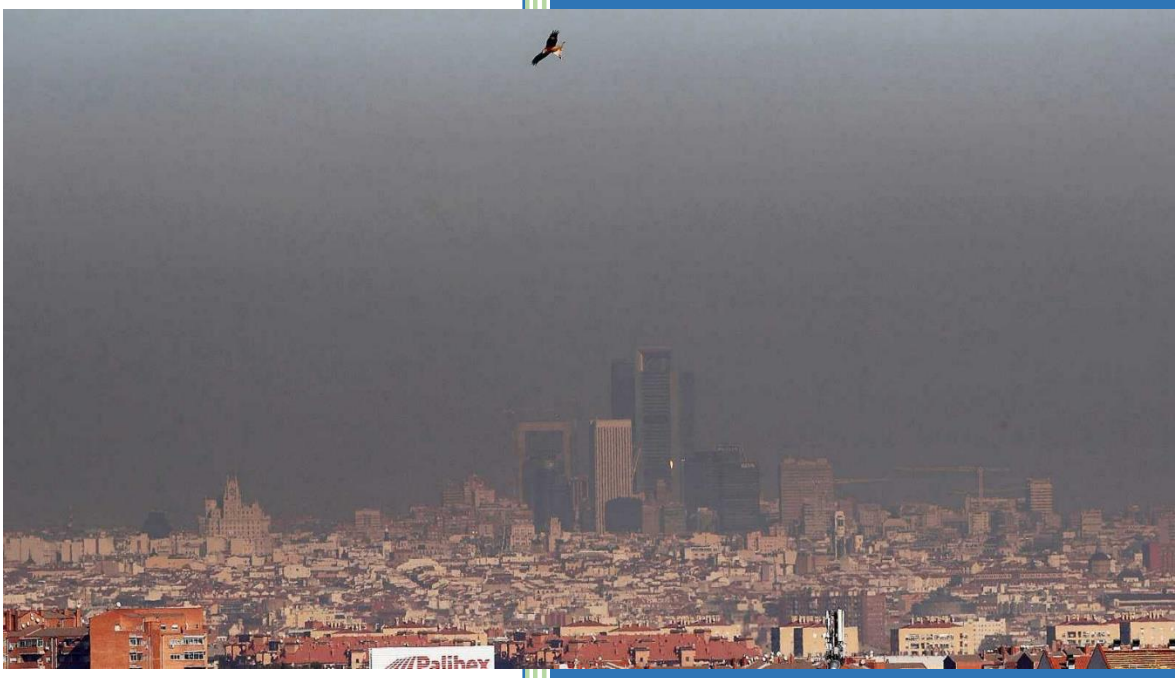
CIRO PROJECT



BEATRIZ CARPI GARCÍA

ANTONIO EDUARDO DOMINGO VIZUETE

RODRIGO LÓPEZ CARMONA

ANDREA PADILLA CABALLERO

JOSE JAVIER PINTADO JALÓN

COLEGIO JESÚS NAZARENO (Getafe, Madrid)

CIRO PROJECT

ABSTRACT.

CLIMATE CHANGE

Climate change is the greatest enemy facing humanity, a problem caused by our ambition as a species to transform and dominate the planet and fueled by the economic yearning behind environmental and resource exploitation.

Around the year 1980, scientists around the world began to contrast data, by which they realized ozone layer wear and confirmed concepts such as global warming as well as rising temperatures.

The most popular cause is the increase in carbon dioxide, CO_2. This is due to human activities (such as wastewater pollution, fertilizer use, heating, etc.) and the urban planning needed to stifle excessive population growth, resulting in excessive waste generation. Other major causes include the use of conventional fossil fuel transports and industries, which have continued to thrive since the French Revolution. We must also highlight deforestation and excessive exploitation of agriculture, livestock, and mining.

Its consequences have an impact on nature, and all affect us in the same way. The increase in temperatures, the melting of the poles, the extinction of species and the presence of tornadoes by the hot air of the atmosphere, are some of them.

It seems that most countries are committing and establishing agreements to slow the progress of climate change at once, but all is little and we must become aware of the problem so as not to continue to destroy our home, because at the moment we only have one.

INTRODUCTION.

GETAFE PROBLEMS

The problems in Getafe related to the negative effects of pollution and climate change are divided into three main groups: Transport, buildings, and urban planning. Each of them will address pollution problems that affect the environment, through the implementation of innovative solutions related to hydrogen and renewable energy derivatives.

AIR POLLUTION

Due to the extra pollution of NO_2 in recent years; since 2016, experts believe it is beginning to be "a serious problem for the health of neighbors". It should be noted that Getafe is surrounded by highways such as the A-4, A-2, M-50 and M-45 (four high exposure tracks of NO_2).

Getafe has suffered from the increase in CO_2 levels recorded since the beginning of 2020, these recurrently and significantly exceed the normal levels indicated by WHO.

NOISE POLLUTION

The main points of high emission of noise pollution in Getafe are: 1. M-406 knot with A-42. 2. Northwest of Getafe North. 3. Old Road of Pinto. 4. Zone A-42 and Leganés Road. Consequences that can affect people include sleep and behavior, memory, and attention, psychological (such as stress and anxiety) among others.

WATER POLLUTION

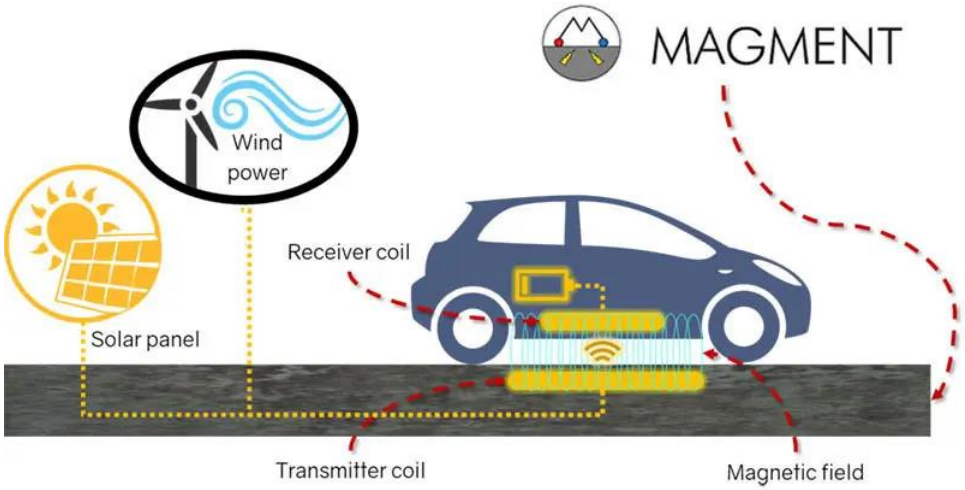
Getafe has polluted the Manzanares River over the past 24 years with faecal spills which strongly affects the health of neighbors and the river ecosystem. This municipality, which is attached to Villaverde Bajo, is surrounded by infrastructures dedicated to the treatment of waste of all kinds: the Valdemingómez incinerator, three scrubbers and a sludge drying plant. The excessive increase of fecal bacteria that are poured without any control, certainly harms the municipality and also the area located within the Southeast Regional Park, which towards the capital connects with the linear park of Manzanares which becomes Madrid Río a few kilometers from Getafe. That's why we'll see that solutions could reduce water pollution in our city.

PROJECT DEVELOPMENT.

TRANSPORT

In order to solve the problems of pollution in cities, especially those related to air pollution and therefore air quality; with regard to the part of transport our city would incorporate the following changes:

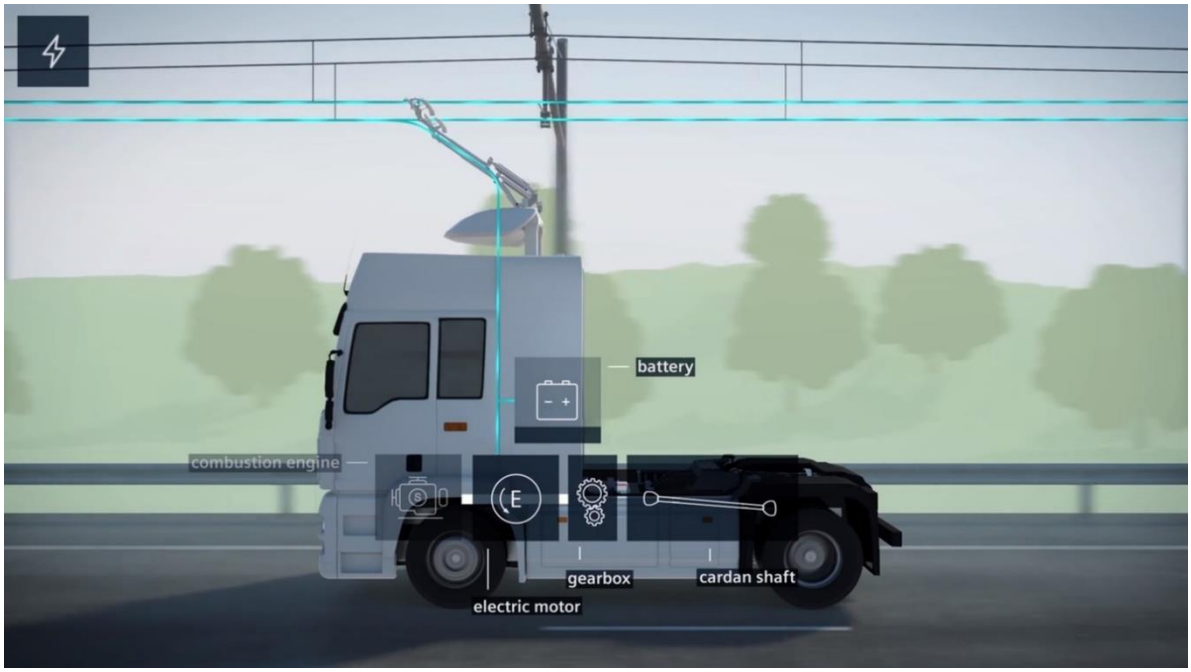
1. Provision an electrical power supply to the cars by implanting coils, under the asphalt, that generate a perpendicular magnetic field that will be transmitted to the vehicles to charge their batteries. For the transmission of this energy two coils will be placed; one just above the coil field being this the transmitting coil; and the second at the bottom of the car, which will be the receiving coil. This system will apply only to highways and major roads.



2. To supply all the necessary energy, we will need to place solar plates on the hard shoulder of large roads and on the streetlight poles in the city. Warehouses will be set up to retain excess energy and use it to supply electricity to the city's homes and other buildings.

3. To make it feasible to transfer energy to the car, a pseudomotor capable of inverting magnetic energy and transforming it into electricity will be placed. This way you can charge the battery of the cars.

4. For large vehicles, such as trucks or autobuses, using a pantograph placed on top that connects to electrical cables; the pantograph will be connected to the motor with two terminals. Such cables will be present only on some sections of motorways. These will be foldable and connected to the cables by pressing a button; and when interacting with it they will charge the electric motor without the need to stop to refuel.



5. A new high-speed line driven by magnetic repulsion will be made, which will be more efficient due to avoidance of friction with the ground. Allowing trains to reach speeds above 250 km/h for newly built lines or 200 km/h for reformed lines.

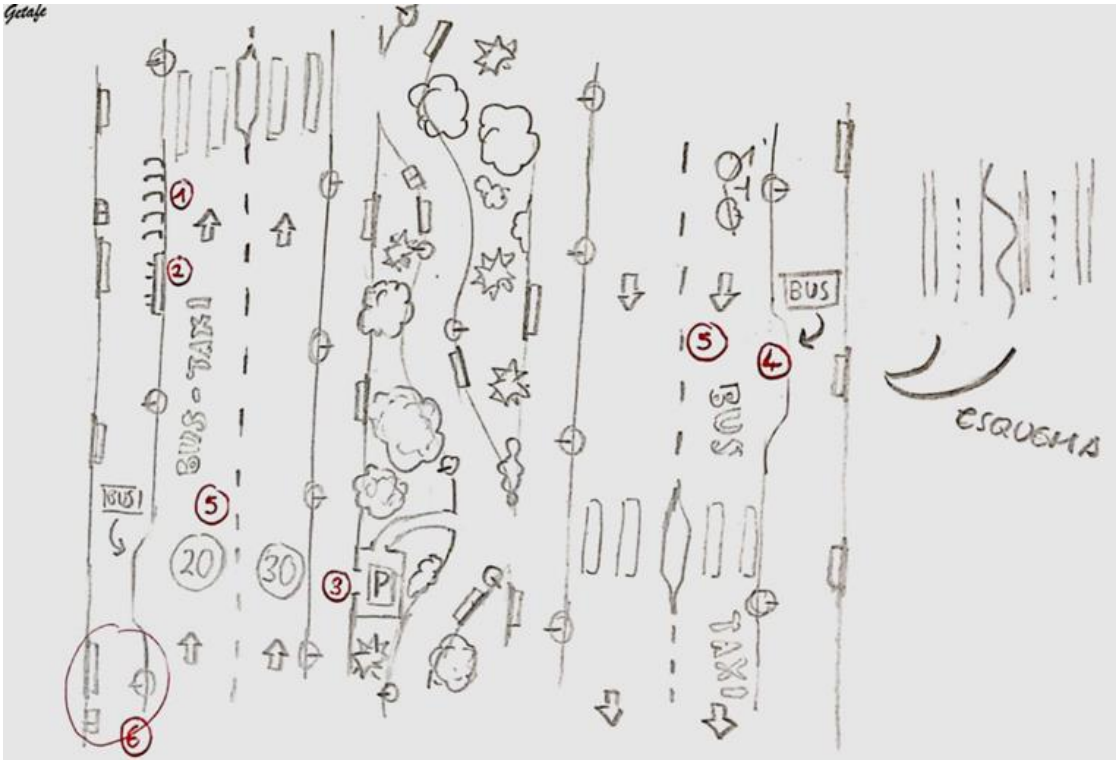
EXPLANATION

Through the action of an electric field we will run some coils that will cause an induced magnetic field perpendicular to the road that will affect the engine of the car which will have a coil for converting the magnetic flow into electric energy, recharging the car without needing to stop and also avoiding the use of fossil fuels.

TOWN PLANNING

The next avenue model would be the perfect example for a wide street such as Ferrocarril Street, Ciudades Avenue and many other streets of Juan de la Cierva area.

Take this illustration as a sketch to be developed for the next phase.



LEGEND

1. Parking bicycles and electric scooters.
2. Installations of electricity to recharge bicycles and scooters.
3. Entrance to underground parking.
4. Bus stop.
5. Bus and bike lane (20 km/h max.).
6. Urban furniture:
    - Solar LED streetlamps.
    - Banks with USB electrical outlets and made with recycled materials.
    - Recycle bins.

Another device will be a windmill with vertical blades, which will be located between the lanes of the streets in opposite directions. It will generate electrical energy by moving its blades driven by the wind generated by vehicles as they pass.

These reforms would involve reducing car lanes and implementing a specific lane for public transport and bicycles. However, if private vehicle traffic is saturated and the bus lane is empty, cars may invade it in order to the traffic is relieved, provided that they do not invade public transport stops.

It would also increase the number of trees arranged in a row, but above all square meters covered by green areas. The center of these boulevards full of vegetation, would have the soil of sealed land, which would generate an ecological infrastructure of the subsoil. That is, to improve the oxygenate of the soil through the roots of plants that drink water and nutrients.

URBAN RENEWAL

The following explains various types of urban planning renewal depending on the type of street to reduce pollution.

AVENUES:

Example: GETAFE CENTRAL STATION AREA

As a wide street model, we take the Ferrocarril Street. One of the riskiest bets of our project is to eliminate the parking in the surface area of the city, that is, at street level. Instead, underground car parks will be built for public and free use. The main problem of this idea comes in the center of the city, where everything is already built, also underground (railway structures and the sewage network mainly),so it is difficult to make a work as large as it is to tunnel and empty the subsoil.

However, there is an area where it is possible and, in fact, it would be quite necessary:

In the roundabout of Ferrocarril Street with Leganés Street there are two parking spaces on the surface, in addition to all the cars that are parked on both sides of the road until reaching Getafe Central Station.

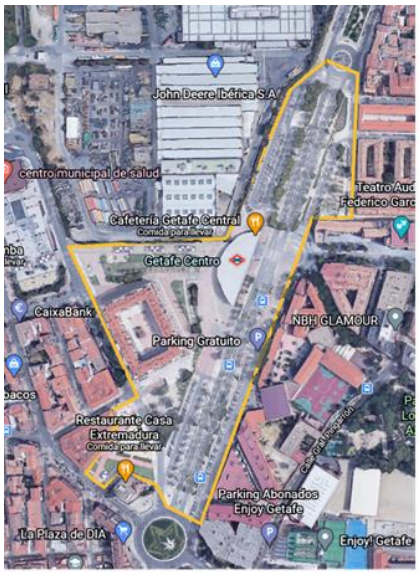
The idea to get rid of all the cars that park in this area is to make a great extension of the private parking of the Felipe Calleja Street. This remodeling of the existing parking is to expand its surface on both floors, to extend it to the Mayor Juan Vergara Square, and also to make it public.

Once the surface is cleared, the total free space is 47,200 m^2**.** Then there will be space to unify, through a large open area: the Leganés Street, the Ferrocarril Street, the roundabout Isidro Parejo Risco, the park around the Atenea building, Dr. Fleming Street, Teatro García Lorca Square; and link it with the green area, already existing, of the Estación Street.

In this way we can get an extensive green area, with a large playground, a larger esplanade than already exists (where events are held) and the overall urban improvement of the space. For example, by removing the concrete walls that save the unevenness of the square and using large ramps as shown in the image.

EXISTING SQUARE

Getafe Central Station is the main hub of communications in the city, and one of the most important in the southern part of Madrid. This specific remodeling of the downtown area, which surrounds it, not only improves people's lives, making the environment more pleasant, but also helps to improve the environment; and it is just one example of many others that could be made on the streets of Getafe.



PLAN OF REDEVELOPEDMENT SITE.

Panoramic view of redeveloped area.

Panoramic view of Ferrocarril

NARROW STREETS IN THE TOWN CENTER:

Another renewal to be carried out in this area is to pedestrianize the entire center of the city in order to reduce pollution so that pedestrians have more space to walk and create green areas instead of just roads and car parks. The streets would be: Villaverde Street, Ramón y Cajal Street, General Pingarrón Street, Leganés Street, Magdalena Street, Jardines Street, and, finally Polvoranca Street.

One of the biggest bets for the use of renewable energies is to install all the lighting with solar panels. These streetlights are charged during the day to operate at night emitting warm (yellow) light, which is less harmful in terms of light pollution. As for the storage of all this energy, it is concentrated in each streetlight, so no extra infrastructure is needed, thus being a very efficient structure.

The biggest advantages that these offers are economic and clean energies, greater durability thanks to be highly studied technologies and much more modern, it also are self-sufficient and automatic installations. Furthermore, they are very simple to install and the only requirement needed is sunlight, that also reduces expenses and there is greater economic savings.

In addition, banks made of recycled (and wood-looking) materials will be installed to recharge mobile phones, as well as small-scale recycling bins, thus improving and modernizing the city.

BUILDINGS

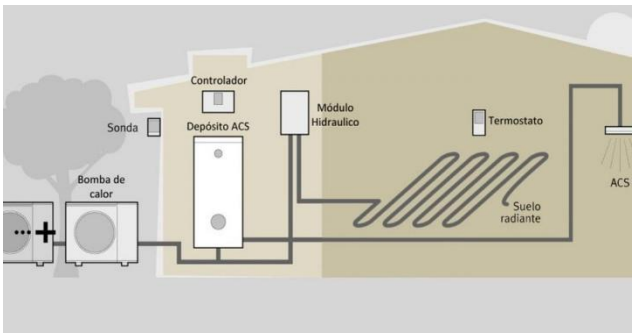
We will carry out a division between existing buildings and new ones. For existing buildings, we will classify them into three types:

Chalets: Heaters and boilers will be replaced in these buildings with aerothermia systems.

For the use of electricity solar panels will be implanted in the roofs and the excess energy will be stored in fuel cells that will be deposited in a new specialized container, and will be collected

and sent to the industries through the electrolysis process and that is transformed is electrical energy into hydrogen.

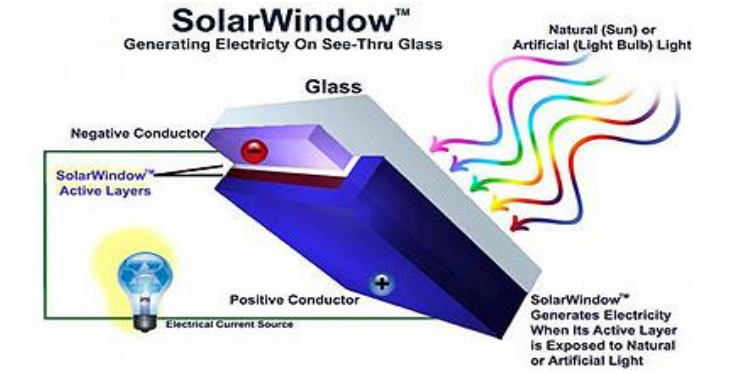
Floors and urbanizations : Solar panels will also be implemented on the roofs of these repeating the solution proposed in the previous section, which will supply sufficient energy for the operation of the facilities of the urbanization and if left over, it would be aimed at reducing the energy consumption of the neighbors. An autonomous aerothermal system will be in place to prevent contamination by boilers and polluting hot water supplies. This works as follows: it collects the energy produced by the wind, which will be used to heat the water.



Leisure and culture areas: In an area on the outskirts of the city a wind field will be installed so it will produce energy enough to meet the needs of these cultural and leisure centers.

For new buildings, standards shall be decreed by law for their construction:

> Buildings and chalets: at least one renewable energy production system must be carried out the windows of this will incorporate photovoltaic cells, which will capture solar energy and continue to fulfill their function with glass being translucent. In order to reduce the massive CO-pollution by heating systems, radiant flooring systems will be installed while avoiding possible drownings by carbon monoxide that occur when performing a bad combustion on stoves and chimeneas.



CONCLUSIONS

Regarding transport, fulfilling the following proposals we will be able to eliminate air pollution and optimize air quality by reducing carbon dioxide emissions caused by a major cause such as traffic. The purpose of implementing these systems is that they do not expel polluting emissions, and although it would take at least until 2030 for it to be built and viable, in the future it will be very beneficial and will be a major step forward.

Regarding urban planning, these reforms are the ones that we believe are most timely and effective to improve Getafe and make it a more sustainable city. Ideas can be summed up in eliminating parking lots and pedestrianizing pedestrian streets so that green spaces can be created, and air quality increased with less pollution.

Regarding buildings, the implementation of aerothermal systems, as well as solar panels, will serve to improve energy problems as well as, in newly built buildings, windows with photovoltaic cells will be implanted that will provide sufficient energy to maintain the home. The only thing that will require a greater environmental impact will be the construction of the wind farm in the peripheral area for the cultural and leisure area, but that will provide a positive balance in the energy and economic character.

For all the reasons mentioned above, we think it appropriate that hydrogen is the best solution as it is renewable, quite easy to obtain, even if it is still very expensive. It is therefore necessary to enhance the use of this at the state level, and also for individual uses.

BIBLIOGRAPHY

http://revista.dgt.es/es/noticias/internacional/2018/0425primera-autopista-electrica-del-mundo-suecia.shtml#.YC2aa4ZKjIU

https://tecvolucion.com/como-funciona-recarga-inalambrica-coches-electricos/

https://www.toshiba-aire.es/que-es-aerotermia/

https://www.getafe.es/areas-de-gobierno/urbanismo/medio-ambiente/actuaciones/mapa-estrategico-de-ruido-de-getafe/