

## SOLUTIONS TO ATMOSPHERIC AIR POLLUTION IN INDUSTRIAL DESIGN

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**Abstract.** *"Industrial design is a creative activity aimed at improving the external advantages of objects produced in industry," Thomas Maldonado said at the time. At the moment, this definition is considered to be the most complete description of the concept under consideration. Thus, when faced with the problem of air pollution, it is industrial design that comes to the aid in creating new cleaning methods.*

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### **Introduction**

Nowadays, the problem of atmospheric air pollution is one of the most serious global problems faced by humanity, it is becoming more and more urgent and requires immediate solutions. Atmospheric pollution is dangerous because instead of clean air, people begin to breathe air containing many harmful substances. In addition, it is fraught with catastrophic consequences, irreversible changes in the climate of the entire planet. Thus, today there is an urgent need to create not just an "ecological design", but a design based on innovative environmental and bioengineering technologies and capable of solving the problem of air pollution, changing the existing situation for the better. Such design objects are futuristic and may seem unrealistic in their ideas and implementation. However, it is the futuristic design, with its look to the future that is able to solve such a global problem as atmospheric air pollution.

### **External and Internal Air Purifiers**

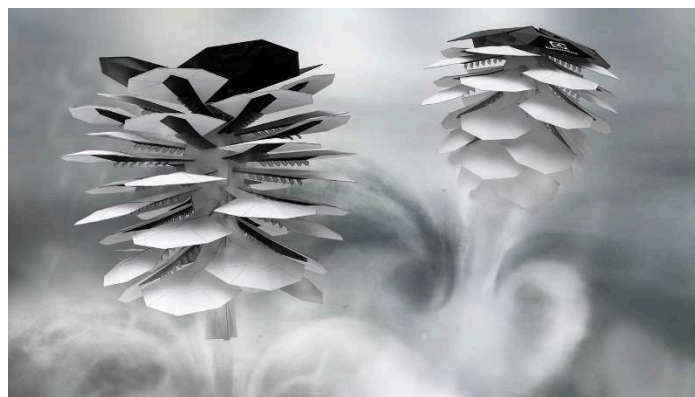
One of the most striking futuristic projects of industrial designers are the projects of "Flying Gardens". Similar to each other, they are represented by designers and scientists from different countries — "Hydrogenase" by the Belgian Vincent Callebaut, "green" airships of the American architectural company "Rael Sap Fratello Architects", flying air purifiers «PH Conditioner Skyscrapers» by a group of Chinese designers.



**Figure 1. "Hydrogenase" by Vincent Callebaut**

The projects are futuristic "green farms" made in the spirit of bionics and aimed at purifying atmospheric air. According to the authors' ideas, they would move around the city constantly, continuously bringing oxygen to places without greenery, migrating to areas with a high level of pollution, as well as migrating seasonally [1].

A lot of amazing projects dedicated to air purification were presented to the world by the participants of the annual contest of original ideas "Electrolux Design Lab", held by the company «Electrolux». For example, the concept of the future with the technology of a healthy microclimate, thanks to flying jellyfish called "UrbanCONE".

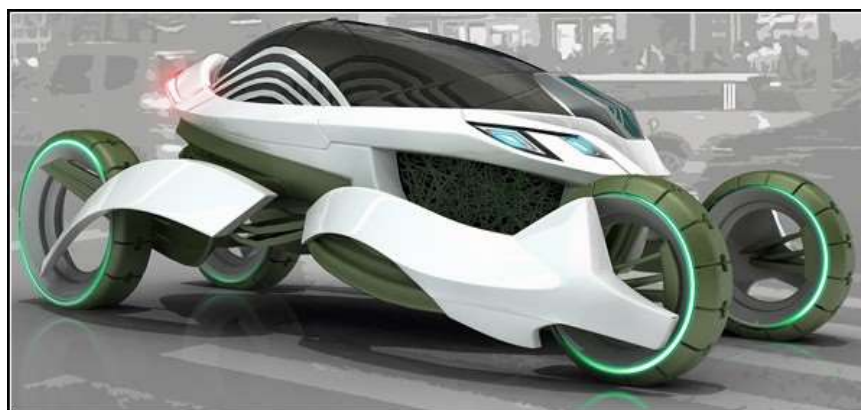


**Figure 2. "UrbanCONE" by Michael Pospech**

This is an unusual urban air purifier, a flying personal drone designed for a future in which the air will become unbreathable. The author of the project, Michael Pospech, took the structure of a jellyfish as the basis of an artistic design solution and equipped his drone with a set of "organs" and "body parts" containing replaceable filters for air purification and solar panels and allowing the object to move in the air [2]. "I thought about the idea of small objects which clean their air and make their life better. I imagined a story about a little jellyfishes which fly around us and clean our air. The jellyfish is my important inspiration. It is amazing creature which lives in the sea or lake and swims from darkness to the light."- Mikhail Pospech.

To solve such a global problem as atmospheric air pollution, it also requires not just the creation of an object that performs the function of purification, but an object that does not allow pollution. Humanity receives a huge amount of harmful emissions from cars. Therefore, designers and engineers are engaged in the development of all kinds of vehicles with various functions aimed at improving the environment [3].

One of them is the eco-car of the future "Vieria", presented by Korean designers-innovators. The aim of the project is to clean the air from dangerous carcinogenic compounds such as carbon dioxide, carbon monoxide, sulfur and nitrogen oxides.



**Figure 3. Eco-car of the future "Vieria"**

It is planned that the "green" car will pick up polluted road air with its nose while driving, which will then get into the filter, where the cleaning system will rid it of dangerous oxides and "blow out" from the aft part of the car [4]. "Vieria" is supposed to be equipped with an electric motor so that the Eco-car itself does not pollute the urban atmosphere with exhaust gases. Another equally interesting project from Electrolux, but already designed to purify the street air entering the room—is the "Breathing Wall", which is an integrated air purification and enrichment system in urban life.



**Figure 4. "Breathing Wall"**

The prototype of the object was the gills of the fish and their movement during breathing. The result of the transformation of this idea into the design of the air purifier was a wall-mounted built-in device that changes the shape of the wall as the air is cleaned. Thus, it can be concluded that many ideas for solving environmental problems are taken by innovative designers from the diversity of the natural world, both plant and animal.

A very real project called "Air Drop" is an air purifier that uses plants to purify the air from harmful gases, as well as a filter to remove dust and other particles.



**Figure 5. Purifier "Air Drop"**

As in many other analogues, the air filtration system "Air Drop" is carried out thanks to the energy received by solar panels, as plants do. "Air Drop" is convenient because it is suspended from the ceiling and does not take up space on the floor, so it will be in the field of view as a functional and decorative element.

### **Alternative Solutions to Environmental Problems**

Scientists and industrial designers from all over the world also offer solutions to environmental problems by designing futuristic cities. They create them with concern for ecology and ease of movement, saving space and striving for vertical development. The cities of the future are characterized by the use of alternative energy sources (solar, wind, geothermal energy) and independence from traditional ones, the transition to ecological fuels, vertical and dense buildings, an increase in landscaping, abandonment of transport, etc. Such are, for example, the "Green City" in the desert, Masdar in the UAE — a city without cars and skyscrapers, the project of a city with a vertical building "Multiplicity", the project of the city of Shengchen - a city of "pebbles", the project of the city "on the water", the project of the 3D city "NeoTax", the essence of which is to build houses not only up, but also to the sides above the trees [5].

The most amazing, but not as effective as the previous concepts, is a conceptual project called "Hand-Tree", made in the form of a bracelet that is worn on the wrist. According to the author, the device, just like plants, absorbs polluted ambient air and emits clean air (thanks to the built-in carbon filter), creating an atmosphere around the user filled with a subtle aroma of his choice.



**Figure 6. "Hand-Tree"**

### **Conclusions**

Reading this article, you can notice how extensive a person's imagination can be and how it can be used for useful purposes, while working as an industrial designer. Thus, the report examined futuristic projects of designers and scientists from all over the world who aimed to fight for clean air, as well as innovative technologies and new materials used in industrial design. Despite the futurism and unreality, these projects may be feasible in a few years. And perhaps they will help humanity to escape from the predicted environmental disasters.

### **References:**

1. [https://vincent.callebaut.org/zoom/projects/100505\\_hydrogenase/hydrogenase\\_pl005](https://vincent.callebaut.org/zoom/projects/100505_hydrogenase/hydrogenase_pl005)
2. [https://www.behance.net/gallery/24171731/UrbanCONE?tracking\\_source=search%7Cgoodwood%202014](https://www.behance.net/gallery/24171731/UrbanCONE?tracking_source=search%7Cgoodwood%202014)
3. SAFONOV, Sergey «Mechanical Engineering Technology», 2011.
4. <https://novate.ru/blogs/140511/17628/>
5. <https://fishki.net/1965898-goroda-buduwego-10-unikalnyh-proektov.html>