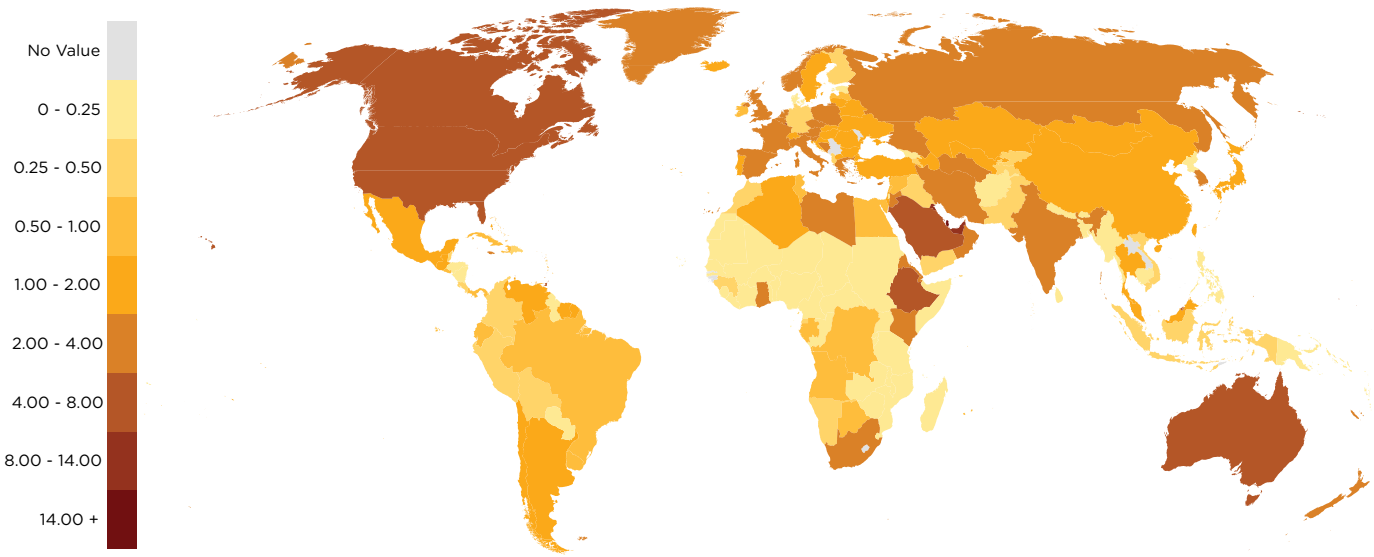

Figure 1. Countries by 2007 per capita carbon dioxide emissions from burning of fossil fuels (tons of CO_2). Data from CDIAC (Boden et al. 2011).

	Texas	São Paulo
Area		
1,000 sq km	696	249
1,000 sq mi	269	95
Population		
Total mln	25	42
Capital, mln	Austin, 0.8	São Paulo, 10
Gross Product		
Total $ bln	1,224	550
share of country's	8%	34%
1,000 $ per capita	48	13
Fossil-fuel CO_2 Emissions		
Total million tons	630	85
Ranking in the world	6th	43rd
Per capita, tons	25.2	2.1
Per dollar GDP	0.51	0.15
Energy Consumption		
Total tons of oil equivalent (toe)	300	58
Per capita toe	12.0	1.4
Typical Environmental Impacts Associated with Climate Change	Hurricanes, severe droughts and water shortages, flash floods, heat waves and cold blasts, sea level rise, losses in crops and fisheries, climate-induced migration from other countries	Severe droughts and floods, sea level rise, landslides during thunderstorms, heat islands in cities, epidemics of dengue fever and other weather-associated diseases, agricultural losses, enhanced air pollution episodes

Table 1. Texas and São Paulo, basic information (2008 data from SSE 2011; 2005 CO_2 SP emissions from CETESB unpublished; U.S. DoE 2011b; ranking as if a country by Wikipedia 2010; vulnerabilities from IPCC 2007; Pew Center 2007; Environmental Defense et al. 2000; and SMA unpublished.

With a significant part of the economy depending on fossil fuels, a long-term view cannot leave out the possible benefits of new technologies, such as hydrogen associated with carbon capture and storage (CCS). More than for local use, these technologies have a huge potential for enhancing value-added exports of goods and services from Texas and São Paulo. Local benefits include urban air pollution abatement and improved clean energy security through better use of coal, oil, and gas.

Obviously, such challenges are often seen as barriers to be avoided by eliminating environmental regulations (a *laissez-faire* approach) or by promoting the idea of a certain "right to emit," because other nations have caused damages to the earth's climate system in the past (the *differentiated responsibilities* view). As a result, a race for unsustainable growth is happening in many parts of the world. Unfortunately, the denial of global warming is leading to serious risks to humankind. There is no environmental room for such controversy, since there is no other Planet Earth as a laboratory control; this one bears the consequences of an ample and accelerated consumption footprint. Man-made climate change skepticism is a good topic to sell paperbacks and to lobby against so-called job slashing legislation, but it is

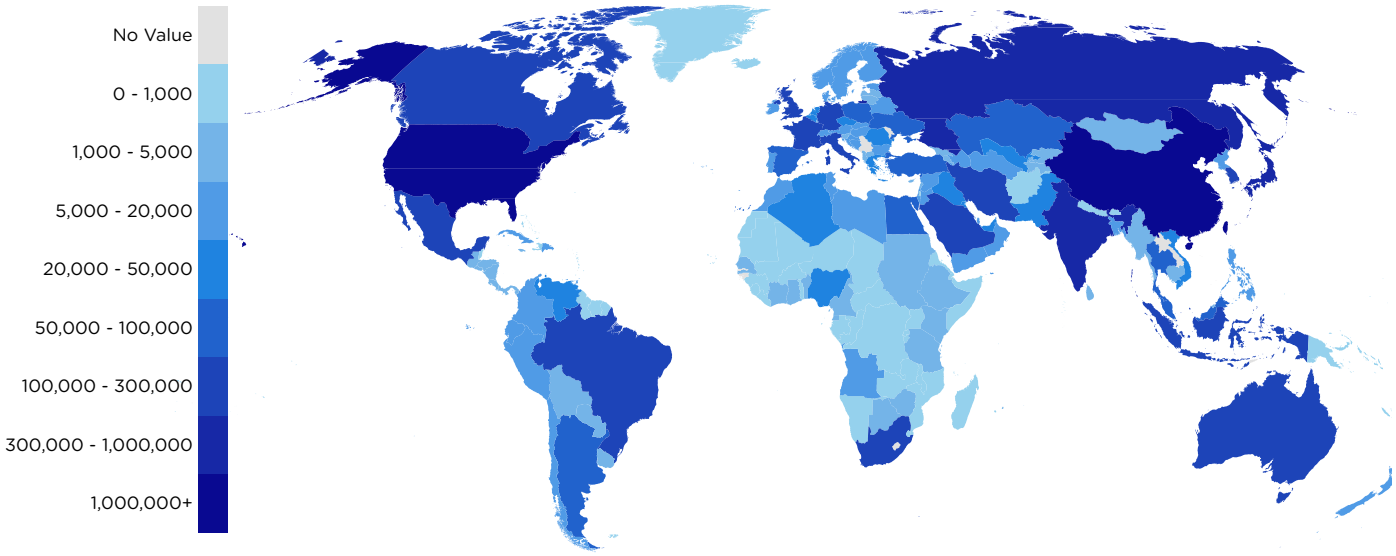

Figure 2. Countries by 2007 carbon dioxide emissions from burning of fossil fuels (thousand tons of CO_2) (Boden et al. 2011).

also a head-in-the-sand option with long-term effects that are economically risky and inconsistent scientifically. The scientific community has reached a consensus, with even skeptical scientists reaching similar conclusions. This was the case of the Berkeley Earth Surface Temperature project, financed by the Koch Foundation (Krugman 2011). Skeptical scientists have been reaching conclusions similar to NASA and other groups analyzing climate trends. Benefits from the business-as-usual economy do not last for long and are counteracted by escalating hidden costs (paid by the society as a whole). Jobs, for example, are not secured against losses in competitiveness to other markets that have opted for a high-value-added and low-carbon economy. This is the path that China is pursuing aggressively, as demonstrated by the country's five-year plan (Seligsohn and Hsu 2011).

Adapting to extreme weather events is a whole new area of discussion, in which the Texas experience could make a significant contribution to São Paulo, Brazil, and the whole Latin American and Caribbean region. I have invited students from my UT class to write a special article here (see p. 26) on this topic, covering best practices from the Austin area. It was a great satisfaction to find such a proactive environment here.

Collaboration can happen in several different forms. A good and reasonable first step in the area of climate change could be through institutional departments (e.g., LLILAS and the Universidade de São Paulo's Instituto de Eletrotécnica e Energia). Furthermore, it could be expanded to the whole of UT and USP, as well as to other universities. A more ambitious step would be an agreement between the states of Texas and São Paulo, as was made by the Brazilian region with California in 2005 and 2007 (Reid et al. 2005; SMA 2007). São Paulo and California have adopted ambitious climate policies—including emission targets. This may not be seen as a recipe for Texas, but without any doubt, diversification of energy supply and improved economic competitiveness would be a major driver for mutual interests. ✹

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All Internet links accessed April 11, 2011. *The author would like to thank all those who made this opportunity possible, especially the Fulbright Commission Brazil, the University of Texas and LLILAS, and the São Paulo State Government, as well as Charles Hale, Julie Nordskog, Fernando Lara, Virginia Hagerty, Bruno Covas, Pedro Ubiratan Azevedo, Margarette Sabella, Ana Paula Fava, Jose Goldemberg, Fernando Rei, and Virginia Dorazio, and for the article review and valuable contributions, M. Anwar Sounny-Slitine.*