



# **PORTO MARAVILHA**

- CASE STUDY

**URBAN REGENERATION KSB**



**WORLD BANK GROUP**

Urban, Disaster Risk Management, Resilience & Land



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## 1



## SUMMARY

PROJECT & LOCATION	Porto Maravilha
<b>LAND-BASED FINANCING INSTRUMENT USED</b>	Development/air rights
<b>TOTAL PROJECT COST</b>	\$2.8 billion (2012 figures)

The Porto Maravilha Urban Regeneration Project used the sale of development rights to transform a decaying industrial waterfront in Rio de Janeiro into a vibrant mixed-use zone with renewed urban infrastructure, while preserving its historical identity and heritage.

## 2



## CONTEXT AND BACKGROUND

Porto Maravilha is a large-scale urban regeneration<sup>1</sup> project to restore the old port district of Rio de Janeiro (Brazil). The district is at the heart of the Rio de Janeiro Metropolitan Region, the second most populated urban area in Brazil, with 12 million inhabitants.

Porto Maravilha is a strategically located and historically significant zone of the city. The main roads into the commercial core of the city go through the port zone,

as do the connections between the city's North, South, and West Zones and the Metropolitan Region. Despite its central location and proximity to two airports and popular sightseeing spots, the area had been in decay since the 1960s. Technological advances made the harbor support facilities in Porto Maravilha obsolete, and port activities relocated to larger sites nearby. Economic activities in Porto Maravilha started to decline, leaving behind vacant buildings and low property values.

1. In this paper we are using the term Urban Regeneration to refer to a whole strategy to transform an urban area. We are using urban renovation specifically to refer to the physical urban infrastructures and services.

**FIGURE 1**  
**Porto Maravilha**  
**location.**



A primary motivation behind the regeneration project was to integrate Porto Maravilha with the City Center. This integration was intended to spur a densification of the port area by improving the land use to meet demand for new housing and economic opportunities, promote social inclusion, and help redesign the main mobility grid and connections in the City Center to reduce traffic. It

would also — through improvements in the use of public space and cultural amenities — celebrate the area's unique cultural heritage and history. However, the cost of the large-scale infrastructure needed to connect Porto Maravilha to the rest of the city presented an obstacle for development and attracting investors. It

**FIGURE 2**  
**Consortium**  
**Urban Operation**  
**Model**



Sponsored by the Municipality of Rio de Janeiro's then-Mayor Eduardo da Costa Paes, the Porto Maravilha regeneration initiative was launched through a Brazilian urban policy instrument called Urban Consortium Operation (UCO), and the City of Rio de Janeiro created a special purpose company to lead the implementation process. The UCO is a land value capture (LVC) instrument which allows the municipality to use the sale of development rights to fund enabling and value-enhancing infrastructure.

The UCO, which must be created by municipal law, establishes an Urban Special Interest Area (USIA) – in this case the Porto Maravilha district – and its applicable zoning regulations. These regulations include designating the current land use and also the 'additional construction rights' which would be sold to developers (called Certificates of Potential Additional Construction, or CEPACs). The municipality must invest the funds it raises

from selling CEPACs in the regeneration of the area, as stipulated by the law.

In 2009, the Municipal Chamber of Rio de Janeiro approved Complementary Municipal Law (CML) 101/2009 to create the UCO for Porto Maravilha within an intervention area of five million square meters and with a duration of 30 years. This case study focuses on the implementation of the project from 2009 to 2016.

The CML 101/2009 states that "the purpose of the Urban Operation Consortium is to promote the urban restructuring of the [area] through the expansion, articulation, and restoration of public spaces in the Port Zone with the aim of improving the quality of life of its current and future residents, and the environmental sustainability and socioeconomic aspects of the region."<sup>2</sup> This law establishes a set of principles and parameters to achieve the following goals:



- » Reposition the city center as place to live, helping to increase its population
- » introduce a new concept of urban mobility through:
  - Public transport integration
  - Pedestrian priority
- » invest in the zone's historical and cultural heritage
- » Promote social inclusion

The project's main physical interventions focused on infrastructure reconstruction and upgrading the capacity of urban services. Infrastructural interventions included the reconfiguration of the mobility grid through the demolition of a 5-km bridge and construction of 9 km of tunnels that improved pedestrian walkways, bikeways, and green and public spaces. New drainage, water supply, sewage, electricity, gas, and telecommunication networks infrastructure were constructed along 70 km of streets and avenues. The urban services included improved and expanded public lighting, garbage collection, street sweeping, and traffic control. The interventions aimed to ensure the availability of serviced

land for real estate development and to enhance and promote social inclusion.

Through the UCO, the municipality raised about 5 billion reais (USD 1.9 billion at 2019 exchange rates) from 2011 to 2013 and used the funds to invest in 85% of the planned urban regeneration activities. These funds were secured through the sale of all 6.4 million CEPACs to the Fundo de Garantia do Tempo de Serviço (FGTS), the government-run worker's pension fund. The Fund, in turn, negotiated the on-sale of CEPACs with real estate companies for the development of the area. Since 2012, 10 new buildings have been built, totaling 511,275 square meters.

2. (CML 101/2009, Article 2).

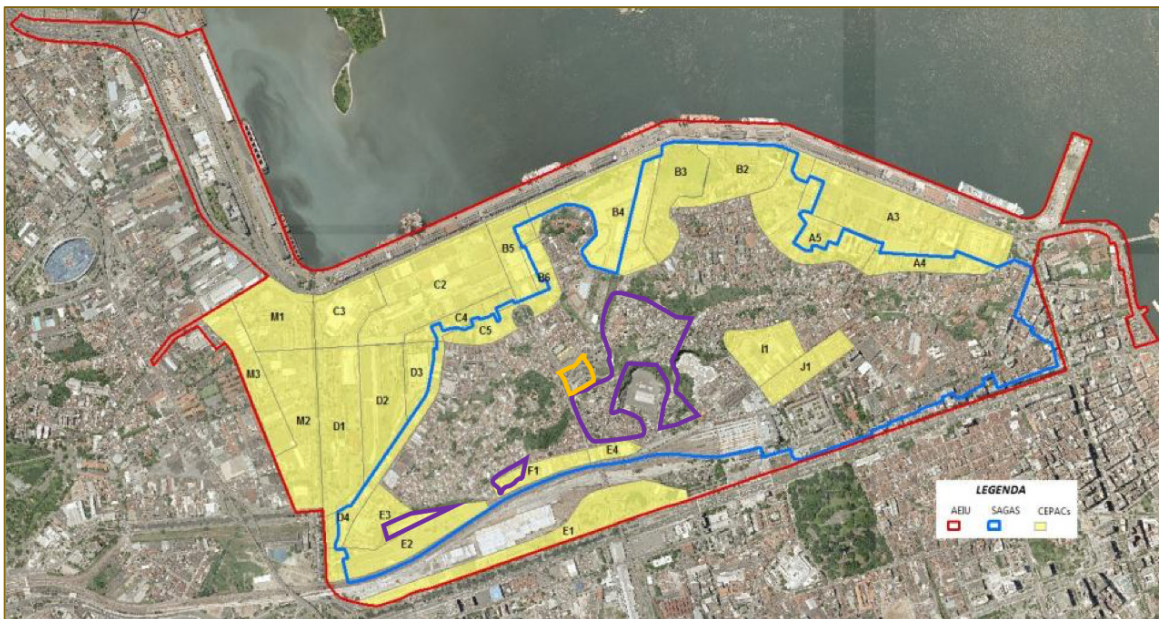


## Site Description

During Brazil's colonial and imperial period (1500-1989), Rio's port was a dynamic center for the city and national economy and the major point of entry for the slave trade. In the beginning of the 20th century, approximately 1.2 million square meters of land was reclaimed from the sea, widening the area to its current size. The new land was used to provide additional logistical services sites to the Port of Rio de Janeiro. The area thrived until the mid-1900s, when technological changes in the operation of the port made many of the old facilities obsolete, kicking off a steady degradation of the zone. Commercial port activities moved to a larger industrial neighborhood nearby.

In the 1970s, when major cities around the world were building large viaducts to handle increased vehicle traffic, Rio de Janeiro built one of its own. However, the 5-km elevated viaduct, known as the Perimetral, had a negative impact on the port area - rendering it a pass-through route from outlying residential areas to the CBD. This accelerated its urban and environmental deterioration with residents and businesses gradually moving out. Major upgrades to the area's infrastructure had already stopped in the 1960s, and as the economic activities declined, many buildings became vacant and the number of inhabitants stagnated. By the late 1980s, traffic jams were increasingly worsening in the port area, particularly during rush hours when the viaduct became a chaotic choke point of converging traffic of downtown commuters.

FIGURE 3  
Porto Maravilha  
Intervention  
Area



—	Total	= 5 million m <sup>2</sup>
—	Heritage área	= 3,8 million m <sup>2</sup>
■	Additional Building área	= 1,2 million m <sup>2</sup>
■	Favelas	
◆	Social Housing Complex	

When the Porto Maravilha UCO was created, its 5 million square meters had two main sections: the heritage area and the reclaimed region. The heritage area, declared in 1987, was about 3.8 million square meters with 1,500 privately owned small- and medium-sized historical buildings, many of which were underutilized and informally occupied at the time. Within this area there were four informal settlements, known as favelas, and the inhabitants had no land titles.

The balance of the land – an area of 1.2 million square meters – was made up of large plots of land with large warehouses and other port operations facilities. Of the land and facilities, 25% were privately owned and 75% were owned by state companies. The latter included the port authority Companhia Docas do Rio de Janeiro and Rede

Ferroviária Federal, a former national railway company. Until the Porto Maravilha project, there was no plans for the defunct railway company's land. On Companhia Docas' land, several unused and vacant warehouses were informally occupied.

According to Brazil's 2010 Census, around 28,000 people were residing in the intervention area, mainly in the heritage section. The majority of the residents lived in poverty with roughly half residing in favelas. The area's drainage, water supply, gas and electricity networks were insufficient and also inefficient. Parts of the area were exposed to floods during the rainy seasons contributing to the pollution of its shores along the Guanabara Bay. Another setback was soil contamination from port activities.

### 3



## THE PROCESS

An initiative of the Municipality of Rio de Janeiro, Porto Maravilha required large-scale investment using funds that had to be raised through a system of additional construction rights (CEPACS) created by the UCO. The project had three areas of investment focus: urban infrastructure reconstruction and maintenance, real estate development, and socio-economic development.

To design and approve a UCO, the municipality assessed the urban, social and environmental impacts, determined the technical and economic feasibility of the potential interventions to catalyze real estate development, and estimated the initial value of the CEPACS. The Brazilian Securities and Exchange Commission (CVM), through which the CEPACS are sold, reviewed the assessments as a part of its approval process for the UCO.

Before the UCO could be approved, the municipality held public hearings and engaged with stakeholders to harness the community's support. During this pre-approval stage, Porto Maravilha drew wide public participation, leading to adjustments in the interventions and the timeline of the project.

The UCO aimed to restore the appeal of the port zone's degraded land in order to boost property prices. To secure rights to develop properties with higher value and density, the landowners, real estate developers, and other private parties had to acquire Certificates of Additional Construction Potential (CEPACS) from the municipality by auction. The municipality, in turn, had to use the proceeds from the sale of the CEPACS to move forward on the urban renovation program, including the major infrastructure upgrades defined in the CML 101/2009. Through the sale of CEPACS, the municipality raised the funds to start the renovation project. Thus, the real estate sector pre-financed the program on the expectation of making a return in the medium to long term while the municipality took steps to increase the value of the area beforehand to help finance the area's transformation. With Porto Maravilha, the additional construction potential was for the reclaimed land area only, while the urban regeneration covered the entire intervention area, increasing the benefits from the funding.

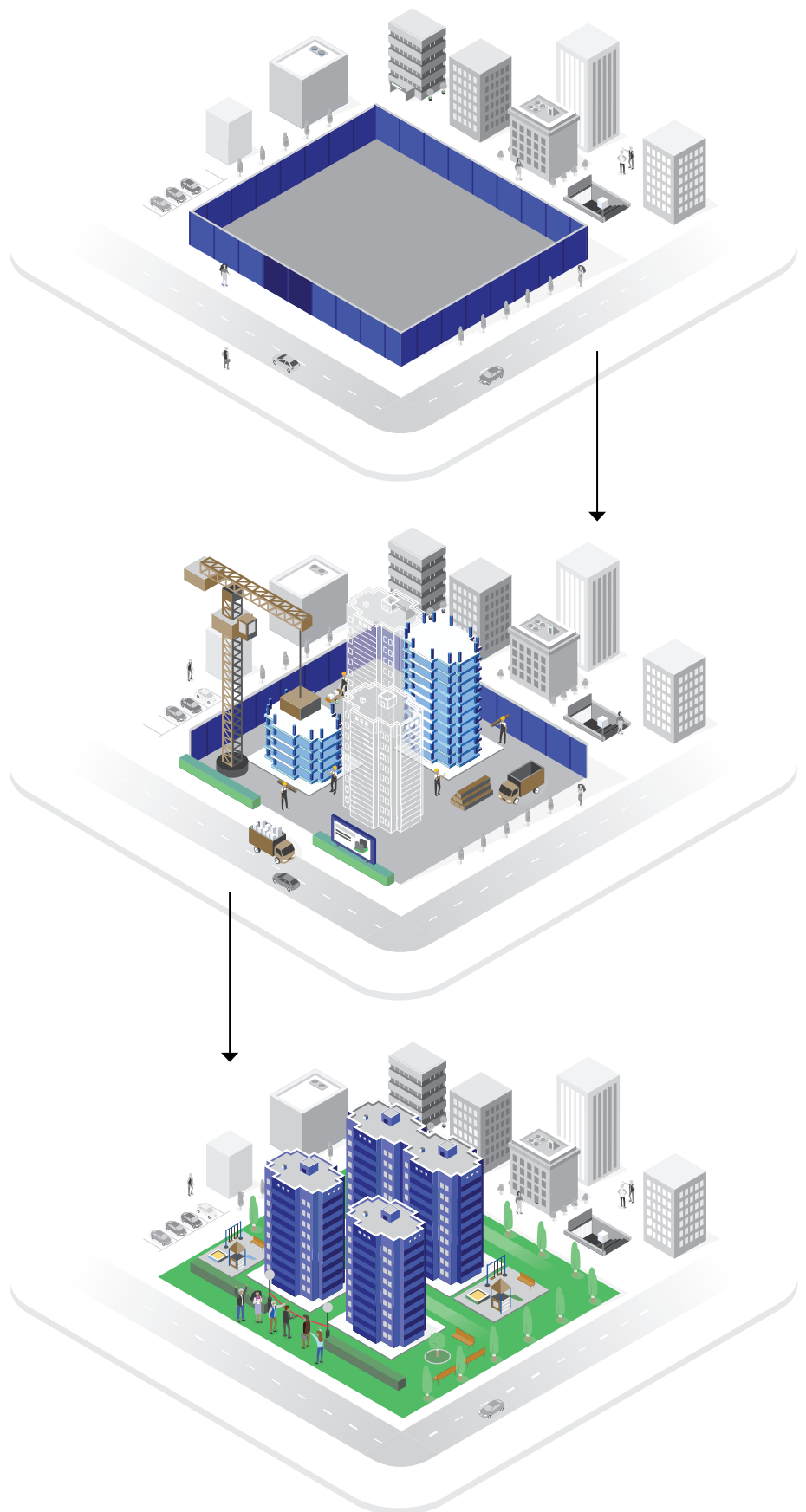


FIGURE 4  
**Consortium  
Urban Operation  
Model**

THE LAND READJUSTMENT WAS NOT A KEY ELEMENT OF THIS PROJECT. THE MAIN CHALLENGE WAS ABOUT LAND REGULATION AND THE DISPOSAL OF THE STATE COMPANIES' PLOTS OF LAND TO THE REAL ESTATE MARKET. THE EMINENT DOMAIN WAS USED FOR GETTING PLOTS FOR SOCIAL HOUSING AND COMMUNITY EQUIPMENT AND, UNDER SPECIAL REGULATION, FOR ALLOWING THE MUNICIPALITY BUYING THE LAND FROM THE STATE COMPANIES.

To establish the relationship with the private sector, the Municipality has created a Real Estate Investment Fund. The Cepacs were put there as well as the land bought by municipality or CDURP from the state companies. Through this Real Estate Investment Fund, the municipality has promoted an auction to sell those assets (Cepacs and land) to raise funds to pay the PPP Contract and the other CUO expenses.

To protect the existing inhabitants, incentives were created through specific laws for the pardon of the debts and 10 years exemption of municipal tax, declaration of the favelas as special areas for urbanization and land regulation.

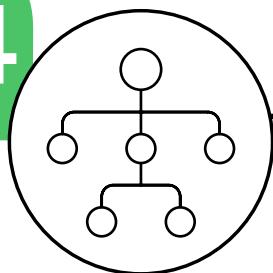


Several additional initiatives were used to support the goals of the UCO:

- » To attract residents to the area (a stated policy objective of the urban intervention), the municipality granted exemptions on municipal property taxes for real estate investments in the first four years of the program to spur the transformation.
- » In 2014, a municipal law was approved to create incentives for housing construction in the heritage area.
- » To protect the existing inhabitants from displacement due to an anticipated rise in land values stemming from the investments and upgrades, specific laws were introduced, intending to pardon their municipal debts and provide a 10-year exemption on the municipal property tax. Land regularization and titling for the favelas was also implemented.
- » The municipality structured 15-year concessions for urban services and infrastructure reconstruction (such as construction of light rail) using a Public Private Partnership (PPP) model, financed by the sales of CEPACs. The long duration of the concession contract was an assurance to investors that the political risk for the implementation of required urban investments would be low.



## 4

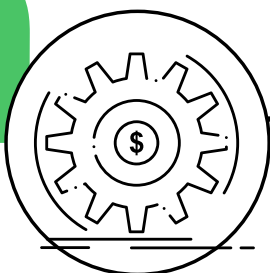


## ORGANIZATIONAL STRUCTURE

To implement the Porto Maravilha UCO, the municipality created the Rio de Janeiro Port Region Urban Development Company (Companhia de Desenvolvimento Urbano da Região do Porto do Rio de Janeiro, or CDURP) in 2009 as

a special purpose company. CDURP started operations in 2010. It developed UCO's business model which stipulated the creation of the Real Estate Investment Fund and the bidding process for the PPP contract.

# 5



## FINANCING AND IMPLEMENTING

### Project's costs

The cost of the Porto Maravilha for the 15 years of the project was estimated in 2011 at around 7.6 billion Brazilian reais for the urban infrastructure renovation (the PPP contract) and about 400 million reais for the

historical heritage recovery, social development, and administration (CDURP and other operational costs) totaling to 8 billion reais, or about US\$2.8 billion at that time.

### Project Funding

The funds for Porto Maravilha came from selling land and CEPACs created as part of the UCO, as explained above. The law that created the UCO established the amount of CEPACs and a corresponding value for each CEPAC. In 2011, this value was estimated at 3.5 billion reais and the land at 400 million reais, totaling approximately 4 billion reais (or US\$1.3 billion at that time). That was lower than the above-mentioned budget estimate for the project.

To close this gap, CDURP held an auction to sell all the CEPACs in a single package and committed to sell the land that 60% these CEPACs are linked to within three years of the auction date. Combined with selling CEPACS linked to the private land (25% of the package), 85% of the CEPACs would be commercialized in the first three years.

CDURP further agreed to make the remaining 15% available in 15 years or less. As part of the plan, the auction winner would pay the Porto Maravilha costs (as described above) over a 15-year period from 2011 to 2026. That provided plenty of time for the auction winner to recoup its investment given that the Porto Maravilha program runs until 2039.

In summary, CDURP created a business model that linked the payment cash flow required by the PPP concessionaire with the payment streams of the auction winner, making it possible for the winner to generate profits from the purchase of the CEPACS, and help the Porto Maravilha area to appreciate in value.

FIGURE 5  
PPP Scope

#### PPP FOR URBAN RENOVATION

**Contract** BR \$7,6 billion / 15 years  
**Funds** CEPAC + Land  
**Garantee** CEPAC



#### INFRAESTRUCTURE

70 km of vias with new drainage, sewerage, water supply, gas, electricit, telecom nets, bike paths and promenade  
 .....  
 9 km of tunnes



#### URBAN SERVICES

Public Space Conservation, Street cleaning and Garbage collection  
 .....  
 Street ligthing and Traffic lights and Traffic operation



#### PPP FOR LIGHT RAIL

**Contract** BR \$1,2 mil billion / 25 years  
**Resources** Federal Government + Private  
**Garantee** Real Estate Investment Fund bonds



28 km net  
 .....  
 Integrating Public Transportation Hubs  
 .....  
 Full Capacit for 320 tousands passangers/day



## Bidding process

Based on the UCO business model designed by CDURP, the UCO implementation required two interlinked bidding processes: for the PPP contract and for the auction of CEPACs. Bidding for the PPP took place in November 2010, after the document preparation, public hearing, and public consultation period. For the CEPACs, the technical studies were approved first, allowing the auction of the securities to take place in June 2011. The

winner was the Porto Maravilha Real Estate Investment Fund (Fundo de Investimento Imobiliário Porto Maravilha – FIIPM), owned by the Brazilian Time of Service Guarantee Fund (Fundo de Garantia por Tempo de Serviço – FGTS), the biggest infrastructure and housing investment fund in Brazil. Two days later, the initial order for the PPP contract was signed, marking the start of the urban renovation process.

## Regulatory framework

To enable complex projects such as Porto Maravilha, several regulatory systems and instruments need to converge - urban and spatial planning frameworks/regulations, financial market regulations, procurement law and policy, and national and/or local legislation for regulating PPPs, amongst others.

**Spatial planning regulations:** For Porto Maravilha, the City of Rio de Janeiro is the authority regulating land use, planning and zoning. In addition to these powers, the Statute of the Cities, defines a set of urban policy instruments which can be applied by municipalities. One of these instruments is the UCO.

The UCO is a policy instrument which is used to redefine the urban parameters and land use of a specified area and can therefore authorize deviations from land use plans which increase the development rights within the specified area, over a set period of time. To use the additional construction potential, financial

compensation is paid to the municipality through the acquisition of CEPACs. In turn, the municipality use the resources secured through the CEPAC sale to improve, renovate and restore the designated area (as approved by the same law). The concept of the CEPACs is analogous to that of air or development rights, or the right to use and develop the space above a property. But in Brazil, as mentioned before, it is linked to an urban renovation plan for a defined area.

**Financial market regulations:** CEPACS is a financial instrument which is regulated by the Security and Exchange Commission of Brazil (CVM). The CEPACS used to fund Porto Maravilha's infrastructure are public securities which much meet standards set out by the CVM.

**Public procurement regulations:** Both the public-private partnership and publicly-owned SPV established for Porto Maravilha are regulated by national and local regulations governing their establishment and rules for operations.

## 6



## LESSONS LEARNED AND REPLICABILITY

The revitalization of Porto Marvilha has brought about significant environmental, mobility, economic, and public space improvements. By December 2016, around 85% of the urban renovation program had been implemented with new infrastructure for drainage, sewage, water supply, electricity, gas, and telecom networks in place. Sewage is now collected and treated, and a new drainage network was designed for potential floods. The new mobility grid with 9 km of tunnels and restored routes had come into use along with a new 3.5 km promenade with bike lanes, walkways, and green spaces. The Perimetral was demolished and replaced by a new traffic grid and mobility system that includes a light rail system. The changes have cut noise pollution and greenhouse gas emissions in the area, and reduced traffic to and from the city center. These projects totaled US\$1.8 billion in investments over five years.

In terms of real estate development, 92% of the land with additional building potential has been made available to the market. Between 2012 and 2018, 10 new buildings have been built, totaling 511,275 square meters. However, the pace of absorption has been slower than originally anticipated, largely due to the country's sluggish economy. In 2019, about 50% of the new buildup area was occupied. The country's economy fell into a deep recession in 2015-16 and the recovery has been weak since. This has put the brakes on the real estate market in Rio and construction of social housing. Even so, the Porto Maravilha business model is showing resilience. The main part of the urban renovation has been completed, increasing the attractiveness of Porto Maravilha. It is only a matter of time before an acceleration in the economy unleashes more investment in the area.


The key challenge in implementing the project was aligning the goals of multiple stakeholders over a wide project area and creating a flexible and resilient management structure that could manage these complexities over time.

A range of stakeholders were involved in the UCO implementation, several of whom had different and sometimes divergent interests and perspectives. These included public authorities from different sectors and government levels, as well as different private sector agents, community, and civil society representatives, including academics. This required good communications to handle a wide range of pressures and to mitigate the impacts of interventions.

The prominent role of the state and state companies (they accounted for 75% of underlying land) created complexities, as it exposes the project to other budgetary, social and political concerns that a purely private project would not. The urban infrastructure renovations caused major disruption in the center of Rio de Janeiro for five consecutive years, increasing the risk of public and political intervention over the project period.

The establishment of CDURP, a publicly-owned development and operations company, to lead implementation of Porto Maravilha project was key to its success. The company was focused solely on this project and, with the support of a robust enabling regulatory environment, supervised infrastructure improvements, area management, stakeholder engagement, and implementation of social policy. The creation of a dedicated company reduced the institutional risks of this complex intervention that involved many departments





run by different administrative sectors. While this made it harder to coordinate the implementation of the program, CDURP could focus on the holistic intervention instead of sectoral or segmented approaches that could lead to communications failures and hamper the implementation process. Another key aspect of the intervention was the leadership of the city mayor from the start, making it a priority project for Rio de Janeiro.

A concern for any public project, of course, is the political will to sustain it after the expiration of the PPP. Porto Maravilha successfully survived its first transition to a new government, which took office in January 2017. While some changes were made, which is considered typical, Porto Maravilha continued despite these changes and the weak economy.

Political and institutional support and engagement is critical to success in a large urban transformation project like Porto Maravilha project which creates uncertainties and resistance. The city's leadership commitment, through the mayor, is crucial for mainstreaming and legitimizing the project. The UCO Porto Maravilha shows that LVC is an opportunity for municipalities to take a lead in the process with a long-term view of the city's development.

The use of a PPP model for constructing and managing urban infrastructure was another key success factor. The PPPs allowed for significantly faster infrastructure roll-out, which (1) reduced the number of public departments and institutions involved in the process, (2) provided certainty to private sector investors in the area, and therefore (3) allowed for more rapid increases in land values, which could be used to finance the infrastructure investments.

The use of the PPP model was, however, not without its complications. Despite a robust institutional and regulatory framework supporting it, the economic recession in 2015 impacted the viability of this PPP implementation mechanism. Fortunately, some of these risks were mitigated through the contracts between FIIPM (the purchaser of the construction and development rights), and the PPP concessionaire who would build the infrastructure that supported FIIPM's ability to utilize the rights.

In terms of financial risk, the contracts allowed for adjustments in implementation and payment streams.

While the recession made it harder for the FIIPM to comply with the payment plan, the adjustments mechanism allowed for a negotiation of the PPP program, postponing some of the interventions to adjust the payment flow.

The contract model has therefore been resilient and worked well from a time and cost perspective. The concessionaire has been committed to managing costs and while keeping the works on schedule in order to get paid regularly. The clear regulations have also averted conflicts, easing legal and political risks. CDURP has played a key role here as it helped negotiate solutions in potential cases of conflicts of interest.

The link between the cash flows of the FIIPM and the PPP made it possible to make fair adjustments for the both sides — the FIIPM and the concessionaire — as well as for the CDURP on behalf of the municipality. It is still too early, however, to gauge the sustainability of the PPP because the contract doesn't expire until 2026.

The decision to sell all the CEPACs in a single auction was an important and unique feature of this project. In other CEPAC sales in Brazil, there are multiple purchasers of these CEPACS. In this instance, however, the rationale to sell to one buyer was to assure that the funds would be available for the urban renovation. However, it has limited the ability of CDURP and the City Hall to negotiate with the real estate investor-led by the FII Porto Maravilha Managers. This operator is focused on maximizing its gains, not necessarily the UCO's long-term objectives. This is one aspect that should be considered in future efforts using this model. It is important for the municipality to put a priority on the goals of urban regeneration above that of simply maximizing the financial gains when applying an LVC instrument.

One challenge that remains for the project is the social impact. The figure below shows the main social development achievements up to December 2016. While there has been some success in avoiding displacement of indigent residents, the CDURP was not able to implement a social housing plan. The main reason for this is that the law governing the UCO did not define the amounts of funds to be used for this purpose. The project implementation is still ongoing, so there may still be an opportunity for financing this plan.



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