

**Evento:** XXV Seminário de Iniciação Científica

**TRANSPORTATION VERSUS AIR POLLUTION: THE CASE OF LIGHT RAIL  
IN PHOENIX ARIZONA/USA<sup>1</sup>**  
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IN PHOENIX ARIZONA/USA**

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## **INTRODUCTION**

Urbanization has been and will be a major problem in the major world cities, in fact most of the population growth will experience in the future, will be in urban areas.

Phoenix, Arizona is no exception. The population has almost tripled in only 20 years, making it one of the fastest growing cities in the United States (Morrison Institute, 2000). The rapid population growth has challenged the metropolitan's infrastructure enormously. Transportation is an element that has been recognized as a major problem and is now being discussed in order to cope with the increasing population growth. Phoenix has been described as an automotive centered city by primarily focusing on creating a grid network of streets for automobiles. It seemed like a phenomenal idea to the time of the invention of the car. Yet today with the fight against the urban traffic emitted greenhouse gases, city leaders search for alternative solutions in order to decrease air pollution and also keep up with the increasing population.

## **METHODOLOGY**

In order to find solutions to the Phoenix traffic problem, it was important to understand the factors that cause the heavy traffic problems in metro Phoenix. Research on the history and geography of Phoenix and its automobile centered planning had to be done to understand how the planning for cars instead for people has serious negative effects on quality of life after the rapid

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population growth.

We considered the already existing light rail system as a great opportunity to expand on an already existing public transportation system. Using the valley metro website as a key resource, we used the already existing light rail extension plans as our template on how to improve the public transportation system in metro Phoenix. It was important to look at the light rail as a system consisting of the physical light rail tracks and the riders themselves. Paying more attention to the factors that make up a good ridership of the Phoenix light rail, we researched why it seems that annual ridership growth has stagnated over the recent years. Looking at similar low density cities like Phoenix, we searched for solutions that would prevent a low ridership in future light rail extensions.

## **RESULTS AND DISCUSSION**

With all three aspects of sustainability in mind; environmental, economic and social, the cities of Phoenix, Mesa and Tempe have started a Transit-Oriented Development program in 2005 in order to create a more pedestrian friendly environment in those areas. The program involved a 20 mile light rail track stretching from Mesa across Tempe into Central Phoenix. The project initially showed extreme economic and social benefits by a heavy increase of development around the light rail.

Seeing the benefits the Transit-Oriented Development program brought, an expansion of the light rail further into Phoenix, Mesa and even Scottsdale might not be a bad idea. Opponents of a light rail system in Phoenix believe it is not such a good idea though. They believe the low density, automobile centered and polycentric nature of metro Phoenix will simply not attract enough riders. What needs to be done to shift people's mind away from cars towards a more sustainable alternative of transportation?

## **RESULTS AND DISCUSSION**

According to American Public Transportation Association between 1990 - 2006 in the United States, the quantities of pollutant gases have increased due to the large increase of cars on streets. Pollutants due to transportation have increased more than 25%. The increase in cars is part of a complex problem with many interrelated factors that contribute to exponential growth of greenhouse gases in the atmosphere.

Congestion being a key problem that can ultimately lead to negative ecological effects by trying to solve it with actions that might backfire. We tend to overcome congested streets by building new streets in the hope of reducing congestion in other areas and therefore achieve better fuel efficiency. This might seem like a good idea, but the construction of new streets usually means a loss of land and vegetation. A loss in vegetation then leads to an increase of Carbon Dioxide, a prime contributor to global warming, in the atmosphere. It shows an attempt to solve congestion that ultimately promotes a further increase of pollutants in the atmosphere. With more and more

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streets being built, less land is available for the constantly growing population. Getting the light rail to be more effective is crucial to continue comfortable life in Phoenix. If not, the remaining undeveloped land will be taken up by roads instead of housing or farms that can produce food.

To rethink growth is important to keep up with an increase demand of transportation in order to decrease greenhouse gas emissions. Studies done by the American Public Transportation Association have shown that public transportation in areas with high automotive traffic has the potential to ease congestion and also reduce Carbon Dioxide emissions by 37 million metric tons annually. If the cities that produce a lot of greenhouse gases could fix that, it would be extremely beneficial. Obviously, without that huge contributor of gases, the environment would benefit.

Metro Phoenix is a relatively low density, automobile and polycentric city. Opponents of public transportation such as light rails believe a light rail system in the metro Phoenix area will not attract enough riders to make the project profitable and effective. People in low density cities such as Phoenix often simply prefer the usage of cars even though a light rail system is available.

With regards to this kind of transportation in the U.S is possible to consider that the country has been adapting for a “new transportation era”, however the progress in this area occurs very slowly. We consider that it is a slow process because it needs a complex adaptability that might be considered as an adaptability material transforming this kind of mass transportation more useful and efficient as well as more attractive. Just like any other change, it needs to (and will be) gradual. Any change that happens too fast will actually be harmful, and cause society to revert back to its old ways. On the other hand, this process requires a profound mental transformation that can be defined by “think ecologically”. Thinking ecologically requires a great change in the manner that we see the nature, the other people and ourselves. People will definitely need to change the way that they think so we can harness this new way of getting around the city, while being less harsh on the environment. Notwithstanding, we suppose that behavioral change depends of a major shift that the educational system of a city, state or country need to fortify and make it reach all sections of population.

Why are not more people choosing the light rail as a means of transportation? How can Phoenix METRO attract more riders to get them chose a more environmentally friendly alternative of transportation? An extension of the light rail is already a topic of conversation under city leaders. Expanding the light rail system is a time consuming task. The metropolitan and suburban areas that the light rail plans on reaching are quite developed and would need more cooperation with the cities involved.

## **CONCLUSION**

Phoenix, an automobile centered, polycentric city is not the classic example of a city driven by light rail transportation. However, traffic congestion is an increasing problem in the metro Phoenix area and the need for a public transportation system becomes an increasing need. The city’s of Phoenix, Mesa and Tempe did a great job in starting up the first light rail system in the

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metro area. The light rail proved success in all aspects of sustainability. It created jobs not only by the maintenance of the light rail, but it also attracted small businesses into proximity of light rail stations. The city of Tempe, especially around ASU extremely benefited by the project. A more pedestrian friendly environment was created with businesses and residential buildings close together. Using google maps and its traffic application, light rail corridors show less traffic during high traffic times. This resulting in better fuel efficiency in those areas and therefore also less greenhouse gas emissions by automobiles.

The city of Phoenix is planning an extension of light rail tracks in the near future in the hope of attracting a larger number of light rail riders outside of Tempe and central Phoenix. It is a great idea and should definitely be executed. However, attracting new riders also lays deeply within us humans as well. Phoenix is a relative low density city, especially in areas like Paradise Valley and Scottsdale. It is very hard to attract riders in those areas, because a walk to a light rail stop often requires a long walk, which in Arizona summers is rather uncomfortable. Therefore choosing the car as a primarily means of transportation often seems like the easiest way to get around. Once again, Tempe is a leader in finding a solution to this problem. A local streetcar system is planned for the year 2016 that will go in a single loop around Tempe and will connect major neighborhoods, business areas, parks and Arizona State University with a large light rail stop on mill or college avenue. This is a system that can be well taken into consideration once the light rail project will hit uncharted areas with lower density such as Paradise Valley and even Scottsdale. People just want their daily lives to be easier. Increasing and improving the light rail system will do exactly that. People will no longer have to worry about fueling their gas-guzzling vehicles. Instead, they can just hop on a streetcar, get to the light rail station, and go to work.

Increasing the amount of annual light rail riders does not necessarily depend on how many more light rail tracks are built. It definitely helps, but the system needs to be made more attractive for the public. Park and Rides and systems that help the public access light rail stops such as streetcars in low density areas will need to be more common than they are right now in Tempe and Phoenix. Many people complain about the light rail due to the fact that more often than not, stations are a far distance from where they live. Before people can ride the light rail, they need to get to the station. Improving the accessibility of the light rail stations is the first step to getting more riders.

Metro Phoenix is on a good path towards solving a complex traffic problem that has been caused by automobile centred planning. The city is doing a great job in creating plans and ideas for potential light rail extensions, but with such a large project the city cannot forget the idea behind the "Peoples Project". Finding ways to connect people with light rail stops should be equally important to creating light rail extensions. What is a light rail system without riders good for anyways?

**Keywords:** Air Pollution; Public Transportation; Sustainability; Urbanization.

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