

THE PUERTO RICO CASE

A case example of road technologies applied to a concession to improve assets' performance

Abertis Case Study
September, 2016



The Puerto Rico Case

A case example of road technologies applied to a concession to improve assets' performance

Abertis is present in Puerto Rico since the creation of the Group in 2003, as one of the founding companies was holding a supermajority shares of "Autopistas Puerto Rico (APR)", the concession company managing Teodoro Moscoso Bridge. Teodoro Moscoso Bridge is a four-lane, 2.2 kms long toll bridge that spans the San José Lagoon connecting the vicinity of Luis Muñoz Marín International Airport with San Juan, the Capital of Puerto Rico. But in recent years Abertis has increased its presence in the US Associated Free State. In 2010 Abertis acquired the remaining 24.75% shares of APR. In 2011, the PR-22 and PR-5 toll roads concession was awarded to Metropistas, a consortium led by Abertis, becoming the main highway manager in the islands. Since it controls PR-22, the most used high capacity road, with 83 kms is a 4-lane road for much of its length, which expands to up to 12 lanes in the San Juan metro area, and PR-5, a small toll road that connects PR-22 to Bayamon business area. Currently, there are a total of 33 toll plazas in Puerto Rico, distributed along 238 km of toll roads with approximately 121 toll lanes in total.

Operator	Km	Routes
Metropistas	87	PR-22 San Juan-Arecibo
		PR-5 San Juan-Bayamón
APR	2	Puente Teodoro Moscoso

Table 1: Presence of Abertis in Puerto Rico

Abertis strengthened the commitment with Puerto Rico, in a moment when the country had several economic issues. Moreover, it has been done through the development of various technological projects that have improved the mobility in the island-state already in the 5 years since Metropistas was awarded. This is why this Case is presented for the Analysis of new technologies in the High Capacity Road Network, as it illustrates how **the use of new technologies can represent an important investment to improve mobility, safety and environment and boost growth in a country with the use and extension of the concession model**. This is especially relevant when the public expenditure cannot be increased or has to be reduced, as it has been the case in Puerto Rico.

Traditionally this type of investment has meant more infrastructure construction, but as Operators, with long standing experience in managing highways, Abertis believes that a lot can be done to improve mobility and enhance the capacity of the existing network with the application of innovations and new technologies promoting a more sustainable use of the infrastructure. The Puerto Rico experience is presented as a package of innovations, which depending on the context could be replicated separate or with more tailored solutions to each infrastructure, and regional conditions. In this case, it has responded to different demands of the Society, the Administration and also to the interest of Abertis, which expects to improve its results and to compensate the investment done during the duration of the Concession. The following table summarizes the main innovations implemented by Metropistas in recent years:

Innovation	Details	Benefits
Dynamic Toll Lane	Changing tariffs on real time, every 5 minutes, based on congestion and/or time savings	Up to 30 minutes of time savings for the users and about 15min for non-users since it also brings decongestion to conventional lanes
Open Road Tolling	100% Free-flow tolling technology, with a system consistent of 10 gantries	Less congestion, less accidents, less emissions as cars do not have to stop, and lower maintenance and operations costs for Abertis
Bidirectional tolling	Tolling plazas limited the number of cars that could be processed in an urban/semiurban environment	Free-flow gantries have no spatial limitation, and allowed for bidirectional tolling and more balanced tariffs
Reversible Lane	Reversible lanes according AM/PM configuration	Increased capacity in peak hours
Environmental	Implementation of LED lightening to the network	Operational savings and improved lightening

Table 2: Innovations applied by Abertis in the Puerto Rico concessions

The first implementation consists of a special managed lane. This Dynamic Toll System allows for the implementation of managed lanes. There were only three DTLs in the world changing tariffs in real time when we opened it, but it is increasingly being implemented all over the world, with a growing interest in the US market. We have it working since August 2013 with a great acceptance from users. In the case of Metropistas the update is every 5 minutes, the algorithms are based on congestion and/or time savings. While typically managed lanes change price from a base price to a peak one according to the time range, the DTL of Puerto Rico is one of the very few which integrates an “intelligent algorithm” that adapts the tariffs to traffic conditions. It calculates the price depending on the real-time level of congestion and allows the users to decide whether to enter the road or not thanks to the display of the price on the lanes. This managed lane was initially conceived to improve the transit and speed of the Bus Rapid Transit (BRT) but afterwards it was opened to light vehicles and resulted in great acceptance from the very beginning. Metropistas guarantees the level of service for the public transport, therefore the prices have to be adjusted so that the time of travelling through the managed lane is kept under a threshold that was set together with the Administration in the concession contract. The benefits of such innovation are many:



Figure 1: Map of PR-22 Concession with the Circle around the location of the DTL system

there is up to 30 minutes of time savings for the users and about 15min for non-users since it also brings decongestion to conventional lanes. It clearly provides an improvement for the whole society since apart from the time savings there are other intangible benefits such as road safety.

Another project which has already been implemented is the free-flow technology. It came as a two-step project that began with an evolution from mixed toll collection in 2011 (45% cash + 55% ETC) to full ETC by September 2015 through channelized ETC Express lanes. After that, an Open Road Tolling (ORT) system that consisted of 10 gantries was installed and in operation since April 2016. It involves a great initial investment but lower maintenance costs compared. The enforcement is managed by the government which assumes the risk that users do not pay and the distribution of fines but the evidence pictures and data are gathered by the road manager, in this case Metropistas.

In order to obtain all the benefits of an ORT solution, Metropistas is also involved currently and for the next three years in the demolition of the old canopies improving safety, environmental and traffic conditions on these toll roads.

In Puerto Rico, there was a spatial limitation to have toll plazas both ways in some section of the toll network. Tolling plazas limited the number of cars that could be processed in an urban/semiurban environment. The old payment system was therefore allowed for tolling in one direction only, having some plazas in Westbound and others in Eastbound direction. Thanks to the implementation of the ORT free-flow gantries, it was possible to convert the whole network to a bidirectional configuration way. This required a renegotiation of tariffs to a more balanced toll cost for both ways.

The existing operation of two reversible lanes according AM/PM configuration near to San Juan city was expanded with the implementation of the Dynamic Toll Lane applying the same solution in the Eastern side combining private and public transportation. Its implementation in Puerto Rico has brought several benefits for the commuters in peak hours, without the need of extending the infrastructure and the investment required which would have to be paid by the users or the tax payers. The barrier-moving process does not compromise traffic flow in either direction, and the truck is shielded by the blocks it's moving, so it is a measure as safe as in a fix extra lane. Moreover, it is done during the hours when there is less traffic, and it is programmed together with maintenance operations. This system or equivalent variants have been present in the US market since 1984, but it is less common in other regions, such as Europe or South America, where this solutions could be exported easily.

These improvements had also important impacts in terms of safety, in particular with the introduction of the free-flow technology. Initial data shows a very strong (over 75%) reduction of accidents in the sections where the toll plazas were located. If the trend gets confirmed the improvement will be really outstanding. These results are due to, mainly, barriers and toll concrete walls being removed. The old plazas were transformed into new gantries compatibles with free-flow technology that do not include barriers nor concrete separations. These changes reduced importantly accidents such as those vehicles crashing with the concrete wall or the barriers, or those crashes between vehicles changing the lane. Cash lanes were also removed as well as cash payment houses, avoiding crashes towards them. Cash collectors are no more between the road lanes either with toll payment houses or physically. This innovative solution reduced also accidents towards our employees. Security improvements were also achieved through reducing armed annual robberies to cash collectors. Toll plazas security is now conducted through a security surveillance system controlled at the Traffic Management Center for toll plazas.

Finally, there has been a set of investment initiatives related to environmental and sustainability issues that we should mention. In the case of Metropistas, there has been a large investment in the renovation of all the lighting system through the toll road, which was changed to LED technology being highly effective due to its low consumption and long life span. Being a cost effective measure in Puerto Rico due to the high cost of the energy, it could be part of the package for the renegotiations and extension of Concessions with the Administration in Puerto Rico, similarly to what was done in the case of France with the Plan de Relance (see *Abertis Position Paper PPPs to Boost Growth*ⁱ).

This case illustrates some technological solutions that can be implemented in agreement with the Administration. Puerto Rico is indeed a clear example of private investment to improve the mobility and the infrastructure, through the implementation of several amendments to the concession contract. In the last 5 years Metropistas has signed 5 amendments with the Administration, all of them clearly related with the implementation of technological solutions, and the subsequent extension of the concession contract to compensate for the investments. This case shows Abertis long term commitment and its aim of being a true partner for the Administration, being ready to invest when the conditions can be negotiated.

ⁱ Abertis, 2015. *PPPs to Boost Economic Growth: Lessons form the Plan de Relance Autoroutier*, s.l.: Abertis Position Paper.