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Energy Consumption: Challenges and Opportunities of Urbanization

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Energy Challenges in the Americas

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Cover Image:

Ribeirao das Lajes dike with its forest bordering the reservoir, an example of Light S.A.'s reforestation program. Light, a subsidiary in Brazil of the French company EDF (Électricité de France), distributes electricity to 80% of the State of Rio de Janeiro and implements environmental protection programs. ANTONIO SCORZA/AFP/Getty Images.

Energy Consumption: Challenges and Opportunities of Urbanization

By Heidi Jane Smith

Latin America and the Caribbean is the most urbanized region in the developing world. Of the mega cities with populations of five million or more, eight are located in this region, and the World Bank estimates this number to increase to 15 by 2030. Faced with the challenges of rapid urbanization, a number of cities have developed innovative ways to deal with increased waste, air pollution and the rising cost of energy. The transportation systems, sanitation sites and waste-to-energy models developed in Latin American cities have been replicated around the world.

When the southern Brazilian city of Curitiba began growing rapidly in the 1960s, Mayor Jaime Lerner and his planning team restructured the city's traffic flow to reduce cars in the downtown area. Curitiba lacked the funding for a subway system, so the team designed a system of express lanes to speed buses through traffic. The system saves around 27 million auto trips annually and approximately 27 million liters of fuel. As a result, Curitiba uses 30% less fuel per capita than any other Brazilian city of its size and has one of the lowest rates of air pollution in the country. Curitiba residents spend only about 10% of their income on travel, much less than the national average, ensuring accessibility for low-income residents.

Bogotá replicated much of Curitiba's transportation ideas when

it created its own rapid transit bus system, the TransMilenio. Project development received unprecedented sub-national financing from the Inter-American Development Bank. Former Mayor Enrique Peñalosa, who presided over the initial project, is now advising other cities interested in building rapid transit bus programs of their own.

A metropolitan giant of 20 million inhabitants, São Paulo has used international cooperation from the EU and US to provide clean technologies around the city. Its waste-to-energy plants reduce approximately three million tons of municipal waste every year. By using a thermal treatment to decompose the garbage, these plants generate approximately 750,000 tons of fuel oil. The decomposition processes within landfills create anaerobic molecules that are absorbed into the atmosphere as H₂O instead of greenhouse gases. With more than 13 million tons of CO₂-equivalent savings, waste-to-energy technologies are of particular interest for climate change policymakers.

Monterrey's sanitation system was in the spotlight when Secretary of State Hillary Clinton visited this northern Mexican city in March 2009. The project is operated by a public-private partnership between Bioelectrical Monterrey, S.A. de C.V., the government of Nuevo León state, and the System for the Handling and Processing of

Organic Waste (SIMEPRODE), a decentralized government agency. The renewable energy project has the capacity to capture 12 MW of electricity per day, sufficient to generate overnight public lighting for seven municipalities. According to SIMEPRODE, the plant has generated more than 400,000 MWh of power and avoided 85,000 tons of greenhouse gas emissions, or 1,800,000 tons of CO₂. The effect is equivalent to planting 970 hectares of forest.

Around the world, the rapid growth of cities is exacerbating global warming, with as much as 78% of total greenhouse gas emissions generated in urban areas. This transformation has enormous implications from an energy and climate perspective: Buildings alone account for up to 40% of the energy consumption of some countries, urban development patterns affect emissions from transportation, and solid waste and sanitation systems are significant sources of greenhouse gases. In some cases, however, the pressures of urbanization have provoked a response from cities to reduce greenhouse gas emissions. As the Latin American cases above illustrate, how cities develop and respond to energy challenges today will have an indelible impact on the world's carbon footprint in the future. ■

Heidi Jane Smith is a PhD candidate in Public Administration at Florida International University.