

GLOBAL URBAN DEVELOPMENT

Curitiba, Brazil

Metropolitan Economic Strategy Report

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July 2004

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I. Introduction

In a world where cities and urban planners are trying to devise ways to adapt to the new global economy, Curitiba, Brazil has been ahead of the game for thirty years. The population boom of the late 1960s and early 1970s required that the Curitiba metropolitan area devise a strategy to deal with what might otherwise become a region plagued by congested traffic, urban sprawl, and pollution. This strategy became Curitiba's metropolitan economic strategy, and like any effective strategy it identified the region's economic assets – a high quality of life that is sustained by an efficient transportation system and a healthy environment. As Mayor Cassio Taniguchi said, “the value of a city is directly proportional to the degree of satisfaction of the people that live in it.”¹ The quality of life in the region is reflected in the fact that Curitiba has a higher per capita GDP and a lower unemployment rate than the Brazilian national average, as well as 55m² of green space per resident compared to the World Health Organization's recommended area of 16m² per resident.²

Once a metropolitan economic strategy identifies the assets it can work with, the next step is to identify the key industry networks – the most economically competitive sources of income for the region – and cultivate them through careful planning that takes advantage of the pre-existing assets. Curitiba's four industry networks (automotive manufacturing, communications software and information technology (IT), infrastructure, and tourism) have grown since the 1970s due to the ability of the metropolitan area to attract skilled workers and international employers. The growth of the city was not haphazard; the cultivation of the environment and the careful planning and integration of public transportation played a large part in the decision of workers and corporations to move to the metropolitan area. For example, Volvo's production plant in Curitiba provides the buses for public transportation and simultaneously creates jobs for this city that is so dependent on its transportation network.

For any metropolitan economic strategy to be successful, it needs people to be the key actors in formulating and implementing a way to encourage growth. This requires good leadership and cooperation between public sector, private sector, government and civic leaders. In Curitiba, two of its most influential leaders, Jaime Lerner and Cassio Taniguchi, both started out as specialists at the local urban planning organization. In addition to creative municipal leaders, Curitiba's Institute for Urban Research and Planning (IPPUC) holds public discussions, takes opinion polls, and collects land-use surveys to keep residents involved in the planning process.³

Curitiba's master plan helped forge a vision and strategic principles to guide future developments. However, that vision was transformed into reality by reliance on the right systems and incentives, rather than on dogmatic implementation of a static plan.

¹ Cassio Taniguchi. “Transported to the Future.” <http://www.ourplanet.com/imgversn/121/tanig.html>

² From Development Company of Curitiba. http://www.cic-curitiba.com.br/quality_life.htm

³ From the IPPUC. “Citizen Information.”

http://www.ippuc.pr.gov.br/informando/index_informando_ingles.htm

The city managers of Curitiba have learned that good systems and incentives are better than good plans.⁴

II. Overview of the Metropolitan Region

Curitiba is a metropolitan area approximately 400km southwest of São Paulo, Brazil that stands 914m above sea level. The entire metropolitan area is 430km² with a population of 2.3 million people, 1.6 million of which live in Curitiba proper. First founded as a gold-mining town in the seventeenth century, the city of Curitiba was also part of the cattle-driving route to São Paulo. From there it gradually evolved into a trading post, attracting merchants at first, and then expanding into a developed city by the end of the nineteenth century.

In 1854, Curitiba became the capital of the state of Paraná. Around the turn of the twentieth century, the region witnessed a large European immigration that left a deep impact on the city's culture. As a result, there is a distinct mixture of German, Polish, and Italian influences. The temperate climate - seasonal fluctuations only range from 13°C to 21°C – made the area ideal for agriculture.

Figure 1



Paraná is the fourth largest exporter of all Brazilian states; over 40% of the state's exports are soybean products, and about 50% of the state's exports are manufactured goods such as automobiles built in the Curitiba metropolitan area. In fact, Curitiba is responsible for about 60% of the Paraná's GDP.⁵ As the capital of this largely agricultural state, Curitiba can be considered the economic center that manages the

⁴ From the National Library for the Environment website.

<http://www.ncseonline.org/NCSEconference/2001Conference/report/page.cfm?FID=1719>

⁵ From the Export Ohio website. <http://www.odod.state.oh.us/itd/Parana.pdf>

transport of goods. Many of Paraná's exports either pass through Curitiba on their way to the port in nearby Paranaguá or are managed by firms based in the metropolitan area in some way. The Curitiba metropolitan area is influenced by a variety of contextual factors. Some of these include, but are not limited to, the geo-political location, the political history, and the current structure of the central government.

Urban areas are inevitably affected by the political and geographical context in which they operate. Thus Curitiba's status as a state capital can provide opportunities for growth because the concentration of different governmental offices gives the metropolitan area access to public leaders. For instance, three-time Mayor Jaime Lerner was elected governor of Paraná in 1994 and 1998.⁶ The region has benefited from its opportunity to hold on to good leaders such as Jaime Lerner.

The political atmosphere of the nation is also bound to affect any metropolitan economic strategy to a certain extent. The central government often sets trade regulations and provides funding for programs that affect the development and implementation of the metropolitan economic strategy, making it necessary to understand the structure of Brazil as a whole.

Over the last fifty years, Brazil has transitioned from a centralized military junta to a highly decentralized democracy with a multiparty system. Officially, the government is now a federative republic comprised of 26 states, as well as a federal district. These are organized into five regions (North, Northeast, Center-West, Southeast, and South). On October 5, 1988 the country adopted a new constitution which marked the end of military rule. It established an executive branch in which the president is elected to a maximum of two four-year terms. The legislative branch is made up of a Federal Senate and a Chamber of Deputies (similar to the US House of Representatives). The judicial system is headed by a court of eleven judges who are appointed for life by the president and approved by the Senate.⁷

Brazil's trade regulations impact Curitiba because they limit the opportunities for trade with other nations, while granting favor to Mercosur nations. Trade regulations have been decentralizing slowly; the Heritage Foundation ranked Brazil 80th in the world for 2004 and gave the country a rating of 3.10, or "mostly unfree" according to its Index of Economic Freedom.⁸ As a member of Mercosur (the Southern Cone Common Market), Brazil has favorable trade relations with the other member nations – Argentina, Paraguay, and Uruguay). All member nations operate under a shared export tariff rate that varies from zero to 23 percent. When looking at the automotive manufacturing network, for instance, it is understandable that the vehicles produced are either for local, national, or at the most Mercosur-wide consumption.

Despite a rather recent transition to economic liberalization, government decentralization began over twenty years ago. From 1965-1978, the prefeitos (mayors) of state capitals such as Curitiba, as well as state governors, had been appointed by the central government. As the regime began to liberalize, the citizens of Curitiba were given more direct control. For instance, free elections for governor were held in 1982. Then, in 1985, Curitiba was able to hold direct elections for mayor. With the 1988 constitution

⁶ <http://encyclopedia.thefreedictionary.com/Jaime%20Lerner>

⁷ From the US Library of Congress. <http://lcweb2.loc.gov/frc/cs/brtoc.html#br0090>

⁸ From the Heritage Foundation Index of Economic Freedom.

<http://cf.heritage.org/index2004test/country2.cfm?id=Brazil>

Brazil's mayors and governors gained considerable power in the development of their jurisdictions through the new specification of mandatory revenue allocation to municipalities and states.⁹

Table 1

Dynamic Leaders: Prefeitos (Mayors) of Curitiba (1971- Present)

Jaime Lerner	1971 - 1974
Saul Raiz	1975 - 1979
Jaime Lerner	1979 - 1983
Marício Fruet	1983 - 1985
Roberto Requião de Mello e Silva *	1986 - 1988
Jaime Lerner	1989 - 1992
Rafael Greca de Macedo	1993 - 1996
Cassio Taniguchi	1997 - 2001
Cassio Taniguchi	2002 -

*first elected mayor
from http://www.casadamemoria.org.br/historiadecuritiba/lista_de_prefeitos.html

III. Curitiba's Metropolitan Economic Strategy

A. Introduction to the Regional Economy:

Curitiba is above the national average in expenditures such as food, housing, and clothing – measures that reflect a high standard of living and a level of prosperity relative to the rest of Brazil. The region's Gross Domestic Product (GDP) is US \$12.1 billion, and has been growing at about 4% per year. More recently its GDP as a share of the national GDP has increased as well as Curitiba's per capita GDP compared to the national average. The per capita GDP for Curitiba is US \$8,000, whereas the per capita GDP for Brazil is US \$5,000 annually. The unemployment rate for Curitiba is 4.02% as of December 2001 – the national rate at this time was 7.5% for men and 11.9% for women according to the UN statistical department.¹⁰ Much of this relative prosperity comes as a result of a successful metropolitan economic strategy.

Mayor Taniguchi repeatedly emphasizes that one of the most important assets for any metropolitan economy to possess is a good quality of life – this helps attract skilled workers, employers, and investors to the region¹¹. Curitiba's high standard of living is reflected by many different values and statistics. For instance, the Human Development Index (HDI) value for 1991 was 0.819 out of 1. The HDI is the scale used by the United Nations Development Program for measuring human welfare. It takes health, life expectancy, education, and standard of living into account through a mathematical

⁹ *ibid*

¹⁰ From the United Nations Statistical Department.

<http://unstats.un.org/unsd/demographic/ww2000/table5a.htm>

¹¹ For example, see "Transported to the Future." <http://www.ourplanet.com/imgversn/121/tanig.html>

formula.¹² The literacy rate was 94% in 1996¹³, and the 1997 life expectancy was 72.2 years. The metropolitan area performs above the national average in both of these statistics as well – 86.4% of Brazilians were literate as of 2000¹⁴, and the life expectancy is 69 years.¹⁵

Another factor that makes Curitiba an economically strong city is the positive influence of a healthy environment on living conditions. The region has 25 parks with 55m² of green space per resident, a value well above the 16m² that is recommended by the World Health Organization.¹⁶ There are 35 hospitals (as of 1999) which help care for a population that is growing at the rate of 1.82% annually. The metropolitan area is also well educated, with 30 “higher education institutions” (such as trade and vocational schools) and five universities; 6.5% of the population has over fifteen years of schooling. Curitiba is also the only metropolitan region in Brazil that did not see increase inequality in the income distribution from 1970 to 1988 according to inequality measurements computed with the Gini coefficient.¹⁷ Since the metropolitan area’s GDP was growing during this period, the steady Gini coefficient shows that the growth was evenly distributed among Curitiba’s residents, thus improving the overall standard of living. In addition, the metropolitan area (RMC in Table 2) has generally grown faster than the city of Curitiba, which reflects the fact that the neighborhoods surrounding Curitiba proper were sites of economic growth instead of just suburban sprawl.

Table 2:

GROWTH ECONOMIC RATES OF CURITIBA, RMC, PARANÁ AND BRAZIL - 1970/80, 1980/90, 1990/96 AND ESTIMATION 96/00					
LARGE	PERIOD / RATES IN %				
	60/70	70/80	80/90	90/96	96/00
Curitiba		11.78	3.97	2.97	3.64
RMC*		12.16	4.16	2.73	3.68
Paraná		9.29	2.16	2.25	2.19
Brazil	5.90	8.56	1.50	3.03	2.01

From the Development Company of Curitiba

*RMC= Curitiba Metropolitan Area

¹² From Acronym Finder: http://www.acronymfinder.com/af_query.asp?p=dict&String=exact&Acronym=HDI and UN Human Development Reports: http://www.undp.org/hdr2003/indicator/indic_8_1_1.html

¹³ From http://oregonfuture.oregonstate.edu/part4/pf4_03.html

¹⁴ From the World Bank website.

<http://genderstats.worldbank.org/edstats/SummaryEducationProfiles/CountryData/GetShowData.asp?sCtry=BRA.Brazil>

¹⁵ From the World Bank website. http://www.worldbank.org/data/countrydata/aag/bra_aag.pdf

¹⁶ From Development Company of Curitiba. http://www.cic-curitiba.com.br/quality_life.htm

¹⁷ From <http://www.country-data.com/cgi-bin/query/r-1739.html>

Table 3:

Family Monthly Average Expenditure (in minimum wages)				
	Food	Housing	Clothing	Total
Curitiba	2.16	2.79	0.81	14.17
Nat'l Average	2.07	2.55	0.6	13.4

(as of 1999, according to the *Instituto Brasileiro de Geografia e Estatística*)

Table 4: Curitiba's Economic Growth in Terms of New Companies Founded

Year of Foundation	# of Companies Founded	With Under 100 Employees	With 100 – 499 Employees	With Over 500 Employees
Before 1969	1,335	N/A	N/A	N/A
1971 - 1980	4,506	N/A	N/A	N/A
1981 - 1990	15,008	20,422*	323*	104*
1991 - 1999	48,576	48,485	75	16

(From the *Instituto Brasileiro de Geografia e Estatística*)

*values are for all companies founded before 1989

B. Investments in Transportation:

The metropolitan area takes an integrated approach to economic prosperity that links transportation improvements with environmental protection, Curitiba's various industry networks, and welfare programs that brings jobs to the disadvantaged. As of 2001, Curitiba's mass transit system transports 2.4 million passengers daily.¹⁸

Former Curitiba Mayor and Parana Governor Jaime Lerner was reported as saying cities need to “have the courage to try simple, common sense solutions;” this mentality was precisely what governed the investments in transportation that played an important part in Curitiba's metropolitan economic strategy.¹⁹ As early as 1934, when the city's population was growing at 3.5% per year, the Agache Plan was born as a way to organize the rapid population growth. Named after its designer, French architect Alfred Agache, the plan called for a restructuring of the roads into a radial system. Unfortunately, the Agache plan was not prepared for the continuous growth of Curitiba – by the 1950s it needed to be replaced.²⁰

Transportation problems such as traffic congestion were the impetus for a new plan known as the Master Plan, approved in 1966. It entailed changing the pre-existing radial growth configuration into a system of linear growth, thus making it possible to streamline public transport and infrastructure. The Institute for Research and Urban Planning in Curitiba (IPPUC), which was created in 1965 for the purpose of

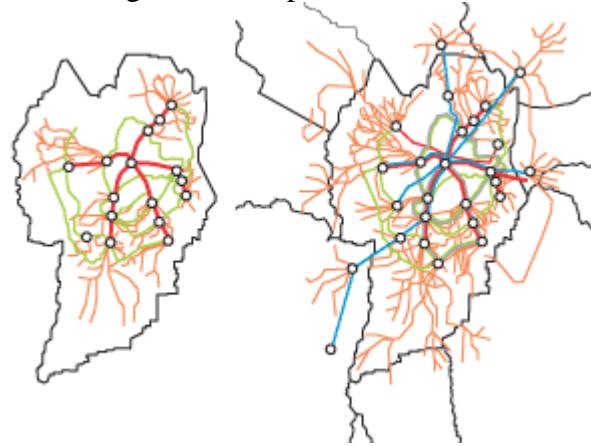
¹⁸ Cassio Taniguchi. *Transport and Urban Planning in Curitiba*. 2001.

¹⁹ Quoted by Zev Yaroslavsky in the San Fernando Valley Transit Insider. <http://www.transit-insider.org/master.html?http://www.transit-insider.org/sectors/mir0401.htm>

²⁰ *ibid*

implementing and managing the urban development of the region, held public debates that encouraged the involvement of citizens and the private sector. The IPPUC's integrative approach to problem solving is reflected in the fact that it is an interdisciplinary institution comprised of architects, engineers, economists, sociologists, and public administrators.²¹ Among other things, it reinforced the new linear configuration through appropriate zoning regulations.

Figure 2: Curitiba's Integrated Transportation Network. 1980s versus Today.



From the IPPUC

Figure 3: Curitiba's zoning structure follows the road system.



From the IPPUC

In 1970 Jaime Lerner became Mayor of Curitiba, after having already worked with the IPPUC development group. As Mayor, he continued to meet with the IPPUC regularly to discuss further improvements in land use and transportation; the tradition of regular coordination between the Mayor and the IPPUC specialists is still carried out to this day.²² By 1971, the city's mass transit terminal plan was developed. The first change to take place under Mayor Lerner was the pedestrian network, but the most effective

²¹ From the IPPUC website. http://www.ippuc.pr.gov.br/pensando_a_cidade/index_hist_planej_ingles.htm

²² From the Development Bank of Japan. <http://www.dbj.go.jp/english/IC/hot/curitiba/02.html#IV>

reform came in 1974 with the construction of two main structural roads through the city. These roads had two central lanes reserved for express buses, in addition to standard two-way traffic on each side. The zoning laws were designed to follow the two main roads (which were eventually expanded to five roads) in such a way that density on a given lot decreased as one traveled further out from the lateral roads (see figure 3). In other words, the two main roads of the city created a parallel downtown area. City planners took the opportunity to use infrastructure as a tool in dictating the orientation of spatial growth, instead of taking the more common approach of scrambling to make the infrastructure meet preexisting demands.

As Jonas Rabinovitch pointed out in his study on Curitiba, convenient transportation is important because it reduces the cost of mobility and trade within the city, thus encouraging economic development. It also reduces the indirect costs of future infrastructure improvements.²³ The city was facing two problems – how to manage a growing population and potential urban sprawl, and how to keep the economy going through difficult times – and by working with the private sector and the IPPUC it solved both problems in an efficient and creative way. In converting to bus transit, one of Curitiba's most important tasks was to acquire funding for the buses. So, the Curitiba Integrated Transport Network opted to hand out licenses to private companies responsible for providing and operating the buses.²⁴

Urbanizao de Curitiba (URBS), a state owned company created in 1980, is charged with maintaining the infrastructure and overseeing the bus companies. Municipal law in 1987 regulated the granting of licenses and reimbursements to companies according to number of kilometers traveled instead of number of passengers carried.²⁵ The advantage of such a system is that companies compete for more routes in general, instead of with other buses for the most popular routes. This system was implemented to solve the problem of destructive competition among bus companies that was clogging the main roads.

URBS sets the fare necessary to cover all the costs incurred by the bus companies (e.g. labor wages, bus maintenance and depreciation, and a certain percent profit for the companies), and thus avoids having to subsidize the transportation system.²⁶ By setting the fare the municipal government is not only saving money, it is also making life easier for the commuters who might otherwise face a confusing and unorganized fare schedule. Operating on a single-fare system is also a socially responsible method because in Curitiba, like many other metropolitan areas, land values are so high that the poor are continually pushed further away from downtown. By charging a single fare the economically disadvantaged are not “punished” for having to take a longer commute to work.

Another municipal law that reflects good leadership and public-private sector integration is the ten-year maximum use of a bus. It specifies that bus companies must continue to replace their old buses by buying new ones from Curitiba's auto

²³ From Jonas Rabinovitch and John Hoen. A Sustainable Urban Transportation System: the “Surface Metro” in Curitiba, Brazil. <http://www.wisc.edu/epat/energy/.metro/.format/.urban.html>

²⁴ From Lars Friberg. Innovative Solutions for Public Transport; Curitiba, Brazil. 2000. World Bank. http://www.worldbank.org/transport/urbtrans/pub_tr/curitiba_summary.pdf

²⁵ ibid

²⁶ ibid

manufacturers. Volvo and DENSO, for instance, have been operating in Curitiba since 1980.²⁷ The old buses do not go to waste, however, once they are pulled off the mass transit system. Instead, the city uses them for its various social programs; the buses become schools for the poor or recycling centers under the Green Exchange program, or they are used to by the city to provide special transportation to parks.²⁸ According to the U.S. Federal Transit Administration, the average bus is only three years old.²⁹

Various improvements contributed to making the transportation system an efficient source of economic growth. Originally articulated and consequentially bi-articulated buses were introduced to the transit system in December of 1992, making them the fourth and fifth types of buses operating in Curitiba. An articulated bus is made up of two normal passenger buses connected by a rubber articulation that allows the long bus to turn and navigate along roads. Bi-articulated buses are similar, except that they are the union of three buses connected by two articulations. Because they are manufactured by Volvo's Curitiba plant, the new buses both alleviated traffic congestion (each bi-articulated bus can hold 270 passengers) and provided more jobs and a boost to the local economy. Since the buses are faster and more efficient than their predecessors, their implementation reduced energy consumption by an estimated 50%.³⁰

Another improvement in the Integrated Transport Network involved the collaboration of the IPPUC and the URBS to install bike paths as a new transportation alternative. Tube Stations were also installed along with the articulated buses in 1991 – these were elevated slightly above the street to minimize passenger loading/unloading time and increase accessibility to the handicapped. Total cost of building both the tube stations and the direct bus lanes was \$200,000 per kilometer, which is far cheaper, faster and less disruptive than the estimated \$20 million per kilometer for a suggested light rail system.³¹

Table 5: Understanding the 5 different bus types*:

	Capacity (passengers/bus)	Purpose
Express	110	Operate on special bus arteries.
Inter-District	150	Link express and bi-articulated buses.
Rapid	110	Operate on arteries and main streets. Route changes with demand. Use tube stations.
Articulated & Bi-Articulated	150 & 270	Operate on outside high-capacity lanes.
Feeder	80	Operate on city streets to bring passengers to transfer stations.

²⁷ From Denso History at www.densocorp-na.com

²⁸ From the Federal Transit Administration website. http://www.fta.dot.gov/7694_7697_ENG_HTML.htm

²⁹ ibid

³⁰ From Lars Friberg. *Innovative Solutions for Public Transport; Curitiba, Brazil*. 2000. World Bank.

http://www.worldbank.org/transport/urbtrans/pub_tr/curitiba_summary.pdf

³¹ From the Federal Transit Administration website. http://www.fta.dot.gov/7694_7697_ENG_HTML.htm

Table 6: Other Special Service Buses*:

Conventional	connects neighborhoods and neighboring towns to the downtown area
Circular Center	micro-buses run inside the traditional downtown area;
Special Schools Line	serves students with special needs.
Hospital Line	connects the city's several hospitals
Tourism Line	connects tourist attractions and city parks.

* From the IPPUC website.

What makes Curitiba's investments in public transportation so important to the greater metropolitan economic strategy is that the governing body, the IPPUC, integrated it with the rest of the region's development. As of 2001, the IPPUC's mission is "to coordinate the city's urban planning and monitoring process, conducting sustainable development through compatible actions between the city and its metropolitan area."³² With this in mind, it develops research, plans projects and programs, and raises funds for implementing programs developed by other agencies under the direct and indirect administration of the City of Curitiba.

C. Investments in the Physical Environment:

Curitiba first became the ecological capital of Brazil in the 1990s, and although that may have been the decade in which the most parks, botanical gardens, and outdoor attractions were inaugurated, none of it would have been possible without a deliberate plan that recognized the importance of sustainable development and environmental issues as early as the 1970s.

As the Master Plan began implementation, Curitiba land was set aside for the protection of river areas – land here was susceptible to flooding and thus undesirable and unsafe for building on. At the time the Brazilian state and central governments had formal control over environmental issues, making Curitiba's control rather novel. In fact, Curitiba's ability to secure environmental control reflects the creativity of its leaders. The first attempt at land preservation, entitled the Leisure and Recreation Program, had been rejected by the military regime of the time; but when the IPPUC changed its name to the Flood Control Program, it re-framed the argument by saying that strategically placed large parks would preserve riverbanks (and thus prevent floods).³³ In 1976 the Municipal Decree for Riverside Areas Preservation allowed the local government to set aside land for environmental protection by making the same argument to the central government. This set the precedent of environmental protection that would eventually lead to the creation of 28 parks and wooded areas.³⁴ This flexibility and creativity in dealing with

³² From the IPPUC website. http://www.ippuc.pr.gov.br/IPPUC/index_ippuc_ingles.htm

³³ Cassio Taniguchi. Transport and Urban Planning in Curitiba. 2001. http://216.239.41.104/custom?q=cache:IDRgpr_LnIQJ:www.nsl.ethz.ch/index.php/en/content/download/384/2455/file/+taniguchi+said+curitiba&hl=en&ie=UTF-8

³⁴ ibid

urban planning makes Curitiba's strategy successful. By the end of the decade, Curitiba had about 10 million m² of protected green space.

In 1980 formal power was handed over to the local government for environmental preservation, and in the same year Curitiba established two new parks (one in honor of the Pope's visit) and five protected wooded areas.

In 1992, just before Rio de Janeiro hosted the World Environment Meeting, Curitiba hosted the related World Forum of the Cities, thus drawing international attention. The metropolitan area also hosted World Habitat Day in 1995. Throughout the decade, six more parks and eight wooded areas are inaugurated to add another 8million m² of protected land.

Many outdoor cultural venues were also constructed in the 90s, such as the Botanical Garden, the Wire Opera, and Immigration Memorials (there are Japanese, Ukrainian, Arab, and German Memorials). Wooded areas were also dedicated to the influential Portuguese and Italian cultures.

An innovative solution to the concerns of environmentalists and sugarcane-alcohol producers in the state of Paraná was the conversion of all government cars from gasoline to alcohol fuel. The bill that requires this change was passed in 1998, and allows a five-year period of transition. The Curitiba prefecture currently works with the private Vancouver firm Fuel Cells Canada to develop programs related to nonpolluting energy.³⁵

Original plans have been devised and implemented by the city's public and private leaders in order to further economic growth through care for the environment. These projects are noteworthy for their underlying commitment to finding appropriate and integrative solutions. "As architect Almir Fernandez said, the great discovery made by Curitiba is that the Master Plan is supposed to change; the IPPUC (and the goal of a cohesive metropolitan economic strategy) is meant to be permanent."³⁶

* Fountainhead Project:

Begun in 1996, the Fountainhead Project addresses the issue of freshwater management by getting children involved in environmental monitoring. The program thus has educational value for the children as well as the more obvious value of cleaning up the water system of the Curitiba metropolitan area. While the quantity of the water supply is not a problem, the quality of water is – the system must be monitored to prevent contamination from sewage and runoff from irregular housing. Other groups involved in monitoring water quality include universities, neighborhood associations, and environmental organizations. Technical support is provided by the city of Curitiba, although the bulk of the work has been carried out by approximately 5,100 volunteers. Funding for the Fountainhead Project is provided by both the municipal government and the World Bank.

³⁵ Pheifer, Ismael. "Technology is Key to Brazil-Canada Relation." Gazeta Mercantil Online. 11/26/03. http://web.lexis-nexis.com/universe/document?_m=5bfa9bb380547a08db1f62b81cf79726&_docnum=3&wchp=dGLbVtz-zSkVA&_md5=4dbeb4b2e4a871e292a2f2f7a26d31c4

³⁶ From the IPPUC website. http://www.ippuc.pr.gov.br/pensando_a_cidade/index_hist_planej_ingles.htm

* “Garbage that is Not Garbage”:

In 1989, Curitiba was in need of a recycling plant; unfortunately a plant big enough to accommodate the metropolitan area would cost an estimated US \$70 million that the city simply did not have.³⁷ So, the government embarked on a much less expensive advertising campaign to encourage residents to sort their trash into basic “organic” and “inorganic” categories. The needy in the area were then hired to sort the “inorganics” into metal, paper, glass, and plastic – thus new jobs were created to alleviate two problems instead of just one. The sorting program was run with the help of the Institute for Social Integration. By 1992 residents were recycling 70% of their garbage, and 2/3 of the city’s total trash is recycled.³⁸

* Free Open University for the Environment:

The Free Open University for the Environment founded in 1991, is a popular eco-tourist attraction unique to Curitiba. It offers courses on environmental management and protection to the general public. The university’s picturesque location in a woodland area is what makes this more than a typical government educational program. Both public and private firms within certain industries in the metropolitan area even require that their employees take a course at the university. Some examples are companies from the chemical, environmental, and energy and petrochemical sectors.

D. Integrative Investments in the Quality of Life:

The democratization taking place in the country as a whole during the 1980s had the positive effect on Curitiba of extending the supply of social services.³⁹ For instance, Regional Administration Centers were founded in 1986 to identify similarities between regions and plan social programs for the periphery. According to the IPPUC, its specialists teamed up with municipal secretariats to define where and how to implement each unit’s activities. The goal was to integrate the public into each social program, especially since the new democratic political climate stressed the importance of public approval and participation. One example of a post-democracy social project was the 1989 Bairro Novo Project, which used the last of the vacant urban area to provide houses for about 20,000 needy families.

In the 1990s Curitiba’s metropolitan planning led to the creation of a variety of new organizations concerning education, health, the environment, and job creation. The Municipal Housing Fund began in 1990 by providing housing funds to low-income families.⁴⁰ The Fund has expanded since then to support programs for popular development, land regulation, and home construction. Another example of an integrated housing and development program is the “Village of Trades” program, which was founded in 1995 to combine housing and work opportunities on the same site. The

³⁷ From the United Nations website. <http://www.un.org/cyberschoolbus/habitat/units/un06txt4.asp>

³⁸ From Jonas Rabinovich, http://www.wri.org/wri/wr-96-97/up_b4.html

³⁹ From IPPUC website. “The 80s.”

http://www.ippuc.pr.gov.br/pensando_a_cidade/index_hist_planej_ingles.htm

⁴⁰ From the IPPUC website. “The 90s”

http://www.ippuc.pr.gov.br/pensando_a_cidade/index_hist_planej_ingles.htm

IPPUC coordinated this and the 1997 “Jobs Route” program. The latter is designed to provide the structural framework to help the 28,000 (in 1996) unemployed peoples of Curitiba’s periphery find work. The Jobs Route program is a R\$100 million endeavor funded by the Brazilian Development Bank (BNDES) with the help of matching funds from the City of Curitiba. As of 2002 the program had expanded to include trade schools, industrial facilities, and a design center. The BNDES is a federal organization, established in 1952, for the purpose of providing financial assistance to programs that will contribute to the financial and social well-being of the country; it shows how the federal government can contribute to, and support, regional development efforts.⁴¹

The effect of efforts to increase public participation in the late 80s could be seen by 1995 with the inauguration of Citizenship Streets. These are situated at or close to the main bus terminals and provide services to the general public. Services include government offices (you can file a police report, pay your energy bill, or get a marriage license), shops, sports centers, and low-cost professional training courses.

The IPPUC helped design and implement the Citizenship Streets, but long before then, in 1968, the organization was conducting research analyses of Curitiba’s needs. The first social programs to spring from this research were education-oriented. Gradually, the Education Plan of the early 1970s expanded into other aspects of daily life. Then, in 1989 the IPPUC inaugurated its four “Social Networks” - the Municipal School Network, the Municipal Daycare Centers Network, the Municipal PIÁ (short for Integrated Childhood and Adolescence) Network, and the Municipal Health Network.⁴²

Several programs involve cooperation between public and private actors, local and international support, and various administrative branches. What these programs have in common is that they cut across traditional organizational boundaries and show an understanding that investments in education, technology, and the environment can benefit everyone in the metropolitan area because they make Curitiba a more desirable place to live and work. Below are some examples of such programs:

* Idéias Força (Core Ideas Project)

The Core Ideas Project encompasses the 24 current urban projects under Mayor Cassio Taniguchi. Each of the projects has its own expert in the relevant field, but the main approach is meant to be integrative. In other words, the projects will all evolve simultaneously, and they will work together to establish common goals and tasks. The Idéias Força links several different administrative branches and public institutions. One example is the “Typing the Future” project, which entails providing internet access to the city’s libraries (called Lighthouses of Learning), installing computer labs in secondary schools, and bringing adults into these labs at night to provide computer training. The unifying idea of the project is to work with Apple, which provided the computers, to prepare the current and future workforce for a labor market where information technology skills are necessary.

⁴¹ ibid

⁴² From the IPPUC website. “Urban Equipment.”

http://www.ippuc.pr.gov.br/pensando_a_cidade/index_ingles.htm

* University Programs:

Study Abroad programs with American universities show an interest in cultural and educational exchange. The Mega-Cities Project, for instance, is organized by Trinity College to give undergraduates a first-hand learning experience in urban policy. The Mega-Cities Project has identified and documented dozens of innovations in cities worldwide; brokered 40 transfers across national, regional, and neighborhood boundaries; developed a grassroots leadership strategy; designed a travel/study semester for honors undergraduates; conducted a global leadership survey; and produced numerous case studies, articles, books, and videos.⁴³

* Research & Development:

Curitiba's universities have also partnered up with Siemens Telecomunicacoes to work on research and development projects. In 2000, Curitiba hosted Siemens' Fourth International Conference on Technology and Policy Innovation, a three-day conference that tackled issues such as "Training and Education for the Learning Economy," "Science and Technology Policy," "Industrial Policy," "R&D Management," "Knowledge Management," and "Innovation Networks." The conference is sponsored by the Government of Paraná, the Ministry of Science and Technology, and the University of Texas at Austin, among others. Its objectives, which are very much in line with the Curitiba's metropolitan economic strategy, are as follows:

"The main objective of this series of international conferences on Technology Policy and Innovation is to bring together leading representatives of academic, business, and government sectors worldwide to present and discuss current and future issues of critical importance for using science and technology to foster regional economic development and shared prosperity at home and abroad. Multidisciplinary perspectives are encouraged to provide state-of-the-art and useful knowledge to decision makers in both the private and public sectors - including informed and effective education, business, and government policies and strategies for the global, knowledge economy."⁴⁴

* The Green Exchange Program:

Started in 1989, this program encourages both children and the poor to collect cans and other recyclables that they can exchange for food or other basic goods. Since the separation plant is operated by street children and other citizens desperately in need of work, the program is cost efficient. The food they "buy" comes from local farmers, so that money spent by the municipal government stays within Curitiba. The same community that most needs to turn in cans for food is the same group that is employed by the program, thus helping the city's poor get job experience. Another aspect of the program is to turn old buses into classrooms where residents can learn vocational skills. So far the Green Exchange Program has helped about 35,000 families.⁴⁵

* The Brazil National Housing Bank (BNH):

Known in Portuguese as the Banco Nacional da Habitação, the BNH is a sixty-year-old federal program providing low-interest loans to low-income Brazilians for the

⁴³ From <http://www.megacitiesproject.org/about.asp>

⁴⁴ From the official website of the 4th International Conference on Policy and Innovation.

<http://in3.dem.ist.utl.pt/curitiba2000/spons.html>

⁴⁵ http://www.wri.org/wri/wr-96-97/up_b4.html

purpose of securing housing. Thomas Klak published a detailed study on the BNH activities and its beneficiaries in Curitiba, in which he found that 75 percent of Curitiba's housing loans are within reach of the poorer half of the population. Since the BNH claims to be socially progressive, this distribution is rightly weighted in favor of the poor.⁴⁶ At the intra-city level, however, the BNH faces structural problems that lead to a less than equitable distribution of funds. For instance, Curitiba receives relatively little loan money from the central government due to the overall wealth of the region. Once the money reaches the cities, however, Curitiba grants a greater percentage of the funds to low-income households because they have more stable employment and are generally better off than the people of comparable regions.

* “Lighthouses of Learning”

The first “Lighthouse of Learning” was built in 1995, and its success led to the quick establishment of over 30 others in Curitiba’s neighborhoods. The Lighthouses are two-story libraries made to model the combination lighthouse and library in Alexandria, Egypt. Each costs about US \$180,000 to build, and contains about 5,000 volumes and internet access.

In 1995 Curitiba was recognized as one of the first cities to make the United Nations “Best Practices” list, making it a model in urban development for the rest of the world. The criteria used to determine cities of “Best Practices” considers the strategy’s impact on people’s livelihoods, partnerships between community organizations and the private sector, and the long-term sustainability of the initiative.⁴⁷

E. Investments in Competitive Industry Networks:

The Curitiba metropolitan area must compete with other highly developed urban regions in Brazil, such as Sao Paulo and Rio de Janeiro. These regions, however, are notorious for their problems with pollution, poverty, urban sprawl, and traffic congestion. When an employer is looking for a place to set up his next manufacturing plant or distribution center, he must judge which of these global cities would make the best location. As MIT economist Lester Thurow said in his 1999 book, “the power -- or perhaps we should say the freedom from government supervision - - of global businesses is growing with companies' ability to move to the most



⁴⁶ Klak, Thomas. “Spatially and Socially Progressive State Policy and Programs: The Case of Brazil’s National Housing Bank.” *Annals of the Association of American Geographers*, Vol. 80, No. 4 (Dec., 1990), 571-589.

⁴⁷ From the United Nations Centre for Human Settlements website. Press release on “Best Practices” cities. <http://www.un.org/Conferences/habitat/unchs/press/bestpr.htm>

advantageous locations.”⁴⁸ Curitiba’s competitive advantage, which was recognized early in its formulation of a metropolitan economic strategy, was in a high quality of life.

As Mayor Taniguchi said regarding the Industrial District, “the idea is to create living conditions close to the industries... For the Worker, that is quality of life.”⁴⁹ So, the Industrial District of Curitiba was established in 1973 and administrated by the Development Company of Curitiba, a private nonprofit organization that shares the basic goals of the IPPUC.⁵⁰ The industrial “city” was designed with the proper infrastructure, where housing, leisure, social equipment, and transportation are fully integrated to the city, connected by transportation axes.⁵¹ Originally, this district attracted New Holland, Plastipar, Phillip Morris, Siemens, and Carbomafra; today, it is home to 700 companies and 200,000 jobs.⁵² Active courting of the automobile manufacturing industry has also brought Renault, Volkswagen, and Daimler Chrysler to the metropolitan area.

The fact that 24% of all state industrial value-added sales taxes come from this one district means the state government has a vested interest in the region. The Software Park within the Industrial District is another feature that attracts firms to the area. Its easy accessibility, location, and modern and attractive structure make the Software Park, and the district as a whole, a desirable place from which to conduct business according to the Development Company of Curitiba. The Industrial District, like the rest of the metropolitan area, was designed with respect for the environment, and high quality of life, in mind.

IV. Curitiba’s Key Industry Networks

A. Automotive Industry

The automotive industry network has been a key source of wealth for the region over the last ten years, and it represents US \$4.1 billion in investments in the last decade. The metropolitan area is Brazil’s second largest automobile producer, employing 17,500 people in the annual manufacturing of 380,000 cars, trucks, and buses. Volvo, Chrysler, Renault, Volkswagen-Audi, and New Holland all have factories in Curitiba.

In 1998, for instance, the state government created a 10-year incentive package for the manufacturing company Renault. Benefits for Renault included state and municipal tax exemptions, as well as reimbursement of any costs related to

⁴⁸ Lester Thurow. [Building Wealth](http://www.theatlantic.com/issues/99jun/9906thurow4.htm). Retrieved online.

⁴⁹ http://216.239.41.104/custom?q=cache:1DRgpr_LnIQJ:www.nsl.ethz.ch/index.php/en/content/download/384/2455/file/+taniguchi+said+curitiba&hl=en&ie=UTF-8

⁵⁰ From the Development Company of Curitiba website. http://www.cic-curitiba.com.br/development_company.htm

⁵¹ From the IPPUC website, under “Projects.” http://www.ippuc.pr.gov.br/pensando_a_cidade/index_pensando_ingles.htm

⁵² From the Development Company of Curitiba website. http://www.cic-curitiba.com.br/development_company.htm

environmental damages. In exchange for this protection, the state of Paraná was made a partner with 40% control in the company.⁵³

The greatest benefit to Curitiba from this incentive scheme came after September of 1999 when Renault announced an alliance with Japanese car manufacturer Nissan; the company established the first ever Renault-Nissan joint factory in 2001. In July of that year the factory began producing Megane vehicles (the third best-selling Renault vehicle, after Scenic and Clio, which are also produced in Curitiba). This US \$90 million investment was estimated to have used 40% of the plant's operating capacity.⁵⁴ According to Renault, the factory would help it reach its 2005 goal of capturing 10% of the Brazilian automobile market.⁵⁵ The factory is also meant to produce cars for export to the entire Mercosur market (made up of Argentina, Paraguay, Uruguay, and Brazil).

The metropolitan area is becoming increasingly popular for companies such as those that look to break into the Mercosur market. For instance, U.K.-based Perkins Engines chose Curitiba as the location for its first international production facility. Perkins purchased the factory, which expects to build 20,000 engines per year, in February of 2003 from Daimler Chrysler.⁵⁶ Chrysler had left Curitiba due to the poor economic performance of the Dodge Dakota that was being manufactured there, as well as energy rationing and rising interest rates that made it difficult to continue operations.⁵⁷ In today's global economy, Curitiba's leaders will have to continue to entice new firms to replace those that struggle, as was the case with Perkins and Chrysler, by offering a skilled workforce and a desirable quality of life.

The Volkswagen-Audi plant, for instance, has become a world leader in new automotive manufacturing techniques, coming up with the "Industrial Condominium" concept that gives the supplier more flexibility to adjust to the market. Located within the Industrial District, 10 "system suppliers" create complete systems (such as an exhaust system) that are transported to a nearby assembly line. As of 2001, the plant was responsible for all VW Golf production in the Americas.⁵⁸ Volkswagen-Audi's success reflects how a creative and skilled workforce can take advantage of capital investments and planning strategies; the Industrial District provides the central location for new manufacturing innovations such as this one to take place.

⁵³ "Parana to finance Renault for 10 years." Gazeta Mercantil Online January 29, 1998. Academic Universe. Lexis-Nexis. June 22, 2004.

⁵⁴ "Renault-Nissan Drive Ahead in Brazil." Ward's Auto World. 7/1/01. http://www.wardsauto.com/ar/auto_renaultnissan_drive_ahead/index.htm

⁵⁵ "Renault and Nissan Create Joint Factory in Brazil." Financial Times. 12/21/01. http://web.lexis-nexis.com/universe/document?_m=562b33cad50d2538ae97a8f83a662faa&_docnum=4&wchp=dGLbVlbzSkVA&_md5=52bbfa8a3970892d8addb1542cbc01c2

⁵⁶ Osenga, Mike. "Perkins Opens Brazilian Engine Plant." Diesel Progress North American Edition. 01/04. http://www.findarticles.com/p/articles/mi_m0FZX/is_1_70/ai_112686548

⁵⁷ From <http://www.labournet.de/branchen/auto/cut-neu5.html> accessed on 7/2/04

⁵⁸ Pires, Silvio. New Productive Systems in the Auto Industry. <http://www.univ-evry.fr/labos/gerpisa/recontre/S11Pires.pdf>

Table 4:

PRODUCTION OF VEHICLES IN METROPOLITAN AREA OF CURITIBA - 1997-2000					TYPE/ MODEL*
INDUSTRY	1997	1998	1999	2000	AS OF 2001
Volvo	6,674	6,380	4,176	6,290	Truck, Chassis
New Holland	7,397	8,498	6,205	7,700	Engine
Chrysler	-	3,642	3,647	4,370	Engine
Renault	-	-	24,809	52,600	Megane, Scenic, Clio
Volks Wagen - Audi	-	-	18,297	68,600	Golf, A3
TOTAL	14,071	18,520	57,134	139,560	

From the Development Company of Curitiba

**From 2001 Issue of Wards Auto Word*

B. Communications Software & Information Technology Network

This industry network is made up of 3,500 information technology (IT) companies, making it the second largest region in Brazil for IT business, the largest being Sao Paulo.⁵⁹ The industry employs 40,000 workers in companies such as Motorola, Siemens, Brasil Telecom, and Impstat.

In 2001 Impstat invested US\$70 million to link Curitiba to Argentina as a part of its fiber optic network. Impstat is just one internet and data communications service provider in Curitiba. Others, such as Brose, specialize in technology for automobiles. Brose has been in Curitiba since 1999 and employs about 120 people in its plant. The company mostly sells its window regulators, door systems and manual seat height adjusters to DaimlerChrysler, General Motors, Honda, Toyota Corolla and Volkswagen.⁶⁰

In 1999, current Mayor Cassio Taniguchi spurred other direct investments in IT through the Smart Card, which is made by Schlumberger Smart Card & Terminals. This \$1.5 million investment consolidates a person's information as well as store bus fare values.⁶¹ The Smart Card is an example of planning and coordination between the infrastructure and information technology (IT) networks – this serves the dual purpose of directly improving the efficiency of local businesses, and attracting workers and

⁵⁹ From <http://cio.co.nz/cio.nsf/0/11D24BE04F0BDCBBCC256D470017318D?OpenDocument> accessed on 7/1/04

⁶⁰ From <http://www.brose.de/en/pub/company/history/> accessed on 6/28/04

⁶¹ "Brazilian City Rolls Out Major Smart Card Project." May 1998. From Lexis Nexis. http://web.lexis-nexis.com/universe/document?_m=b56dfd8fb1b7e69c33c4a15810911da9&_docnum=3&wchp=dGLbVtz-zSkVb&_md5=3c33807cd2bf65119efd65c0d21a4a61 See also Cassio Taniguchi. *Transport and Urban Planning in Curitiba*. 2001.

http://216.239.41.104/custom?q=cache:IDRgpr_LnlQJ:www.nsl.ethz.ch/index.php/en/content/download/384/2455/file/+taniguchi+said+curitiba&hl=en&ie=UTF-8

corporations who want to live in a well-run metropolitan area. The metropolitan economic strategy of Curitiba has also integrated IT businesses like Apple with education programs to enhance learning through computers.⁶² Mayor Taniguchi and the Curitiba municipal government have implemented programs such as “Typing the Future” to make technology available to the public.⁶³

C. Infrastructure Network

Curitiba’s urban planners and economists such as Jonas Rabinovitch have written that by making transportation of goods into and out of the city as efficient as possible, the area becomes more attractive to investors and corporate executives.⁶⁴ Investments in transportation also created jobs as the airport is expanded, thus providing some immediate income benefits to the metropolitan area in addition to the long term economic benefits that come with the improved infrastructure.

The Alfonso Peña airport handles 3.5 million passengers per year and is only 4 miles (7km) from the city, in Varzea Grande. In 2002 Infraero (Brazil’s governing airport authority) added a new intermodal cargo terminal to help attract more companies to conduct business through the airport. Along with the new terminal, Infraero also streamlined the local air, highway, and railroad services. The specific effects of these improvements are difficult to assign a dollar value to, but since their implementation there has been at least one sign of growth. For instance, Thrifty car rental consequently established a franchise at the airport. Even if more analysis is necessary to gauge the immediate benefits of the new terminal, such continuous evaluation, cooperation, and organization between transportation departments is exactly what the IPPUC says the Curitiba metropolitan area needs in order to grow successfully.

Aside from transportation, Curitiba’s infrastructure is also important for the rest of Paraná and its surrounding areas because it is a main supplier of energy. COPEL, GERASUL, and the Itaipu Hydroelectric Dam supply all of Paraná and export their surplus to other states. Companhia Paranáense de Energia (COPEL) is the largest supplier, and it won the Brazilian Association of Power Distribution Utilities’ (Abradee) Best Distributor award three times between 1998 and 2002. COPEL Distribution’s services reach about 9.4 million people throughout 393 towns and another 715 locations such as districts and villages. The latest estimates indicate that the power grid covers 99% of the urban areas and 87% of the rural areas in all of Paraná.⁶⁵

In 2001 Brazil experienced an energy crisis that led to a forced reduction in consumption by 20%. The effect of the crisis can be seen in Curitiba by the switch to power-saving articulated and bi-articulated buses.

⁶² “Apple Sets Up Computer Pedagogical Center in Curitiba.” [Gazeta Mercantil Online](#). Sept. 4, 1996.

⁶³ From the Curitiba city website.

<http://www.curitiba.pr.gov.br/pmc/ingles/Solucoes/Ideias/DigitandooFuturo.html>

⁶⁴ From the Development Company of Curitiba website. http://www.cic-curitiba.com.br/economic_informations.htm See also Jonas Rabinovitch online at http://www.wri.org/wri/wr-96-97/up_b4.html

⁶⁵ From COPEL website.

<http://www.copel.com/pagcopel.nsf/docsap/2A31DA0837B99B0B03256B8F00716C9A?OpenDocument&secao=English%3ACopel%3AAbout&>

D. Tourism Industry Network

The Tourism network has grown 5.3% annually over the last decade, attracting both business and leisure travelers. As of 2000, 40% of all travelers visited Curitiba for business purposes, 30% identified as visiting relatives, and about 15% came on vacation. The large fraction of business travelers is related to the complementary growth in other industry networks because as large companies move to Curitiba, other businesses that wish to deal with those companies are also drawn into the region. So, business travel operates in a cycle with the general economic health of the software, automobile manufacturing, and consume goods industries. Furthermore, business travel is enhanced by the high quality of the Curitiba's public transportation.

Through its special tourist bus line, the metropolitan area's public transportation has also adapted to meet the needs of non-business tourists. This line stops at the top 22 attractions in the area; other lines, such as the Italian Rural Tourism Route, have been designed to preserve and pay respect to the Curitiba's diverse cultural traditions.

The metropolitan area's many parks, the Wire Opera, and the 24-hour Street Mall are a few of the tourist attractions that contribute to Curitiba's status as one of the most visited cities in Brazil, according to the Development Company of Curitiba.⁶⁶ The Wire Opera is an open-air entertainment complex made out of tubular steel. It was built in 1992 and includes two facilities, the Paulo Leminski Cultural Space and the Wire Opera itself, which was modeled after the Paris Opera House. The Street Mall is a cobblestone pedestrian zone in the middle of downtown Curitiba. The "street" is located on what was the main road in the 1970's Rua Quinze.

Curitiba has also been attracting sports enthusiasts over the years, starting with the 1950 World Cup soccer tournament. The matches were spread out among Curitiba, Rio de Janeiro, Sao Paulo, Belo Horizonte, and Recife. The Estadio Durival de Brito, which can hold 50,000 people, was on the international soccer stage again in June 2004 as Curitiba hosted the Toyota Libertadores Cup.

Attracting a wider base of international attention over the last ten years, Curitiba hosted the 2004 Olympic Qualification for kayaking. The environmental capital of Brazil also holds an annual marathon that the International Athletics Federation and the Brazilian Confederation of Athletics (BCAt) rank as one of the nation's top three competitions. The course of the Curitiba Ecological Marathon begins through Barigüi Park and ends at the Paulo Leminski Stone Quarry.

V. Future Challenges

For the last 30 years, the overarching goal for the Curitiba metropolitan area has been continuous economic growth through sustainable development. The region's public

⁶⁶ From the Development Company of Curitiba website. Under "Tourism." <http://www.cic-curitiba.com.br/tourism.htm>

officials, private firms, and citizens have shown a commitment to improving daily life. This entails keeping water clean through sewage monitoring, keeping the streets clean through aggressive recycling campaigns, and working to develop new ways to incorporate the city with the surrounding metropolitan area. Since changing circumstances require new approaches, Curitiba's most important future challenge is to continue cooperation among a wide spectrum of people and organizations in order to foster economic prosperity.

In an interview with Frontline/PBS in December 2003, Mayor Taniguchi had the following to say about Curitiba's future:

"I think these poor income areas must have priority. But also we cannot forget the macro-aspects of the urban development, so we must think of the future of the transportation network. You must invest constantly in public transport, so you must propose solutions for mass transit systems not only for now but in the future. That's the reason why you are now beginning implementation of a new axis of transportation and also the upgrade of the bi-articulated bus system and the structural axis. This is very important because people want to see what is the next perspective, what is the future. So you must go to the future also. To create new parks, to preserve the environment, everything that's concerning the conception of the urban plan in Curitiba."⁶⁷

Challenge #1: Keep the environment clean as the metropolitan area continues to grow.

Challenge #2: Fight poverty and housing shortages for the poor.

Challenge #3: Ensure that children receive a quality education to guarantee a dynamic and competitive workforce in the future.

VI. Conclusion

The Curitiba metropolitan area developed its economic strategy in the late 1960s and early 1970s by tackling its growing population and transportation problems in a creative and cost-effective way. Over the years, social programs such as the Jobs Route, Green Exchange, and Citizenship Streets, have taken advantage of the transportation system by using old buses as classrooms and organizing activities around bus terminals. These programs were organized by the local planning organization, the IPPUC, and other public and private leaders because they understood that the fundamental asset that Curitiba relies on to attract and build a skilled labor force and economically strong businesses is its high quality of life. The main industry networks in the region – automotive manufacturing, communications software, infrastructure, and tourism, have benefited from Curitiba's various urban improvements like the Industrial District and the Software Park.

⁶⁷ Cassio Taniguchi in "Frontline." <http://www.pbs.org/frontlineworld/fellows/brazil1203/taniguchi.html>

In his book, Building Wealth, economist Lester Thurow noted the special dynamic between strong leaders and public participation regarding economic development. “The new economic game is simultaneously a team game and an individual sport. Without the support of the team the individual fails. Without individual initiative the team fails. Both are necessary.”⁶⁸ The fact that IPPUC meets with the Mayor of Curitiba on a weekly basis, takes regular opinion polls, and holds public discussions before implementing a new program shows that Curitiba’s metropolitan economic strategy has had the foresight to ensure that all citizens feel included in the metropolitan “team.”

While different metropolitan areas have different assets to cultivate, Curitiba can offer an example of a successful way to harness those assets and use them to grow competitive industry networks. A common reaction to Curitiba’s environmentally-oriented approach to urban development is that it would not work in the largest of cities. Jaime Lerner’s response to such remarks is, “to agree that the city is different - but this is because it has *made* itself different: all cities (including mega-cities) could follow its example.”⁶⁹

“I hold great store in the ‘domino effect’, believing that the example of one city - good or bad - can influence the rest. Countries can be changed by their cities and I emphatically believe in an optimistic vision of both the city and humanity. If the city becomes environmentally friendly, the country will follow suit and future generations will inherit a world in which development is sustainable.”⁷⁰

⁶⁸ Lester Thurow, Building Wealth. Accessed online at <http://www.theatlantic.com/issues/99jun/9906thurow3.htm>

⁶⁹ Jaime Lerner, “Change Comes from the Cities.” <http://www.ourplanet.com/imgversn/81/lerner.html>

⁷⁰ *ibid*

VII. Appendix

Composition of Establishments and Type of Activity in Curitiba Metropolitan Area

KIND	RMC* (%)	# OF JOBS
INDUSTRY	18.96	159,196
Minerals Extraction	0.34	1,608
Transformation Industry	12.57	114,216
Non-Metallic Minerals	1.33	9,407
Metallurgy	1.66	9,724
Mechanics	0.66	10,919
Electric and Communications Material	0.37	7,148
Transport Material	0.38	14,840
Wood and Furniture	2.07	13,357
Publishing and Printing Activities	1.16	10,327
Rubber, Smoke and Leather	0.64	4,294
Chemical Products	1.29	13,982
Textile	1.17	4,372
Shoes	0.05	113
Food and Beverages	1.78	15,733
S.I.U.P.**	0.09	13,157
Civil Construction	3.40	30,215
COMMERCE	36.44	102,956
Retail Commerce	31.90	85,729
Wholesale Commerce	4.54	17,227
SERVICE	42.82	410,794
Financial Institutions	1.69	16,659
Advisory / Consulting	16.65	68,101
Transport and Communication	4.00	43,257
Accommodation and Food	12.33	60,369
Medicine, Odontological and Veterinary	5.85	31,547
Education	1.84	22,582
Public Administration	0.46	168,279
AGRICULTURE	1.69	3,534
OTHERS	0.10	9
TOTAL	100.00	676,489

From the Development Company of Curitiba, 1998 figures

The Largest Companies in the Curitiba Metropolitan Area

A: Agipliquigas S/A; Alba Quimica Industria e Comercio Ltda.; All America Latina Logistica do Brasil S/A; Anaconda Industrial e Agricola de Cereais S/A

B: Batavia S/A; Becton Dickinson Industrias Cirurgicas Ltda.; Berneck Aglomerados S/A; Botica Comercial Farmaceutica Ltda.; Brasholanda S/A Equipamentos Industriais; Britania Eletrodomesticos S/A

C: Cafe Damasco Sociedade Anonima; Carrefour Comercio e Industria Ltda.; CCV Comercial Curitibana de Veiculos S/A; Chrysler do Brasil Ltda.; Cia de Desenvolvimento Agropecuario do Paraná – CODAPAR; Cia Metropolitana de Automoveis; Cia Nacional de Abastecimento – CONAB; Cimento Rio Branco S/A; Comau do Brasil Ind e Com Ltda.; Companhia Brasileira de Distribuicao; Companhia Brasileira de Petroleo Ipiranga; Companhia Cervejaria Brama; Companhia de Cimento Itambe; Companhia Providencia Industria e Comercio; Companhia Ultragaz S/A; Cooperativa Central de Alimentos do Paraná Ltda

D: Denso do Brasil Ltda.; DFV Telecomunicacoes e Informatica S.A.; Dipava Veiculos S/A; Disapel Eletrodomesticos Ltda.; Distribuidora de Medicamentos Santa Cruz Ltda.; Distribuidora Farmaceutica Panarello Ltda.; DIVESA – Distribuidora Curitibana de Veiculos Ltda.; Drogamed Com de Medicamentos e Perfumaria Ltda

E: Electrolux do Brasil S A; Eletrofrio Ltda.; Empresa Brasileira de Correios e Telégrafos; Empresa Brasileira de Telecomunicacoes S/A – EMBRATEL; Empresa Transm de Energia Eletrica do Sul do Brasil S.A.; Esso Brasileira de Petroleo Limitada

F: Ferragens Negrao Comercial Ltda.; Fortaleza Com de Cereais e Defensivos Agricolas Ltda.; Fox Distribuidora de Petroleo Ltda.; Furukawa Industrial S/A Produtos Eletricos

G: Gerdau S/A; Grafica e Editora Posigraf S/A

I: Imcopa Importacao Exportacao e Industria de Oleos Ltda.; Importadora de Frustas La Violetera Ltda.; Impressora Paranense S/A; Incpa Revestimentos Ceramicos S/A; Industrias Gessy Lever Ltda.; Inepar S/A - Industria e Construcoes; Isdralit Industria e Comercio Ltda

K: Kraft Lacta Suchard Brasil S/A; Kvaerner Pulping Ltda

L: La Paz Distribuidora de Cosmeticos Ltda.; Leao Junior S/A; Lorenzetti - Porcelana Industrial Paraná S/A

M: Mastec Inepar S/A Sistemas de Telecomunicacoes; Mercedes Benz do Brasil S/A; Minasgas Distribuidora de Gas Combustivel Ltda

N: Nacional Gas Butano Distribuidora Ltda.; Nestle Brasil Ltda.; New Holland Latino Americana Ltda.; New Hubner Componentes Automotivos Ltda.; Novartis Biociencias S/A; Novo Nordisk Bioindustrial do Brasil Ltda.; Nutrimental S/A Industria e Comercio de Alimentos

O: Osten Ferragens Ltda.; Ovetril Oleos Vegetais Ltda

P: Paraná Equipamentos S/A; Parmalat Brasil S/A Industria de Alimentos; Pepsico do Brasil Ltda.; Petrobras Distribuidora S/A; Petroleo Brasileiro S/A – PETROBRAS; Philip Morris Brasil S/A; Placas do Paraná S/A; Plastipar Comercio e Industria Ltda.; Positivo Informatica Ltda

R: Refinadora de Oleos Brasil Ltda.; Renault do Brasil S/A; Robert Bosch Limitada

S: Senff Parati S/A; Servopa S/A Comercio e Industria; Shell Brasil S/A; SID Informatica S/A; Siemens Ltda.; SONAE Distribuicao Brasil S/A; SPAIPA S/A Industria Brasileira de Bebidas; Sucessores de Dorival Ribeiro Ltda.; Sundown do Brasil Bicicletas Ltda.; Supergasbras Distribuidora de Gas S/A; Supermercados Condor Ltda

T: Telecommunicacoes do Paraná S/A – TELEPAR; Telepar Celular S/A; Texaco Brasil S/A – Produtos de Petroleo; Trombini Papel e Embalagens S/A

U: Ultrafertil S/A; Utingas Armazenadora S.A.

V: Volkswagen do Brasil Ltda.; Volvo do Brasil Veiculos Ltda

W: White Martins Gases Industriais S/A

X: Xerox do Brasil Ltda

VIII. Bibliography

“About COPEL.” Companhia Paranáense de Energia. 2002. Compañía Paranáense de Energia. http://www.copel.com/PagCopel.nsf/secaos/Home_english?OpenDocument June 28, 2004.

“About Us.” The Mega-cities Project. 2002. Trinity College. <http://www.megacitiesproject.org/about.asp> Accessed on July 1, 2004.

Alaran, Gbenga and Kerr, Juliette. “The Americas: Power Moves.” In Focus 2002. 2001. World Markets Research Centre. http://www.worldmarketsanalysis.com/InFocus2002/articles/energy_americas.html June 28, 2004.

“Apple Sets Up Computer Pedagogical Center in Curitiba.” Gazeta Mercantil Online. Sept. 4, 1996

“Background Note: Brazil.” Bureau of Western Hemisphere Affairs. 2004. US Department of State. <http://www.state.gov/r/pa/ei/bgn/1972.htm> June 23, 2004.

Birk, M.L. and P.C. Zegras. “Integrated Transport Planning in Curitiba, Brazil.” Moving Toward Integrated Transport Planning: Energy, Environment, and Mobility in Four Asian Cities. International Institute for Energy Conservation. 1993. <http://sol.crest.org/sustainable/curitiba/part4.html> June 25, 2004.

“Brazil.” Index of Economic Freedom. 2004. Heritage Foundation.

<http://cf.heritage.org/index2004test/country2.cfm?id=Brazil> Accessed on July 2, 2004.

“Brazil – Curitiba’s Urban Experiment.” Frontline World Fellows. 2004. Public Broadcasting Service. <http://www.pbs.org/frontlineworld/fellows/brazil1203/taniguchi.html> Accessed on July 6, 2004.

“Brazilian City Rolls Out Major Smart Card Project.” May 1998. From Lexis Nexis. http://web.lexis-nexis.com/universe/document?_m=b56dfd8fb1b7e69c33c4a15810911da9&_docnum=3&wchp=dGLbVtz-zSkVb&_md5=3c33807cd2bf65119efd65c0d21a4a61 Accessed on July 1, 2004.

“Citizen Information.” Instituto de Pesquisa e Planejamento Urbano de Curitiba. 2004. Instituto de Pesquisa e Planejamento Urbano de Curitiba.

http://www.ippuc.pr.gov.br/informando/index_informando_ingles.htm June 25, 2004.

“City of Curitiba, Brazil.” Members In Action. 1999. International Council for Local Environmental Initiatives. <http://www.iclei.org/mia98-99/curitiba.htm> June 22, 2004.

“Curitiba.” Production Plants and Joint Ventures. 2004. Brose. <http://www.brose.de/en/pub/company/history/> June 28, 2004.

“Curitiba 2000.” 4th International Conference on Technology Policy and Innovation. 2004. International Conferences on Technology Policy and Innovation. <http://in3.dem.ist.utl.pt/curitiba2000/> June 23, 2004.

“Curitiba airport wants to be like Viracopos” Gazeta Mercantil Online. October 3, 2002. Academic Universe. Lexis-Nexis. June 23, 2004.

“Curitiba Ecocity.” News And Topics. 2004. Development Bank of Japan. <http://www.dbj.go.jp/english/IC/hot/curitiba/02.html> June 24, 2004.

“Curitiba Experience.” Federal Transit Administration. No date available. United States Department of Transportation. http://www.fta.dot.gov/7694_7697_ENG_HTML.htm Accessed on July 7, 2004

“Curitiba: The Ecological Capital of Brazil.” Geographic Guide: Curitiba. 2003. Geographic Guide. <http://www.curitiba-brazil.com/> June 22, 2004.

“DaimlerChrysler Closing Plant.” Confederação Nacional dos Metalúrgicos da CUT. 9/5/01. Labour Net Germany. <http://www.labournet.de/branchen/auto/cut-neu5.html> Accessed on July 2, 2004.

“Earnings.” Brazil. 1997. Country Studies Series of the Federal Research Division of the Library of Congress. <http://www.country-data.com/cgi-bin/query/r-1739.html> Accessed on July 8, 2004.

“Economic Aspects.” Development Company of Curitiba. 2000. Development Company of Curitiba. http://www.cic-curitiba.com.br/economic_aspects.htm June 22, 2004.

Friberg, Lars. Innovative Solutions for Public Transport: Curitiba, Brazil. 2000. World Bank. http://www.worldbank.org/transport/urbtrans/pub_tr/curitiba_summary.pdf accessed on June 22, 2004.

“Garbage That’s Not Garbage: Waste Disposal.” City Solutions: A Healthy Urban Future. 2002. United Nations. <http://www.un.org/cyberschoolbus/habitat/units/un06txt4.asp> June 29, 2004.

“Government and Politics.” Brazil - A Country Study. US Library of Congress. <http://lcweb2.loc.gov/frd/cs/btoc.html#br0090> June 23, 2004.

“Habitat Press Release.” United Nations Centre for Human Settlements. 1995. United Nations Centre for Human Settlements Website. <http://www.un.org/Conferences/habitat/unchs/press/bestpr.htm>

“Human Development Indicators 2003.” United Nations Human Development Reports. 2003. United Nations Human Development Programme. http://www.undp.org/hdr2003/indicator/indic_8_1_1.html Accessed on June 28, 2004.

Ito, Tim. “Brazil: A History of Political and Economic Turmoil.” The Washington Post Online. January, 1999. <http://www.washingtonpost.com/wp-srv/inatl/longterm/brazil/overview.htm> June 24, 2004.

Klak, Thomas. “Spatially and Socially Progressive State Policy and Programs: The Case of Brazil’s National Housing Bank.” *Annals of the Association of American Geographers*, Vol. 80, No. 4 (Dec., 1990), 571-589.

Lerner, Jaime. “Change Comes from the Cities.” Human Settlements. 1996. Our Planet Magazine Online. <http://www.ourplanet.com/imgversn/81/lerner.html> Accessed on July 5, 2004.

“Lerner, Jaime.” Encyclopedia Articles. 2004. The Free Dictionary. <http://encyclopedia.thefreedictionary.com/Jaime%20Lerner> Accessed on July 2, 2004.

Lerner, Jaime. “Recommendations for Achieving Sustainable Communities.” 2001. National Library for the Environment website. <http://www.ncseonline.org/NCSEconference/2001Conference/report/page.cfm?FID=1719> July 6, 2004.

Mirabella, Marina. “Curitiba, Brazil’s Green City, Has Recycling Program.” Cable News Network Online. June 5, 1992. Academic Universe. Lexis-Nexis. June 22, 2004.

Osenga, Mike. “Perkins Opens Brazilian Engine Plant.” Diesel Progress North American Edition. 01/04. http://www.findarticles.com/p/articles/mi_m0FZX/is_1_70/ai_112686548 Accessed on July 2, 2004.

“Paraná approves loans to Banestado.” Gazeta Mercantil Online June 25, 1998. Academic Universe. Lexis-Nexis. June 22, 2004.

“Paraná, Brazil Fact Sheet.” Export Ohio. No date available. State of Ohio International Trade Division. <http://www.odod.state.oh.us/itd/Parana.pdf> July 23, 2004.

“Paraná state vehicles to be run by alcohol.” Gazeta Mercantil Online May 08, 1998. Academic Universe. Lexis-Nexis. June 22, 2004.

“Paraná to finance Renault for 10 years.” Gazeta Mercantil Online January 29, 1998. Academic Universe. Lexis-Nexis. June 22, 2004.

Parasram, Vidisha. “Efficient Transportation for Successful Urban Planning in Curitiba.” Horizon Solutions Site. 2003. Yale University. http://www.solutions-site.org/artman/publish/article_62.shtml June 22, 2004.

Pheifer, Ismael. “Technology is Key to Brazil-Canada Relation.” Gazeta Mercantil Online. 11/26/03. http://web.lexis-nexis.com/universe/document?_m=5bfa9bb380547a08db1f62b81cf79726&_docnum=3&wchp=dGLbVtz-SkVA&_md5=4dbeb4b2e4a871e292a2f2f7a26d31c4 Accessed on July 1, 2004.

“Quality of Life.” Development Company of Curitiba. 2000. Development Company of Curitiba. http://www.cic-curitiba.com.br/quality_life.htm June 22, 2004.

Rabinovitch, Jonas. “Urban Priorities for Action.” A Guide to the Global Environment. 1997. World Resources Institute. http://www.wri.org/wri-96-97/up_b4.html Accessed on July 1, 2004.

Rabinovitch , Jonas and Hoen, John. A Sustainable Urban Transportation System: the “Surface Metro” in Curitiba, Brazil. 1996. Available online through The Environmental and Natural Resources Policy and Training Project. <http://www.wisc.edu/epat/energy/.metro/format/urban.html> Accessed on July 2, 2004.

“Renault and Nissan Create Joint Factory in Brazil.” Financial Times. 12/21/01. http://web.lexis-nexis.com/universe/document?_m=562b33cad50d2538ae97a8f83a662faa&_docnum=4&wchp=dGLbVlb-SkVA&_md5=52bbfa8a3970892d8addb1542cbc01c2 Accessed on July 2, 2004.

“Regional Accounts of Brazil.” Brazilian Institute of Geography and Statistics. 2004. Instituto Brasileiro de Geografi e Estatistica. <http://www.ibge.gov.br/> June 28, 2004.

Savonen, Carol. “Brazilian City Raising Eyebrows Worldwide.” Looking for Oregon’s Future. Oregon State University. http://oregonfuture.oregonstate.edu/part4/pf4_03.html Accessed on July 2, 2004.

Schugurensky, Daniel. “Curitiba Launches ‘Green Exchange’ and the Free Open University of the Environment.” History of Education: Selected Moments From the 20th Century. 2002. University of Toronto. http://fcis.oise.utoronto.ca/~daniel_schugurensky/assignment1/1991curitiba.html June 23, 2004.

Silvio, R.I. New Productive Systems in the Auto Industry. p 6. no date available. <http://www.univ-evry.fr/labos/gerpisa/rencontre/S11Pires.pdf> Accessed on July 2, 2004.

“Summary Education Profile: Brazil.” EdStats. 2002. The World Bank Group. http://genderstats.worldbank.org/edstats/SummaryEducationProfiles/CountryData/GetShowData.asp?sCtry=BRA_Brazil Accessed on June 25, 2004.

Taniguchi, Cassio. Transport and Urban Planning in Curitiba. 2001. http://216.239.41.104/custom?cache:1DRgrp_Ln1QJ:www.nsl.ethz.ch/index.php/en/content/download/384/2455/file/+taniguchi+said+curitiba&hl=en&ie=UTF-8 Accessed on July 1, 2004.

Taniguchi, Cassio. “Transported to the Future.” Solutions from the Cities. 2003. Our Planet Magazine online. <http://www.ourplanet.com/imgversn/121/tanig.html> July 5, 2004.

“The Turning Point: Worldwide Expansion.” Vision Online, 2002. DENSO Corporation. <http://www.densocorp-na.com/visiononline/2003spring/s41.html> Accessed on June 25, 2004

“The World’s Women 2000: Trends and Statistics.” Demographic, Social and Housing Statistics. 2000. United Nations Statistics Division. <http://unstats.un.org/unsd/demographic/ww2000/table5a.htm> Accessed on June 28, 2004.

“Thinking the City.” Instituto de Pesquisa e Planejamento Urbano de Curitiba. 2004. Instituto de Pesquisa e Planejamento Urbano de Curitiba http://www.ippuc.org.br/verde_Index_ingles.htm June 25, 2004.

Thurow, Lester. “Major Unresolved Problems.” Building Wealth. 1999. The Atlantic Monthly online. <http://www.theatlantic.com/issues/99jun/9906thurow4.htm> Accessed on July 6, 2004.

“Typing the Future.” Core Ideas Project. 1998. Prefeitura Municipal de Curitiba. <http://www.curitiba.pr.gov.br/pmc/ingles/Solucoes/Ideias/DigitandooFuturo.html> June 28, 2004.

Yaroslavsky, Zev. “Whither Transit in Los Angeles?” The San Fernando Valley Transit Insider. 2001. San Fernando Valley Transit Insider Online. <http://www.transit-insider.org/master.html?http://www.transit-insider.org/sectors/mir0401.htm> Accessed on June 30, 2004.