

## Idea Title

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### BioSmart food tray

Innovation and re-design of airline food services: a case for bioplastics systemic adoption.

### Where are you/ your team located?

We are in Barcelona, Spain.

### How does this idea redesign unrecyclable small format plastic items that often end up as waste?

This new, disruptive idea affords envisaged innovative sustainable scenarios for the air industry's food services. By developing, preferred products (food trays) alongside with new service delivery formats, BioSmart contemplates a plausible and desirable future of on board optimised food services. Items big or small belong to modular systems, task-related biodegradable and compostable objects. This is in sharp contrast to the situation right now. BioSmart's approach is to seize the opportunity to create new services and new consumer centred innovations revolutionising airline food services, airport's waste management around the world while caring deeply for the environment.

We consider this to be a challenge and stance of both economic and environmental circularity.

New services and consumer centred innovations for the proposed BioSmart tray fall under a design stance of *systems thinking*. We seek to create "new systems of plastic objects" as well as the most promising possible contexts for introducing them. We seek to maximize positive environmental impact with new, functional, usable designs, while employing a prudent and intelligent restraint. As highly respected designer Dieter Rams once stated "Good design is as little design as possible". The New Plastics Economy challenge deals with a wicked problem, hence prompting a lateral way of thinking where we ought to accomplish a lot with less.

This proposal seeks to redesign and repurpose food tray items with alternative, proven, bio-based plastics that are both *biodegradable* and *compostable*. Our concept is mindful of the critical efficiency issues both at the catering facilities as well as those of cabin crew's tasks and galley operations. We envision scenarios that not only maintain the exact same on-board food services convenience but can actually streamline and even simplify flight crew's tasks.

We are keen on intervening in the re-design of all utensils and objects found in a typical meal tray. For that goal we consider also the need to drastically reduce the number of different materials or polymers. We propose the use of only two (2) kinds of PLA bioplastics and one (1) kind of biomass material for all of single use items, plus a single renewable, bio-based polyethylene for those non-disposable items such as the trays themselves. This reflects our choice of exclusively renewable materials and the proposed design restraint.

According to IATA a staggering 3.8 billion passengers travelled in 2016 around the globe. If hypothetically each of those passengers consumed just two water bottles in return flights that would amount to an astounding 7.6 billion water bottles! Additionally, all indicators point to the demand for air travel in the next two decades to double reaching 7.2 billion passengers by 2035. The forecasts confirm that the biggest driver of passenger growth will be the Asia-Pacific region. It is a geographic region already plagued with plastic waste on land and oceans. But it is a problem that can be gradually mitigated with design thinking. It is a challenge not to be missed!

Why the air industry as the project's target? We are convinced that solutions with an easier, higher adoption potential will be those proposed within clearly *scalable frameworks* from the outset. The airline industry perfectly fits the criteria. Preferred solutions will always be those created to be *systems focused, holistic and change driven*. Moreover, full value-creation streams will take place so long as the design efforts foci are on the causes of a problem, like "runaway" plastics into rivers and oceans for instance, as opposed to the symptoms i.e. the ocean garbage patches. The waste streams in our planet are gargantuan, immensely complex and the uncontrolled presence of plastic litter both on land and oceans is but one aspect of an "invisible", far greater multidimensional problem.

In several use-contexts different plastics are frequently mixed up in rather complex ways. Not only different types are put to work together, being almost impossible to separate later, but are also mixed with other materials such as aluminium foil, food-soiled paper, cans, glasses, etc. This is one of the greatest recycling challenges today. This is what happens repeatedly in different contexts around the world. It happens every day, every hour, every minute. It happens in fast food restaurants, of course. But it also happens when we, as passengers, are offered food trays, conveniently presented to us at 35.000 feet. The story along the aisles and galleys of aeroplanes is not exactly one of a circular economy or sustainable success. It is, by and large, a very different story indeed!

The scale of the global waste disaster before us so vast that it is even hard for us to grasp. According to The Guardian more than 480bn plastic bottles were sold in 2016 across the world. If all were placed end to end, they would extend more than halfway the distance to the sun! With such sobering facts before us, it is clear that not only drastically improved global recycling efforts are desperately needed around the world but also brave and highly responsible actions of governments, international influence groups, and various industry efforts.

The airline industry is one such candidate, a key player in this complex equation affecting us all. Air travel being plastic intensive service systems, and traversing regional, national and continental boundaries, cause immense impact. Plastics of all kinds are travelling around the globe as fellow passengers, sadly ending up incinerators or in landfills. There is a massive CO2 footprint to be solved here. Again, according to The Guardian, airline passengers generated 5.2 million tonnes of waste in 2016. The waste mixes always intractable including toilet waster and products, miniature wine bottles, plastic cutlery, plastic cups, half-eaten meals, unused toothbrushes, magazines, and the list goes on.

### **Which use cases does your idea apply to?**

This pilot project involves the re-design and substitution of all conventional petrol-based plastics and non-recyclable materials currently used in meal trays of on board food services. This requires the rethinking of food receptacles, hot and cold beverage cups, and small to medium sized items like plastic cutlery, cocktail stirrers, *condiment & butter containers*. The small condiment containers can typify new delivery formats. And, as a matter of principle, *no straws* are part of the regular food services unless required for special passenger needs.

Virtually all proposed items will be biodegradable and compostable. Meals offered to passengers carefully consider rational modularity in presentation, simplification of receptacle formats whenever possible, elimination of all unhealthy petrol-based plastics and a goal of overall maximum circularity and sustainability. The proposed bio-based materials for meal tray redesign are **bagasse** derived from sugarcane, **PLA ( polylactic acid )** derived from **cassava** starch and **bio-polyethylene** derived from **bioethanol**. These materials already provide sufficient research, use precedents, and a global, proven record of success, performing identically to ubiquitous non-renewable, petrol-based polymers.

Why sugarcane bagasse, cassava starch and bio-polyethylene specifically? There are very some strong reasons. Critical plastic waste polluting countries, both in land and oceans, must act seriously and urgently to clean up their act literally. Several of them happen to be geographically situated in tropical and subtropical climates where cassava and sugarcane are major crops, hence offering abundant raw material for these bio-based, renewable products to be produced and proceed as substitutes to non- renewable ones

### **In what geographical context or area does your Idea plan to operate / solve?**

The geographical context chosen responds to the severity of the plastic waste problem: the Asia-Pacific region. It is estimated that 60% of all plastic waste in the all world's oceans comes from only five (5) countries in this region: China, Vietnam, Thailand, Philippines, and Indonesia. The reasons for such unfortunate situation are often similarly common amongst them such as poor recycling practices, illegal dumping, runoffs from landfills in storms, polluted rivers, uncivil behavior, massive tourism, etc. Indonesia holds the unfortunate record of being the second biggest source of plastic marine waste in the region and the world. It is one of two prime target countries for this initiative.

Not all is lost though. There is one happy coincidence amongst these countries in the Asia-Pacific though. They all happen to be major producers of the key crops needed to produce bioplastics: sugarcane and cassava. And they have already started to produce bio-based plastics. Thailand is the 2<sup>nd</sup> producer of cassava in the world and Indonesia 3<sup>rd</sup>. It should be noted that Indonesia is a completely insular country with 13.466 islands of which 922 are inhabited, boasting total population of 260 million! This is the "perfect storm" for countless misfortunes of plastics ending in the ocean. Indonesia has two umbrella laws (2009) (2014) concerning their waste problems but no policies or concrete measures to prevent plastic pollution thus far.

Are then bioplastics also the silver bullet for plastic ocean waste? No, bioplastics do not degrade fast in the ocean. They need industrial composting in order to degrade, which means special facilities with controlled humidity, heat, and microorganisms. Why then even bother to produce them? Compost! Compost closes the cycle: what comes from earth goes back to earth. With compost you can fertilise poor or eroded soils in degraded lands that are needed produce food crops for an ever hungrier planet, for the very fast growing populations of the Asia-Pacific countries and elsewhere. Compost will one day become a commodity! Bio-plastics and compost provides us with one system for highly desirable circular economy.

Passenger airline networks using bioplastics onboard will be actually function as “pollinators” transporting from country to country the vary raw materials that later become local industrial compost. San Francisco, for example, already has mandatory recycling and composting ordinance. Yes, composting makes a lot of sense and it will be a keystone in agricultural regeneration. To accumulate only 1cm of soil in tropical areas 200 years are needed. In order to make 10cm of fertile soil it takes 3000 years! Do we have time? Can we wait?

This project seeks major players the airline industry to set the example of corporate environmental responsibility and a visible supporters of a worldwide waste composting action plan. The chosen Asian cities for this pilot initiative are the Hong Kong, Singapore and Jakarta. The target airlines are Cathay Pacific, Singapore Airlines, and Garuda Indonesia. It should be noted that Hong Kong is currently facing a waste management crisis of disproportionate severity. Of 16 landfills in existence 13 are decommissioned having reached full capacity, there are only 3 left! Hong Kong is facing an imminent waste collapse. Both the airport and Cathay Pacific can mitigate this problem in significant ways. Cathay also caters food to 40 other airlines, mostly in Asia.

The first European planned partners are KLM + Schiphol Airport in its flights to the three pilot Asian destinations and Norwegian bound to San Francisco from Barcelona. The chosen airlines not only have extremely high volumes of passengers but, quite importantly, happen to operate their own catering services. Catering services are very mindful of maximum efficiency, reliability, low operational costs, food safety and passenger satisfaction. This compostable food tray project is mindful of all such needs. Furthermore, it anticipates that both airlines and airports can capitalize on this initiative as a genuine form of environmental responsibility and an opportunity to project a very positive brand image.

\*The bigger food service players, well known in the air industry, serving hundreds of other airlines may face initial challenges adapting to the idea as their catering facilities are spread out in dozens of different countries around the world. Sourcing the needed bioplastics and adopting new designs could take several years. Nonetheless, medium range flights within the EU could well be excellent candidates. Case study chosen players could be Iberia Airlines, British Airways and Vueling.

#### **How do you envision scaling up your idea?**

Early adopters, both airlines and airports, can set the example and also exert a positive influence on other partner carriers within the major code sharing organizations they belong to, namely OneWorld, Star Alliance, and Sky Team. Within each group there is a plausible future of at least one airline route and two airports. This number can increase under tax incentives, influence and recommendations from the codesharing organizations as well as from IATA. The involvement in this ambitious project requires investment of all partnering airport authorities. Their support will either be allocating space and resources for building pilot industrial composting units or by reaching agreements with their respective waste management companies to collect the composting ready plastics and actually produce it. Composting can be a win-win and revenue stream for several stakeholders and be valuable in both urban and rural settings.

#### **Please describe from where your idea emerged.**

The idea emerged over the years, observing the operation of onboard food services in hundreds of medium and long haul flights. The New Plastics Economy challenge sparked an Eureka moment, that both the volume and kinds of waste generated in aircrafts is begging for urgent re-design and disruptive innovation.

#### **Tell us about your work experience.**

Sergio Correa de J. Medina

Senior design educator and design thinking consultant with extensive work experience in the US and EU.

Former Associate Professor at Carnegie Mellon University and funded researcher in European Commission project AGORA: Cities for People ( 2003-2006 )in Barcelona, London, Utrecht and Malmö.

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#### **Please describe your legal and organizational structure.**

Design consulting and trading company.

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