

The fragmented city: access to electricity in two neighbourhoods of the metropolitan area of Vitória (Espírito Santo, Brazil)¹

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The positioning of a mass of people living on meager salaries or in part-time work, next door to a minority with very high incomes, creates a division in urban society between those with permanent access to goods and services and those who do not have the means to satisfy the very same needs. In turn, this creates quantitative and qualitative disparities in consumption. These differences are both the cause and the consequence of the existence, the renewal and the maintenance of two cycles of production, of distribution, and of consumption of goods and services within these towns.

(Santos, 2004, p. 37)

Introduction

In dealing with the electricity supply network in the agglomeration of Vitoria (Brazil), this article will analyze a technical aspect of the urban area, through a socio-political and economic rationale. Following Milton Santos, for whom "the characters of society and geographic space, at one point in their evolution, are in relation with a given technical state" (2006, p. 171), a fragmented city is brought to the fore composed of two economic circuits, distinct and autonomous, yet interdependent (Santos 2004).

A comparison will be made of electric energy in two distinct neighbourhoods of the Metropolitan Area of Grand Vitória (RMGV)². The first, Penha, is a favela³ loosely occupied by migrants from the neighbouring states from the 1950's to the 1980's, and also by migrants from other cities. The birth of this neighbourhood illustrates the inferior circuit of the urban economy: lack of capital, technology, planning and functional zoning, but an abundance of creativity, self-learning and mutual aid in the construction of houses and public spaces. The area therefore remains marked by multiple usages: homes, shops, services, small workshops. The second neighbourhood, Praia da Costa, is bustling with economic dynamism, off the back of a shopping centre, bars, restaurants and

¹ NB: this article forms part of a project financially supported by the Brazilian CNPq, which, in 2007 and 2008, granted scholarships to introduce students to science. It takes place within the Laboratory of Human Geography in the Geography Department of the Federal University of Espírito Santo.

² The RMGV was officially created on 17th January 2005 (Constitutional Law 318) and comprises 7 municipalities: Serra, Vitoria (capital of the State of Espírito Santo), Vila Velha, Cariacica, Viana, Guarapari and Fundão. In 2007, its population reached 1,624,837 according to the IBGE.

³ A favela, or slum, is defined by the UN as an area characterized by "overcrowding, poor or substandard housing, inadequate access to sanitation and drinking water, and insecure residential status". This definition limits itself to the physical and legal conditions pertaining to the occupation of the land, without reference to the social dimension which is harder to measure. More often than not, the physical insecurities are compounded by social and economic marginality. On the history of favelas and how they have been perceived in Brazil, opinion varies between labeling them as insecure areas and areas with a strong socio-cultural identity. Concerning the favelas of Rio de Janeiro since the end of the 19th century, see Valladares (2006).

other top level shops. Amongst the highest value areas of the Vitoria agglomeration, it is mainly home to the middle and upper classes and is a hub of real estate activity. The concentration of income in Brazil, amongst the strongest in the world, is particularly apparent in the price of land, which is 40 to 100 times greater in this neighbourhood than in the former. This neighbourhood allows the most characteristic processes of the upper circuit of the urban economy to be visualized: a relative level of urban planning (very often the rules and regulations of urbanism are bypassed for the benefit of real estate promoters) and buildings requiring capital and technology (the property sector is more and more associated with monopolistic capital, both national and international). Increasingly, exchange value trumps use value: unlike in the inferior channels, property here is not just seen as a dwelling but as a commodity and an investment.

This study therefore concerns the role of techniques: it involves understanding the socio-spatial fragmentation through the access to electricity within two socially and economically unequal neighbourhoods, and how this disparate access is conducive to social domination⁴.



Figure 1: Partial views of the Alto Bairro da Penha (left) and of Praia da Costa (right)

⁴ The study comprised several types of work :

- meetings with different employees of the supplier Escelsa (Espirito Santo Centrais Eletricas), and contact with other institutions such as the Division of Public Lighting of the Public Secretariat for Transport of Vitoria, as well as the Terra mais Igual project, also a subsidiary of the town of Vitoria.

- on-site observation of the electricity infrastructures in the two neighbourhoods and an analysis of the network map, supplied by Escelsa.

- discussions with groups of residents, undertaken in 2008 and 2009. As a means of verification, open and closed questionnaires were filled out in the two neighbourhoods (22 in Penha and 24 in Praia da Costa); this survey cannot claim to be representative of the population in a strict statistical sense, but it targets the most varied residents and takes into account differences in age, sex and longevity of residence.

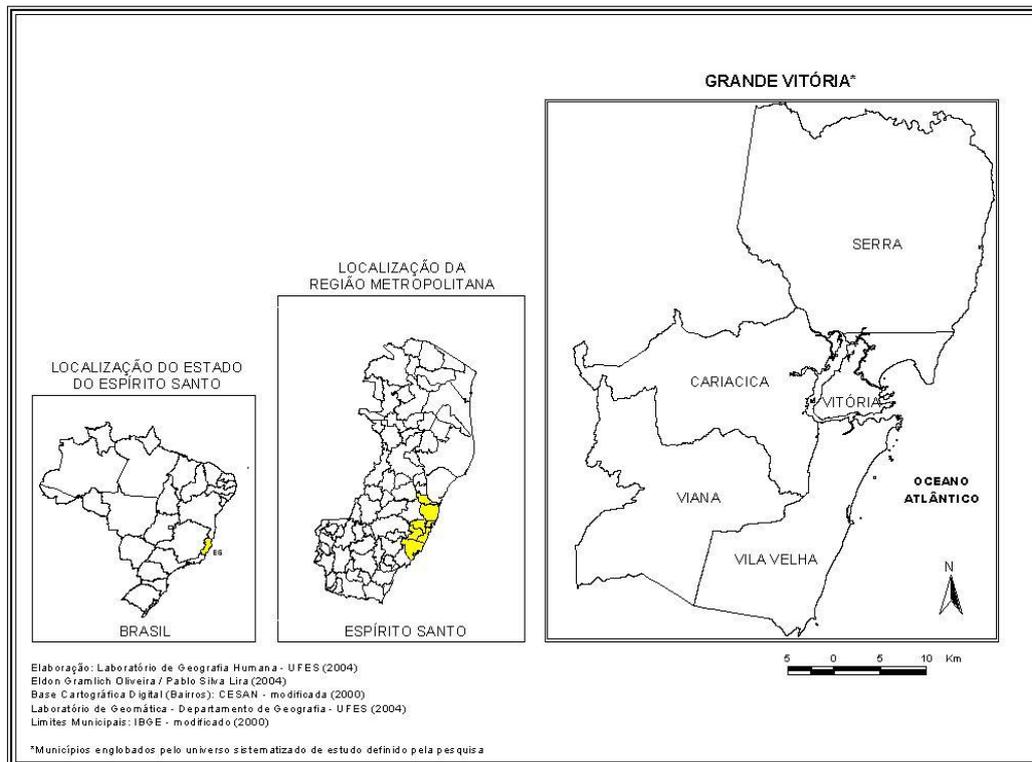


Figure 2: location of the metropolitan area of Grand Vitória

1. Urban fragmentation and the electricity network

The concept of fragmentation has to be qualified, as it is the subject of multiple meanings and a certain level of ambiguity. In general terms it refers to a radicalization of segregation. Fragmentation would therefore point to "a separation which, beyond the 'residential' aspect, concerns 'public' or collective space: the town's central thread – social and functional – would be in question at least as much as the global, symbolic and social unity of the populating of the neighbourhoods (Navez-Bouchanine, 2002, p.62). But this unity, despite distinct circuits, inherently exists, as the different fragments of the town complement each other, as we will see.

When this fragmentation occurs on a socio-economic level, in relation to the transformations of society and space, the application of the concept is not easy to grasp. The globalization of the economy leads to a differentiation between the centres and the peripheries, between those who are connected to globalization and those who are not. But the disconnected amongst them contest the central areas. They lay down a challenge to what is an exclusive and reserved centre. Clearly dominated, they slip into the social space of modernity: street-sellers in the town centres, electronic equipment and televisions in some parts of the working class neighbourhoods, which represents a certain connection as it can reinforce the homogeneity of consumption and behaviour. This fragmentation creates laws and regulations. It opens the door for the connected areas to be protected by private militia. It leads to the appropriation of public spaces and the corruption of their usage. In doing so, it creates tension. And yet the those at the head of these controls are the same people we would find in working class neighbourhoods and who, paradoxically, contribute to the

very law enforcement that exploits them (self-exploitation, and simultaneous adaptation to the dominant values and internalization of those values, complicating the simple view of indignation or the idea of a watertight seal between the two social sectors).

The material expression of fragmentation is equally ambivalent, as we must not confuse poverty and informal dwellings. Differences in income are widespread in working class neighbourhoods, as is conflict between sectors and exclusive behaviour (Navez-Bouchanine, 2002). But beyond the residential question we must consider the networks that relay the different fragments and micro-fragments of the town. People are not locked up in their neighbourhoods. They circulate freely, work, and build relationships outside of their place of residence. Such is the case for bus drivers and domestic cleaners, for example. They may be exploited and dominated, but from this contact is born an awareness of the exploitation, a realization of the conflict, or a submission to the established order with which they are cooperating. Often, we notice strong links in these neighbourhoods between the dominant sectors of the dominated classes (shop keepers, association presidents, public servants, policemen) and the political and economic world within the town⁵.

Physical networks (electricity, water, telephone, optic fiber, road, rail and waterways) are relatively dense, their distribution varying according to the interest and need for their extension into working class neighbourhoods. Networks do exist in these neighbourhoods, but very often of a lower quality and with recurring technical problems.

These neighbourhoods resist and want to change. Organizations have emerged to protect freedoms, where residents can participate in the political sphere. The image given and the stigma attached to these neighbourhoods by the press – as well as the acceptance by the residents themselves of the negative light in which society portrays them – can lead to withdrawal. However, this situation cannot be allowed to develop into a contagion: the refusal of reductionism and the desire to break free from segregation is widespread. And yet “fragmentation” is the term that best describes the processes identified.

2. The recent evolution of the electricity supply network in Espirito Santo

The establishment of Brazil's electricity network occurred in two stages. The first spanned through the 1950's and beyond, during which time electric power was primarily used in industry. Milton Santos puts it this way: “The State is in charge of all operations, as one of the conditions for obtaining external investment is that cheap electric power should be supplied to the industrial sector, the biggest consumers that comprise multinationals and large national firms. As such, large industry monopolizes affordable electricity production, whereas the people are not sufficiently supplied” (Santos, 2004, p.171). Santos' analysis is important; on the one hand it highlights how precarious the supply line is to the residential sector, given that industry has become the priority, and on the other hand it points out that the industrial sector's electricity supply is in fact financed by the residential sector. In the 1970's industry accounted for 24% of the electric power consumed in Brazil, yet 26% of the population was still without access. Today, and in particular in the state of Espirito Santo, the priority given to industrial energy consumption is still patently obvious. Industrial consumption is well below domestic consumption, but the latter pays 48% more for its electricity, therefore financing the former (table 1).

⁵ As early as the publication of “The Shared Space” (1975), Milton Santos discusses how the upper and lower channels of the urban economy complement each other.

Table 1: volume of electricity sold by Escelsa in 2006 and earnings

Type of usage	Volume in MWh	Earnings (1,000 reals)	Price per kWh in reals
Industry	1,041,063	221,042	0.212
Domestic	1,372,831	431,222	0.314
Total	2,413,994	652,264	

Source : Escelsa : Relatorio Administrativo, 2006

available on : <http://www.escelsa.com.br>

The second important stage began in the mid 1990's and continues up to this day. It is dominated by privatization: electricity is no longer merely a necessary element of infrastructure for the economy, it is becoming an integral and constituent part of it, as merchandise produced by large national and international conglomerates. The firm Escelsa (Espírito Santo Centrais Elétricas SA), the electricity distributor in Espírito Santo, is managed by Holding Energias do Brasil (EDB), which also controls the companies that produce and supply electricity to the states of Ceará, São Paulo, Tocantins and Mato Grosso do Sul. 62.4% of the EDB group is, in turn, held by the Energias de Portugal group (EDP), which operates in European countries such as Spain, Portugal and Belgium, as well as in various South American countries, the United States and China⁶.

The privatization of energy companies in Brazil⁷, the sign of neoliberal modernization, came about without the need for social policy regarding tariffs. This is underlined by Bermann (2003, p.45): "the first auction of an electricity supply company – Escelsa – occurred on 11 July 1995, whereas the sector's regulator, the National Agency for Electric Energy (ANEEL) was only created on 6 October 1997 (decree 2335). By then, four electricity companies had already been privatized". Despite the policy that saw unprofitable companies switched to the private sector so that public services would gain in efficiency, what in fact happened was that the State lost its powers of decision-making and planning over a resource which is "a necessity of modern society, considered as essential as water supply, cleanliness, transport and public health" (Jannuzzi and Swisher, 1997, p.12).

3. Access to electric power: the neighbourhoods of Bairros da Penha and Praia da Costa

The surveys conducted in the two neighbourhoods⁸ informed us of the salaries and living conditions of the residents. In the Penha neighbourhood, family income does not exceed 3 minimum-salaries,

⁶ <http://www.energiasdobrasil.com.br/energia/index.asp>. Consultation in August 2008.

⁷ Privatisation has mainly concerned the supply of electricity. Even today, a large proportion of Brazilian hydroelectric power supply is under State control, through large companies such as Furnas, Tucuruí and Itaipu. However, the private sector is now being given greater incentives to build hydroelectric power stations.

⁸ Surveys through questionnaires, see above. The reference to the minimum-salary is that provided by the IBGE. It acts as a benchmark for the subjects of the survey, making their assertions clearer and comparisons over time easier.

whereas the majority of Praia da Costa residents (20 out of 24) have an income greater than 10 minimum-salaries. In Praia da Costa 2 out of 3 residents have studied - or are studying - in higher education, whereas in Penha the same proportion has not even completed primary education. As concerns professions, almost all of Penha's residents are domestic employees, workers or hold informal positions, whereas the majority of Praia da Costa's residents are self-employed, executives or retailers. The socio-economic profiles are very different, and we can use Bourdieu's (1980) terminology to identify the dominating classes of Praia da Costa and the dominated classes of Penha.

The data concerning housing only confirms this split. In Penha's Alto Bairro, dwellings are small (40 to 60m²), overcrowded and of poor quality. We notice both a lesser quality in the energy used and an overconsumption. This paradox is due to the energy losses brought about by the usage of home-made electrical devices and the of old, dilapidated and energy-thirsty products within the home. The poor quality of the network is not only limited to households. Contrary to Escelsa's claims that it treats all of its clients equally, the network in Penha's Alto Bairro is precarious to say the least: rotten wooden posts haphazardly implanted, alleys with no public lighting (which explains the greater insecurity felt by residents), poorly assembled cables with no tension (which accounts for the frequent power cuts in rain or strong winds), and a meager number of transformers. This situation leads to many residents unplugging their household appliances when strong rain is forecast.

The reality in Praia da Costa could not be more different. Households are generally apartments of 100 to 200 m² occupied by a small number of residents in luxurious buildings with guarded access. The electrics are high quality and conform to technical norms. Household appliances are new, efficient, and less energy consuming. The quality of the public network is characterized by a sufficient number of transformers, posts made of cement, cables in good condition, excellent public lighting including on the beach, which has given the neighbourhood its name and its prestige.



Figure 3: the state of the networks in the two neighbourhoods

above : electric post in the middle of the alley, obstructing the passage, base of the post rotten, low-tension wires liable to short circuit, in the Alto Bairro of Penha.

below: well placed cement posts, giving good public lighting, transformers in good condition high tension wires in Praia da Costa, nocturnal lighting often referred to as the jewel in the crown of the neighbourhood.

Illegal access to electricity cannot be ignored. It is common in – but does not limit itself to – poorer social groups, and it must be noted that even amongst the disadvantaged, many pay their bills regularly. It can be explained by the difficulties in accessing electricity legally. These difficulties don't exist in the upper circuit of the urban economy. As such, in Praia da Costa, where the quality of life allows residents to pay their bills without hindrance, illegal access to electricity is not a widespread problem.

Electricity theft in Brazil is known as *gato*⁹. It is a popular expression that refers to the consumption of electricity by illegally hijacking the current. The problem starts with the repeated non-payment of electricity bills, which leads the company to cut off the supply. But as families cannot cope without electricity in everyday life, they misappropriate it. The *gato* in Bairro da Penha can be seen in the installations outside of the network, and is confirmed by the managers of the distribution companies. Amongst the residents interviewed, only a handful recognized this method as a viable alternative to gain access to electricity, but denied – with no trace of irony or subtext – resorting to it. But some residents clearly admit to paying much less than their multiple household appliances should ordinarily warrant¹⁰. There are three forms of *gato*. In the first case, the *gato* is a direct connection to the network: two wires are placed on the network's aerial cables and are connected directly to the household. The second technique involves breaking the seal on the supply box and diverting the current from there. The third method is to dismantle the meter and install within it a mechanism that reverses the logging of electricity consumption, thereby concealing the actual level of consumption. According to Escelsa, the fight back against the *gato* is being won. Three methods are available to them. Firstly, checking all the meters, especially in the outer neighbourhoods: if a meter should produce a reading of zero for several months consecutively, that household will receive a fine. Secondly, replacing the exposed cables with covered cables, the insulation making it harder to attach a wire to directly. Thirdly, removing meters from households and placing them at the supply posts instead. As such, electricity theft has noticeably decreased in the outer neighbourhoods of Vitoria. Such are the particularities – especially topographical – of Penha, though, that operations to quell this wave of theft are difficult to undertake. It is a hill, the top of which has no streets but merely alleys which do not allow for traffic to pass through. What is more, the area is controlled by traffickers. Although Escelsa knows it can count on the Military Police if needed, it prefers not to, in order to maintain its image with the people.

Gato is an alternative form of access to electricity in the lower circuit, in those areas where the spatial organization allows it¹¹, just as access to the ordinary electricity market is a particular feature of the upper circuit. But there are no reliable statistics that shed light on the phenomenon in the different neighbourhoods of the urban area of Vitoria. It remains that the majority of residents of the peripheral neighbourhoods and the favelas belong to a circuit of consumption, so that the demand for electricity increases. Even taking into account diversions of current, the legal consumption of electricity is increasing, and with it the profitability of the supplier.

⁹ Literally, the cat. But the word carries other meanings in Brazilian slang (NdT).

¹⁰ The research did not lead to any article on the illegal access to electricity in Brazil or in South America. One reference (Ilanrewaju, 2000), however, mentioned illegal connections in Africa, in the shantytown of Ijora Badia, in Lagos, Nigeria.

¹¹ The Escelsa director in charge of combating energy losses told us of the *gato* phenomenon in the most varied of Brazil states, and of the techniques introduced to fight it.

The residents of Praia da Costa have a moralistic outlook on the issue of gato, which became apparent in our meetings. "It's theft, we must stop it. Horrible. Illegal. We must be rid of it. It's theft, and we're paying for it." However, some residents are more understanding and free from prejudice, such as one lady who sees this practice as "a call for help for the social integration which we dream of".

We could conclude that the precarious nature of electricity supply in the peripheral neighbourhoods results from Escelsa's commercial values, and a poor structuring of its network in an unprofitable area. The reality, however, is the opposite, and such a claim would only serve to disguise the feeling of domination that exists between the two circuits. The truth is that the lower circuit needs to remain connected to the system, but subordinated, so as to be a source of growth for the upper circuit. We cannot say that the outer neighbourhoods are inherently unprofitable for the supplier; the residents of these areas form the majority of the inhabitants of the urban area of Vitoria, and (mostly) they pay for the electricity they consume and subsequently contribute to the profits of the company. In reality Escelsa does not lose out because the hijackings are taken into account every year by the ENEEL (National Agency for the Electrical Energy) to determine any changes in the tariffs. Besides, as the company has itself admitted, losses from gato methods are calculated to be 5.4%, well below the 7.7% losses due to technical deficiencies in the network. And despite these losses, profits remain very high¹².

The root of the problem is to be found less in the dilapidation of the network and more in the difficulties facing the poorest of the poor in gaining access to electricity. The tariffs are partly to blame. The average price in the urban area of Vitoria is 0.26 reais/kWh before tax, and 0.41 reais/kWh after. The average user – with a fridge, an electric shower, a television, an iron and 3 lamps – would use an estimated 148 kWh per month, which amounts to 60.68 reais. In the Alto Bairro da Penha neighbourhood, the majority of residents concerned have an income of between 1 and 1.5 minimum-salaries, between 380 and 570 reais¹³. The electricity bill would therefore account for between 10% and 16% of their income. In Praia da Costa on the other hand, the vast majority of incomes are over 10 minimum-salaries (3,800 reais). If we imagine a typical household to contain a fridge, two televisions, a DVD player, a radio, a games console, a washing machine, an iron, 3 electric showers, fluorescent lamps in every room, for a living space of 100m², and given that the devices are more modern and therefore consume less, electricity consumption can be estimated at 175kWh with a bill for 70 reais, less than 2% of a monthly salary.

The electricity bill is therefore far more onerous for the resident of Penha than it is for the native of Praia da Costa. In order to mitigate these disparities, and in conformity with the ANEEL regulations, Escelsa charges a more favourable tariff to those classified in the low-income categories. The discount is regressive and varies from 66.35% to 2.82%, depending on the level of consumption (see table 2).

Discount on the bill

up to 30 kWh	→	66,35 %
from 31 to 80 kWh	→	42,04 %
from 81 to 100 kWh	→	41,70 %

¹² 139.6 million reais in 2006 (source : Relatório administrativo da Escelsa, 2006)

¹³ At the time of the interviews, in late 2008.

from 101 to 180 kWh → 12,54 %

above 180 kWh → 2,82 %

Table 2: Favourable tariffs for low incomes

Source : <http://www.escelsa.com.br>

However, the very restrictive conditions for benefitting from this system, as well as the lack of information provided to the users, mean that these favourable rates almost certainly do not reach the very poorest : of the 22 people interviewed in Alto Bairro da Penha, only one was aware of the scheme and was using it. The inherent logic behind this project is criticized by Bermann (2003), who asserts that the level of consumption required for a normal life (which he estimates to be 220kWh/month) would mean that the purely commercial aspect of electricity supply should be surpassed. According to him, the favourable tariff should solely take into account family income, regardless of levels of consumption, and be supplemented by incentives to combat wasteful usage. But efficient – and therefore limited – usage goes against the interests of the suppliers. The precarious nature of the energy network in the peripheral neighbourhoods is the result of company policy, whose sole aim is to maximize profits. Because it invests derisory amounts in energy efficiency programs, it would not have the means to satisfy demand if electricity usage were more egalitarian and if, as a result, the poor had a greater level of energy consumption.

Finally, the homogenization of behaviour leads to a sharp rise in consumption, giving legitimacy to the one way in which energy is produced and consumed. But this modernization is selective, and in semi-peripheral urban areas can crystallize socio-spatial fragmentation. By examining where these techniques operate, we can catch a glimpse of the domination relationship that exists between social classes. This relationship could, paradoxically, weaken the fragmentation. The techniques create an effect of homogenization and an increase in consumption. In the example given here, they spread to the poorest people the notion of the impossibility of living without electricity, a commodity which has necessarily become universal. But this unity which promotes contact, relationships, homogenization, and which therefore weakens fragmentation, also boosts social domination. The appropriation of electric power by the upper circuit, especially after the privatizations of the 1990's, and its transformation into a commodity to be consumed according to predominant norms – that is, in the simple terms of its monetary value – has led to prices which the poor cannot afford. The gato therefore becomes the only means by which they can access electricity, just as clamping down on it becomes a form of social control, maintaining social subordination. In legitimizing this repression and social control, the repression of the gato brutally highlights the reality of the domination to which the poor are subjected. Making gato a crime is nothing other than the dominating classes imposing a non-egalitarian and exclusive order. Through prejudice, this order stigmatizes the poor and portrays them as criminals (gato is punishable according to the Brazilian Penal Code), and only because they cannot take part in the consumption game, which, paradoxically, seduces and excludes them simultaneously.

As such, this hijacking of electricity is deemed tolerable by society, in that it does not resolve the question of low salaries and unemployment, it does not automatically reduce electricity prices for the poor, and it does not launch an energy efficiency program which would durably lead to greater equality. However, these processes are essential for the position of the lower circuit as the subordinated, for ongoing inequality and the concentration of incomes, all fundamental aspects needed to maintain the system.

Conclusion

Social domination in towns manifests itself through the act of despoliation, as workers struggle to live on low salaries. Inserted into the consumer model imposed by the upper circuit, but unable to conform to it, they make choices and establish priorities according to their income. As a result, household spending is neglected and the poorest end up in shanty towns. It is the same principle for electric power. It is used creatively and illegally because certain forms of consumption have been prioritized, notably for household appliances, considered essential for society's predefined way of life. This only worsens the extortion of which the poor are victims, and enriches the upper circuit through the sale of goods and services. In this way the poor are not useless in the consumer circuit. Despite the widening income gap, the poor constitute a profitable consumer market.

The consequence of this model of social domination in the urban space is a fragmented and divided town, scarred by the concentration of public services and structures in certain central spaces, compared to the instability and poverty on the peripheries. However, the poor are not disconnected from the urban economy, as an erroneous interpretation of the concept of fragmentation could lead us to believe. They form part of this economy, but in a dominated position.

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