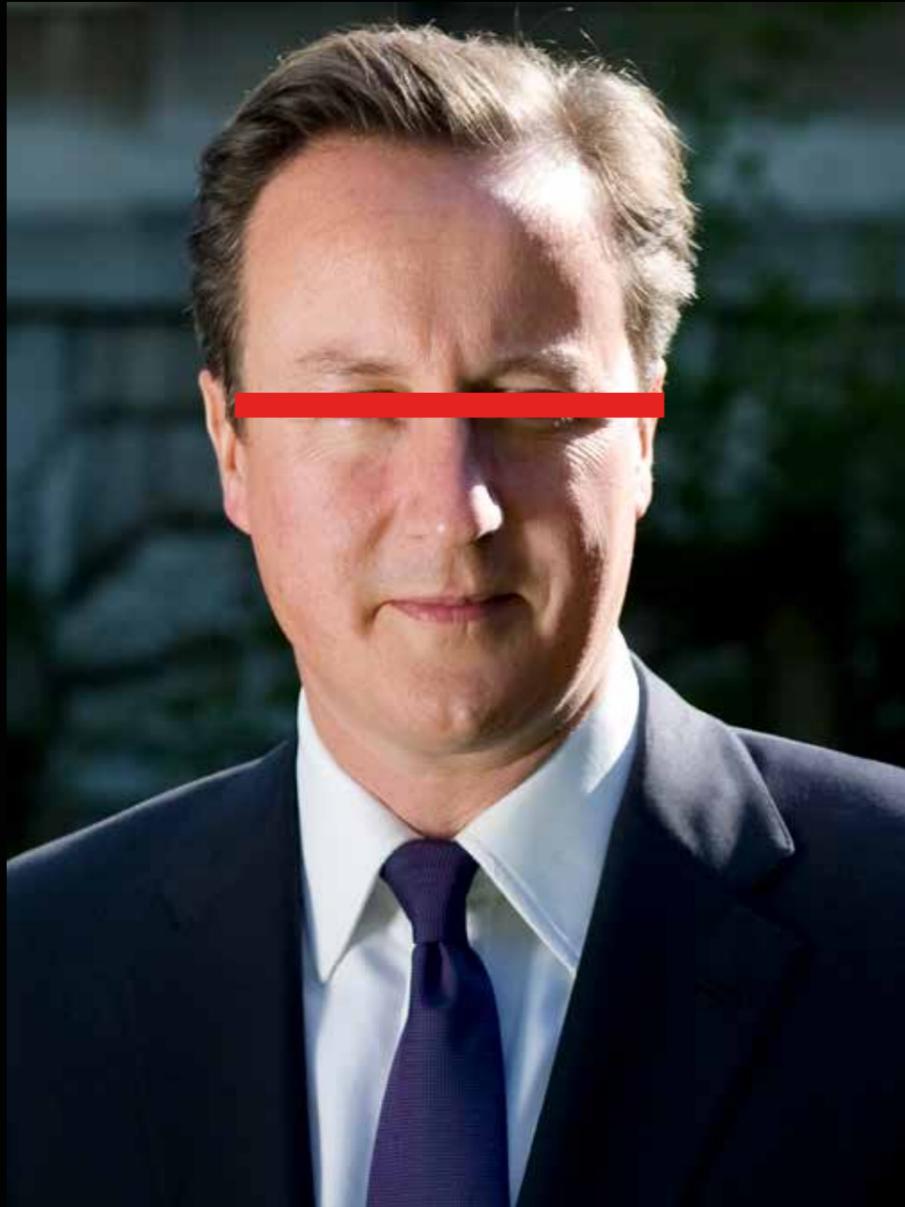


POLLUTION KILLS

An Air-Filtering Jacket

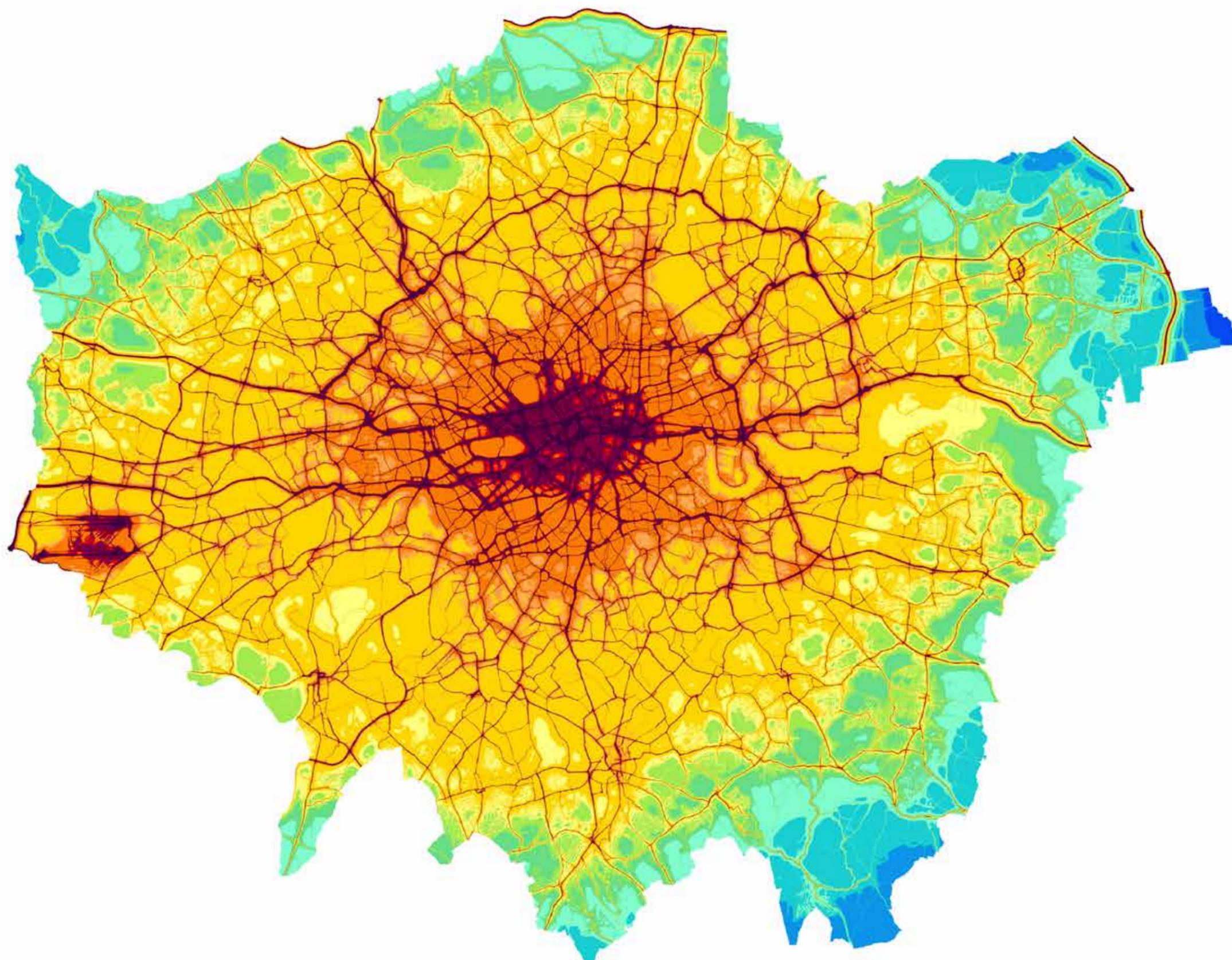
*By Saym Hussain
Developed in 2018*

CESAR



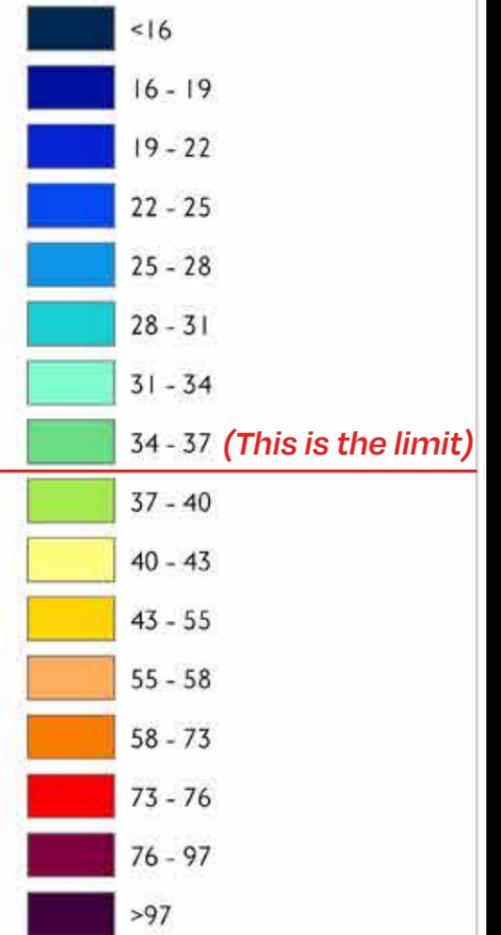
The Government has failed us.

*London frequently surpasses the legal
limit for air pollution.*



Legend

NO_x (µg/m³)



MAYOR OF LONDON

GREATERLONDONAUTHORITY



And people are dying because of it.

🕒 This article is more than 5 months old

Inquest to determine if London air pollution caused child's death

Ella Kissi-Debrah, nine, who lived near South Circular Road in south London, died in 2013



▲ An inquest in 2014 concluded Ella Kissi-Debrah's cause of death was acute respiratory failure as a result of a severe asthma attack. Photograph: Ella Roberta Family Foundation

The Guardian

Future London › The Air We Breathe

3,800 deaths in London caused by air pollutant, study finds

Campaigners are urging councils to charge people to drive in cities and ban wood burning stoves

EDWINA LANGLEY | Monday 27 January 2020 17:38

The Evening Standard

🕒 This article is more than 4 months old

Air pollution could kill 160,000 in next decade - report

British Heart Foundation predicts current total of 11,000 particulate-related deaths per year will continue to rise

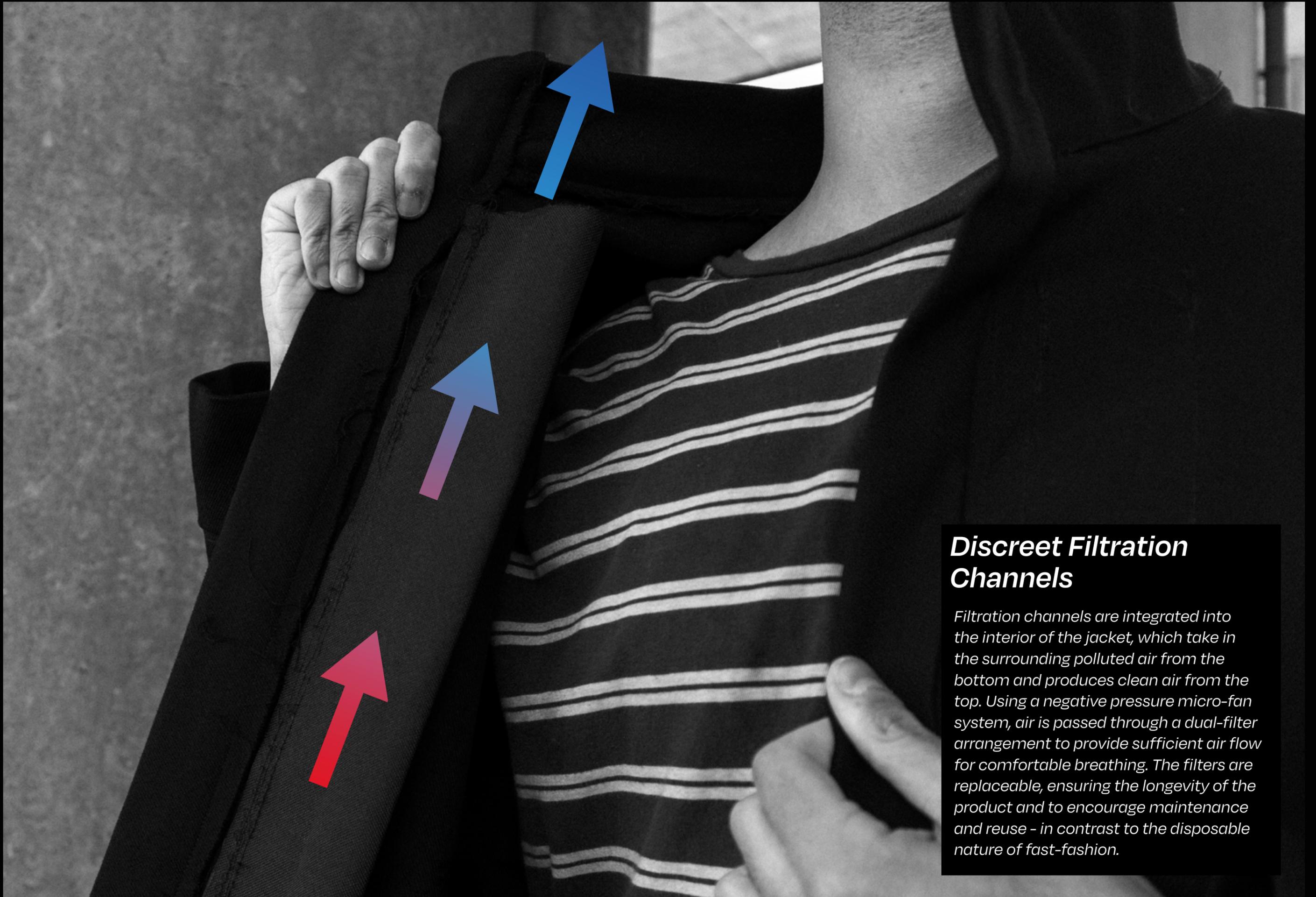
The Guardian



Pollution Kills is a public statement to take control of the air we breathe.



*Through fashion and
technology, it seeks
to push activism for
regular consumers.*



Discreet Filtration Channels

Filtration channels are integrated into the interior of the jacket, which take in the surrounding polluted air from the bottom and produces clean air from the top. Using a negative pressure micro-fan system, air is passed through a dual-filter arrangement to provide sufficient air flow for comfortable breathing. The filters are replaceable, ensuring the longevity of the product and to encourage maintenance and reuse - in contrast to the disposable nature of fast-fashion.



A Statement Collar

The titular collar serves as an open statement to push the idea that the effects of pollution are having implications in the present moment. This is to combat the existing notion that we are distant from the effects of climate change. The bold statement acts in contrast to the discrete functionality of the jacket to mobilise the growing movement for climate change through expressive fashion, enabling the technology to normalise within the fashion market.



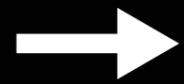
Minimal Design

Inspired by trends of minimal urban fashion, Pollution Kills supports a stripped-back design that compliments the discreet air-filtration system in a way that feels familiar without drawing attention to the physical technology. The clean-cut design acts as a canvas of expression, allowing the jacket to be versatile and customisable with the various styles of Londoners.





RESEARCH



IDEATION



DEVELOPMENT

Attitudes to pollution masks

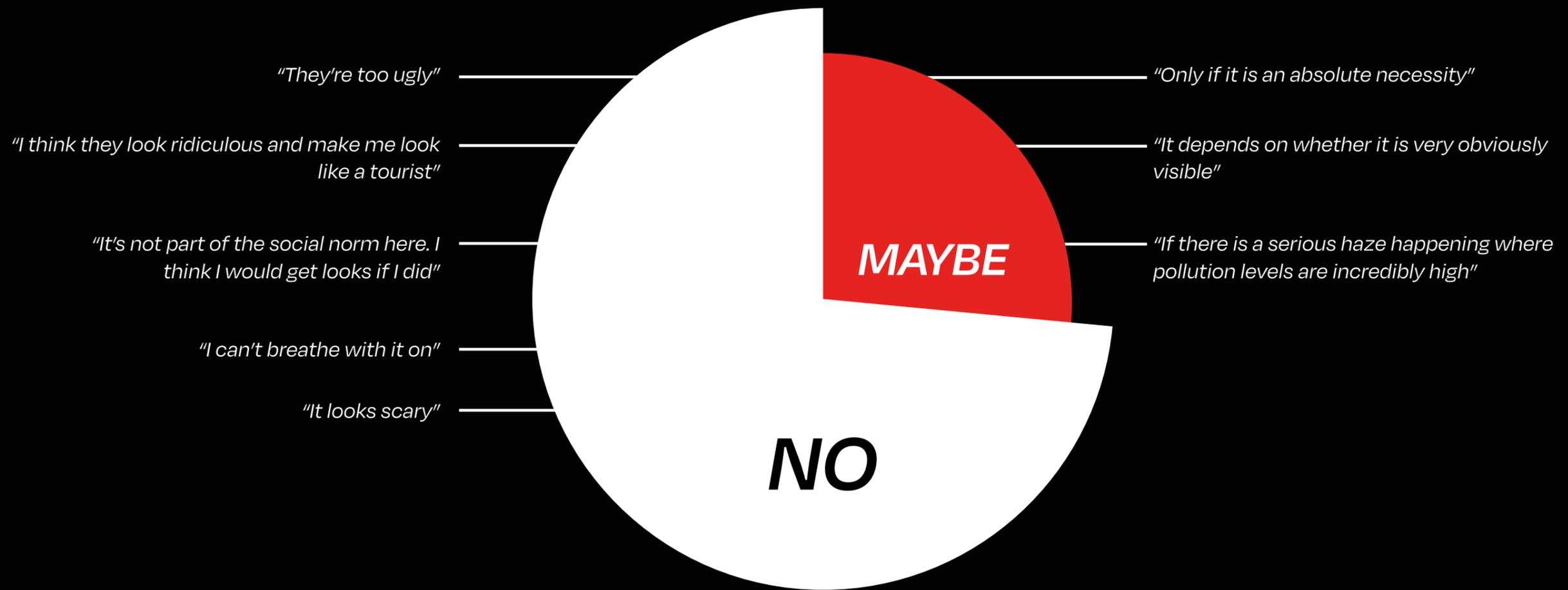
To gain a deeper understanding of pollution mask usage and human needs, in terms of air quality, a survey was conducted. The sample had an almost 50 - 50 split of males and females, and all were students. Most were aged 18 - 21, however some were aged 22 - 25 and 26 - 30.

To what extent are people comfortable covering their face?

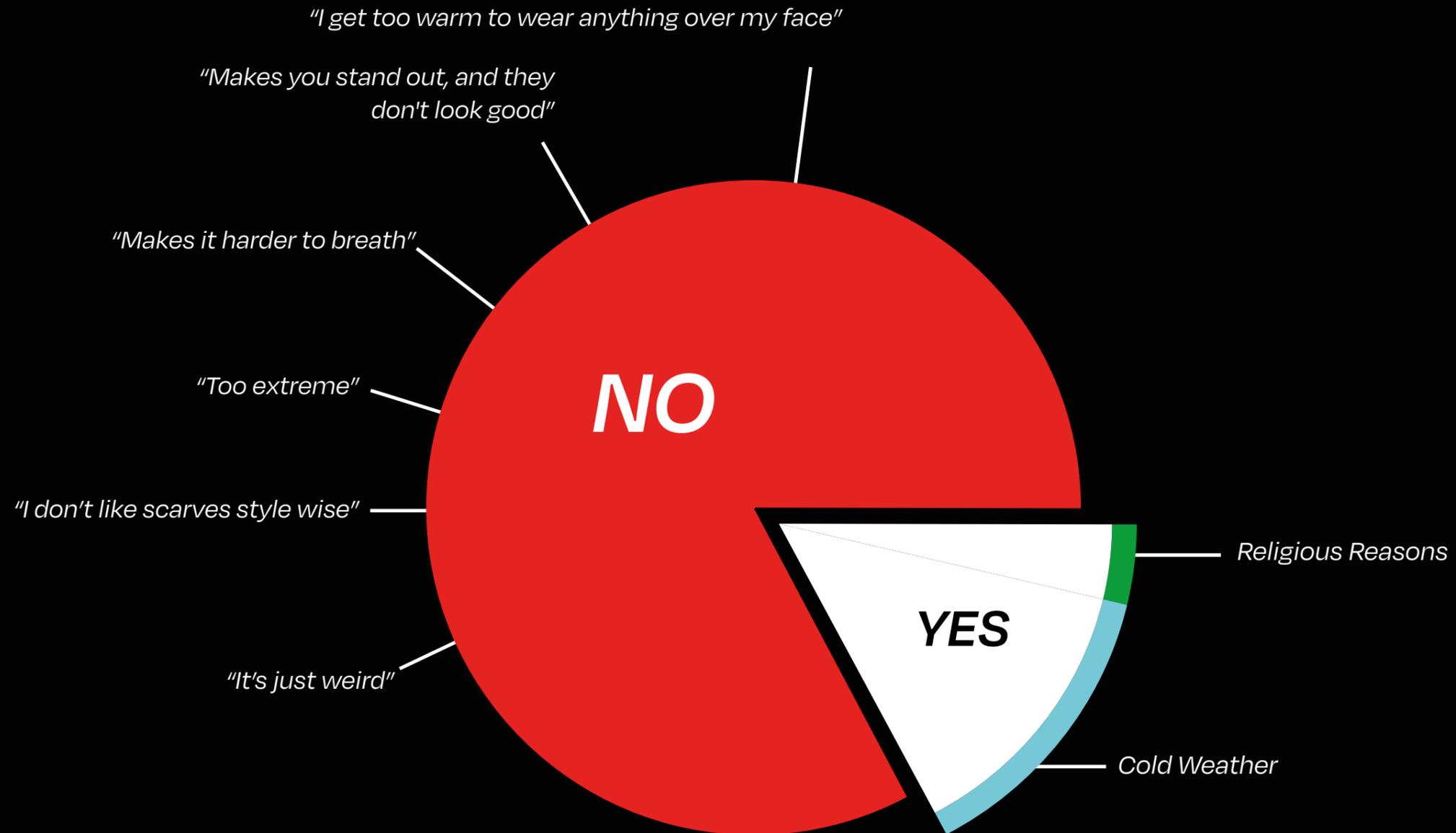


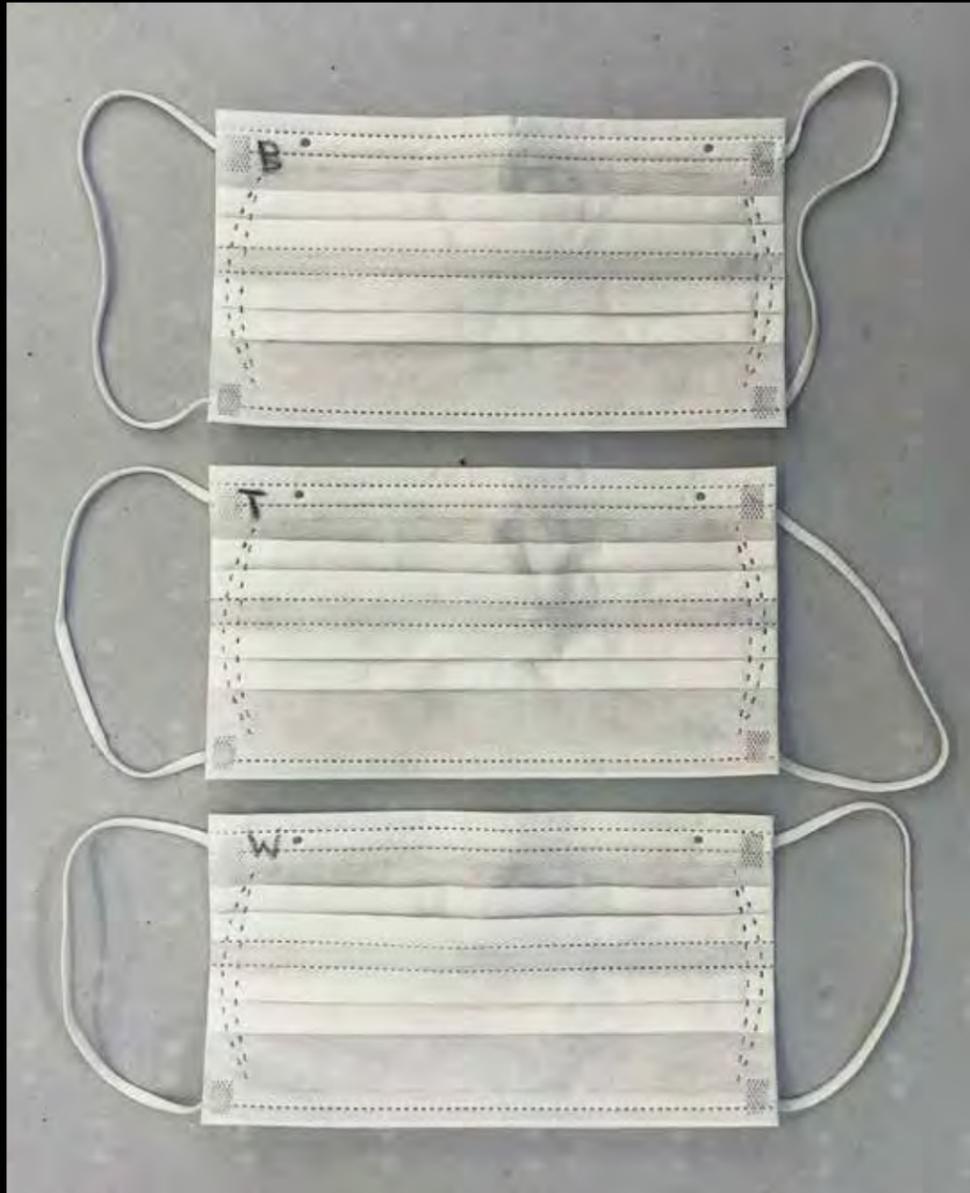
This data shows a general discomfort in people covering their face in public, with most people not comfortable in covering past their nose.

Would people consider wearing a pollution mask on their commute?



Do people currently wear any form of face covering?





Immersion

An immersive study was conducted where I spent a day wearing a pollution mask whilst cycling, walking, and taking the tube around London. This was to gauge public perceptions and to analyse the only available type of anti-pollution product.

Key Findings:

- Hard to wear with glasses and the mask obscures lower peripheral view*
- Hard to look at phone. Neck needs to bend forward or the phone has to be risen*
- Mask was worn upside down for the first two hours - does not signify orientation*
- Constant feeling of warmth and sweatiness, and was hard to breathe when cycling*
- People do not stare in large groups, but do in smaller environments*
- Smells permeated through*

Observation

An observation at Victoria and Paddington stations (two of the busiest in London) was conducted to understand the commuter habits and styles.

Key Findings:

- Black and neutral colours are common amongst all age groups*
- Younger people (18 - 30) wore more colourful, and vibrant clothes.*
- Almost no one covers their face, but when they do it is because it is cold*
- Large amount of time spent stagnant and waiting*
- Overall, there is a high stress level and people speed walk often*
- Most people carry bags of some sort*
- People are generally 'casually smart' - not to be confused with smart casual*

Personas



Jack

Age: 19
Works at: High St Retail Store
Pollution Concern: Little
Health: Good and is Active

"I would not wear a pollution mask. I think it looks strange and I would get weird looks if I wore it. Also, its not as bad as China, right?"

Jack is a man of facts and always needs evidence before believing something. Because he cannot see pollution in the air, he is ignorant to its effects.



Meghan

Age: 23
Studies: Business Management
Pollution Concern: Aware but not stressed
Health: Average, can be lazy at times

"Pollution masks are ugly and people would just think I'm diseased."

Meghan cares about pollution, but her fashion sense comes first. She feels that there is a stigma that would prevent her from even wearing decorative masks.



Rebecca

Age: 29
Works at: WWF
Pollution Concern: High
Health: Average, but suffers from acute asthma

"It's an invisible plague. It causes deformities and death. Just because we can't see it doesn't mean it won't affect us"

Rebecca is fully aware about the effects of air pollution, and wears a pollution mask. She acknowledges that life would be easier if she did not have to wear pollution masks.



There are existing stigmas

Within western cultures, the ability to identify people from their faces to gain trust holds great value, meaning that casual face concealment is not socially acceptable, since it can appear threatening. Existing pollution masks do little to humanise the people who wear them, are uncomfortable to wear, and can be unnecessarily complex to use, putting off many from even trying masks.*

**Pre COVID-19*

“I would only wear a mask if I saw extreme smog”

Quote from user research

There is a lack of urgency

The public are aware that pollution is harmful, but do not realise the extent to which it affects London since it cannot be seen. People only tend to take notice of the issue when they see the effects of pollution or if certain days have more smog.



Trackers are passive

Pollution trackers are great tools, but they are not useful when alternative routes cannot be taken. Within central London, most of the air is above the legal limit. Therefore, rather than passive trackers that only notify users about pollution levels, active approaches need to be taken to provide an alternative means to clean air.





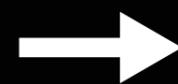
Pollution masks aren't exactly subtle

There have been many designs, however, the products have not significantly penetrated the mass market since they failed to humanise the wearers. As a result, people need to adjust their behaviours and appearance to conform to the products - whereas the product should be designed to accommodate the behaviours of people.

RESEARCH



IDEATION



DEVELOPMENT

ANTI-POLLUTION WEARABLES

HOW MIGHT WE encourage people to be more proactive in lowering air pollution?

POLLUTION KILLS



AIR BUBBLE

HOW MIGHT WE increase awareness and concern for air pollution in London?



JUMPER BEGINS BLANK. OVER TIME, POLLUTION BINDS TO THE PRINT AND REVEALS STARK MESSAGE



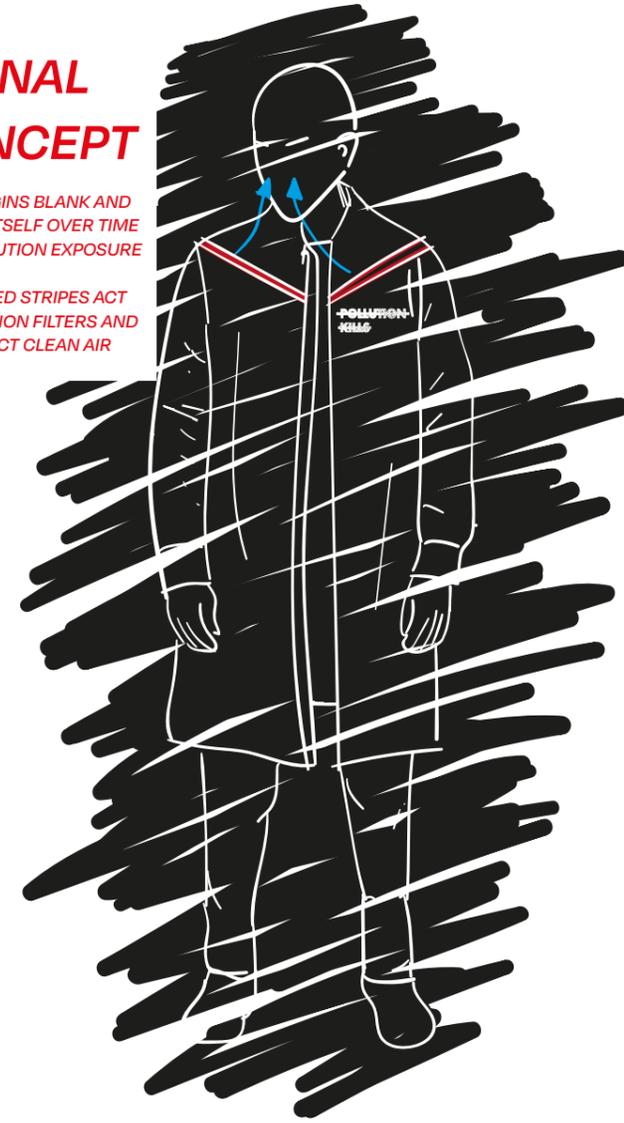
VISIBLY SHOWS CAPTURED POLLUTION AND PROVIDES CLEAN AIR TO FACE



FINAL CONCEPT

LOGO BEGINS BLANK AND REVEALS ITSELF OVER TIME WITH POLLUTION EXPOSURE

FRONT RED STRIPES ACT AS POLLUTION FILTERS AND REDIRECT CLEAN AIR



HOW MIGHT WE generate aesthetic appeal and create desirability?

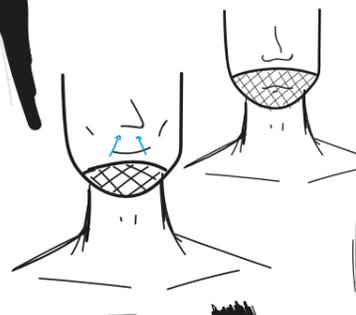
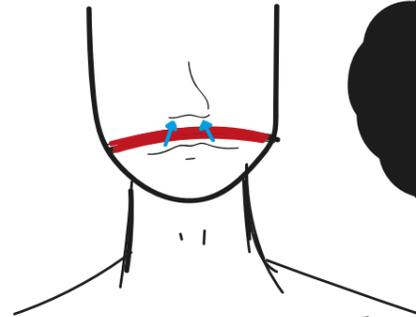
CAPSULES OF CLEAN AIR



PUFFER JACKET INFLATES IN CLEAN AIR ENVIRONMENTS, STORES IT, THEN DEFLATES IN POLLUTED AREAS WHILST DIRECTING CLEAN AIR TO THE USER'S FACE

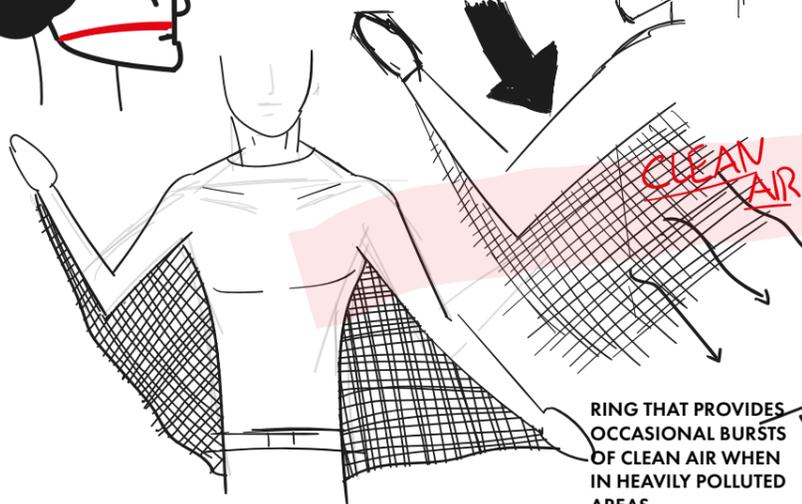
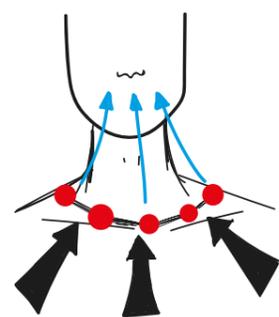


HOW MIGHT WE increase the comfort of people during their commutes?



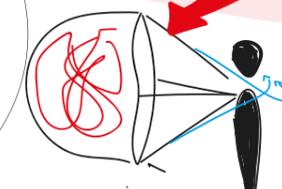
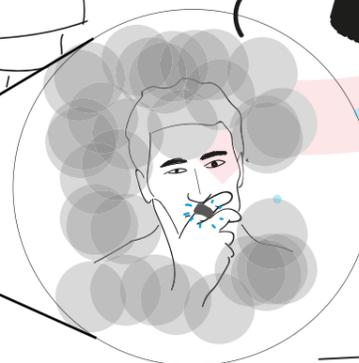
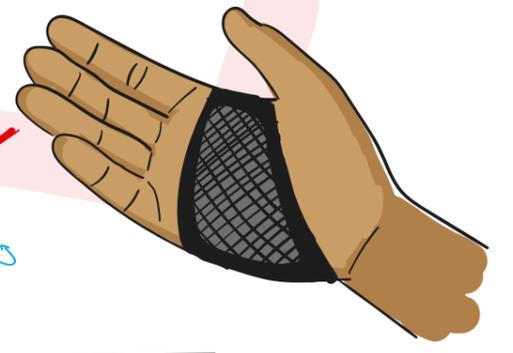
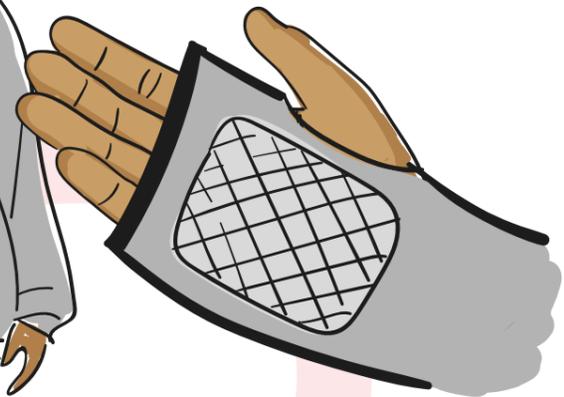
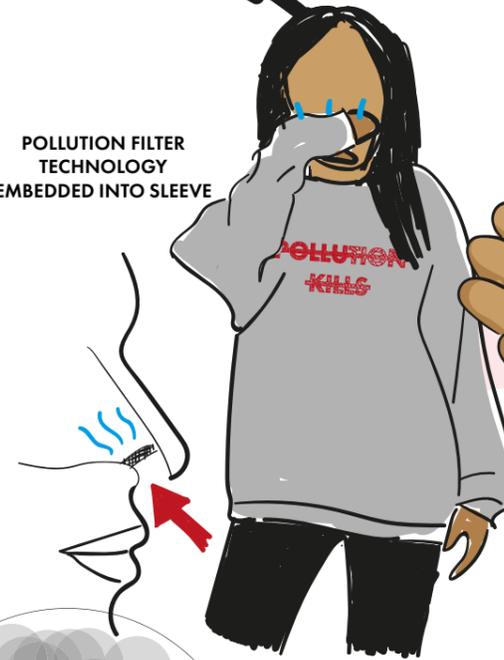
CAPTURES POLLUTANTS AND DIRECTS CLEAN AIR TO FACE

HOW MIGHT WE filter air pollution for people without obscuring their face?



RING THAT PROVIDES OCCASIONAL BURSTS OF CLEAN AIR WHEN IN HEAVILY POLLUTED AREAS

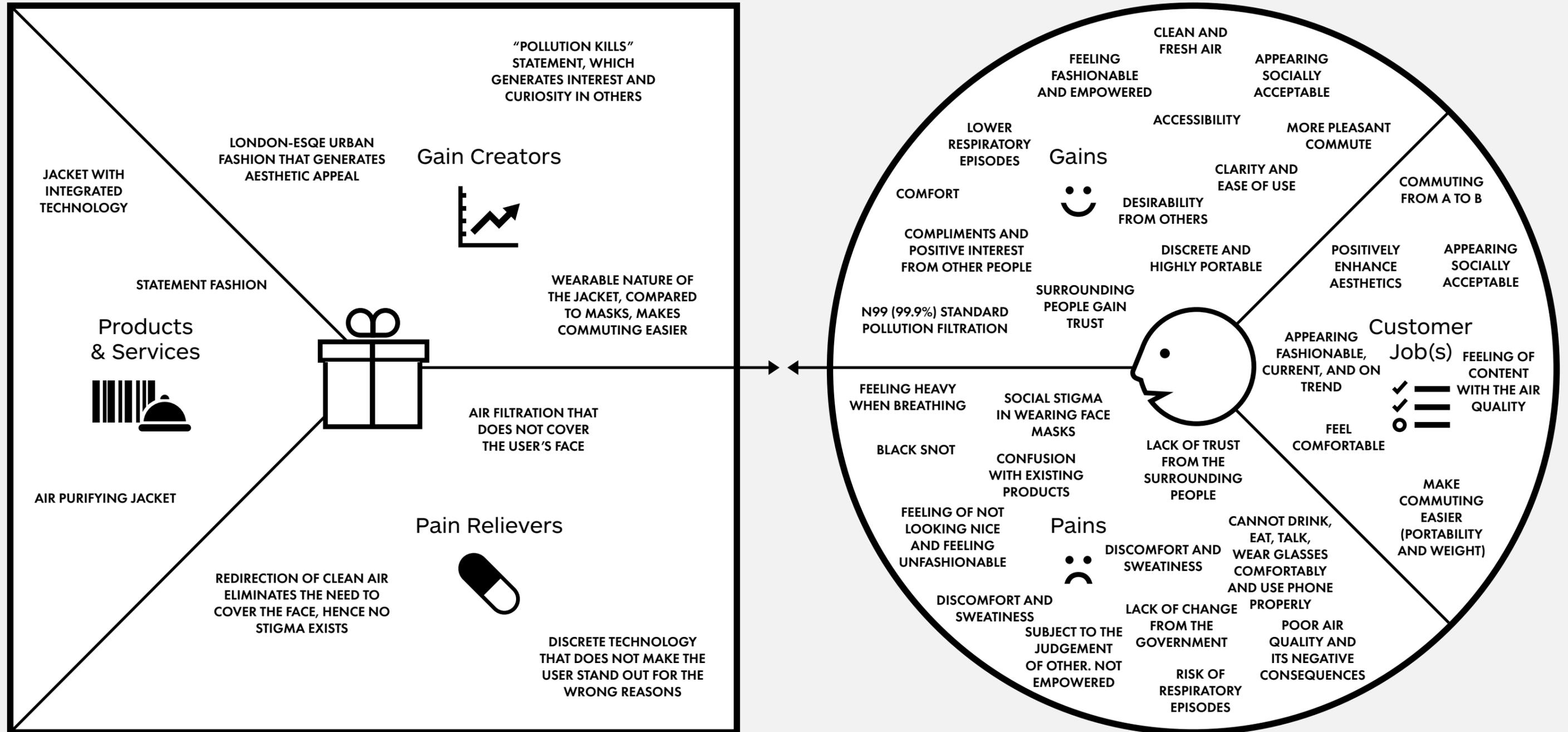
POLLUTION FILTER TECHNOLOGY EMBEDDED INTO SLEEVE

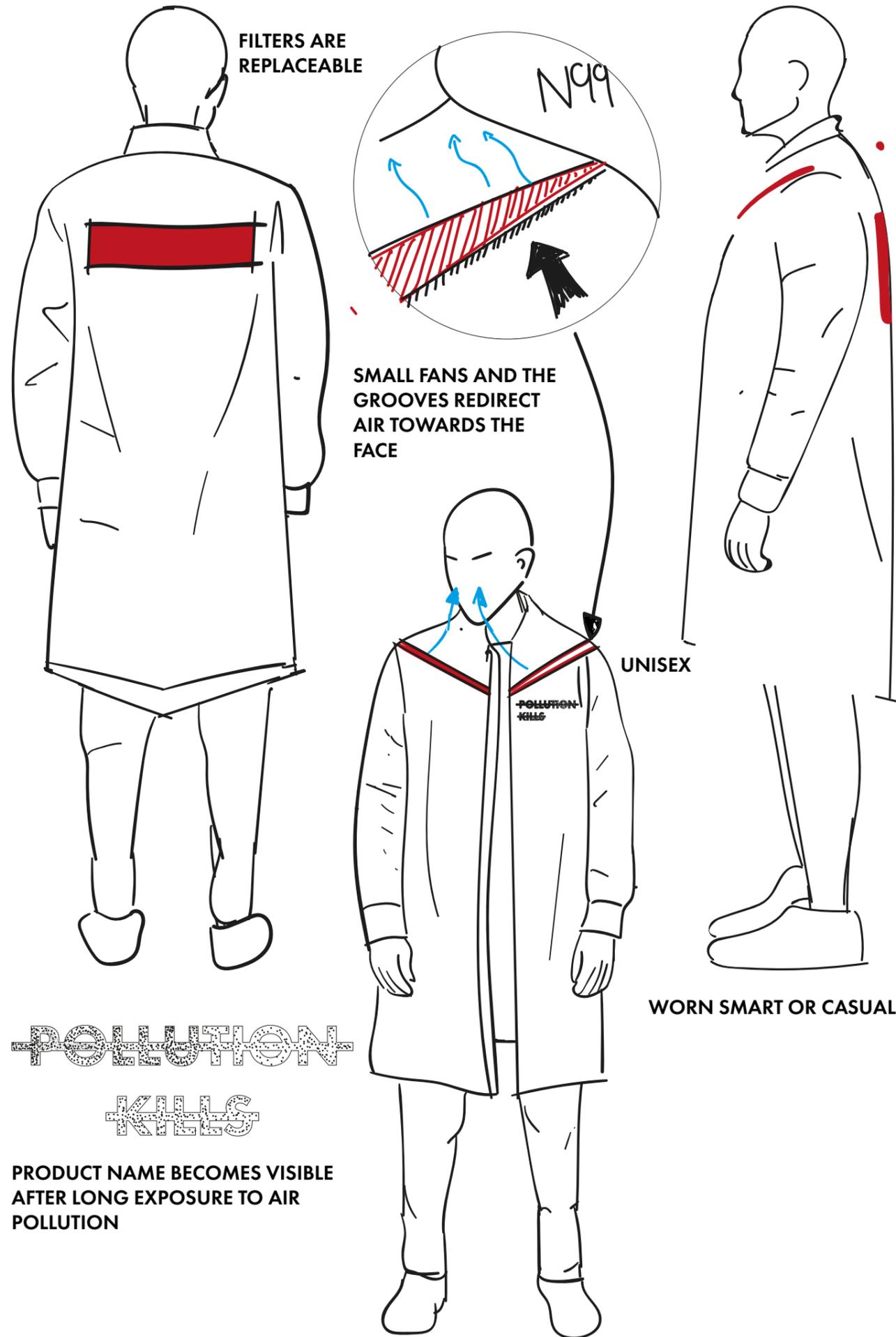


The Value Proposition Canvas

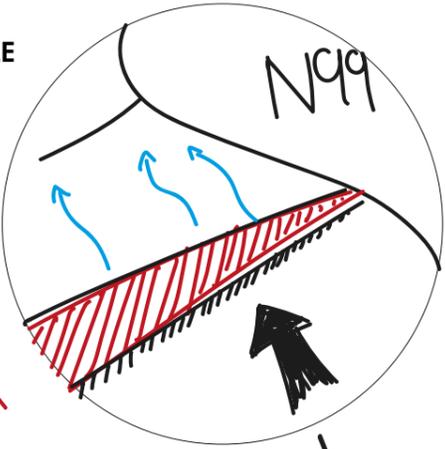
Value Proposition

Customer Segment





FILTERS ARE REPLACEABLE



SMALL FANS AND THE GROOVES REDIRECT AIR TOWARDS THE FACE

UNISEX

POLLUTION
KILLS

PRODUCT NAME BECOMES VISIBLE AFTER LONG EXPOSURE TO AIR POLLUTION

WORN SMART OR CASUAL

RESEARCH



IDEATION



DEVELOPMENT

Specifications

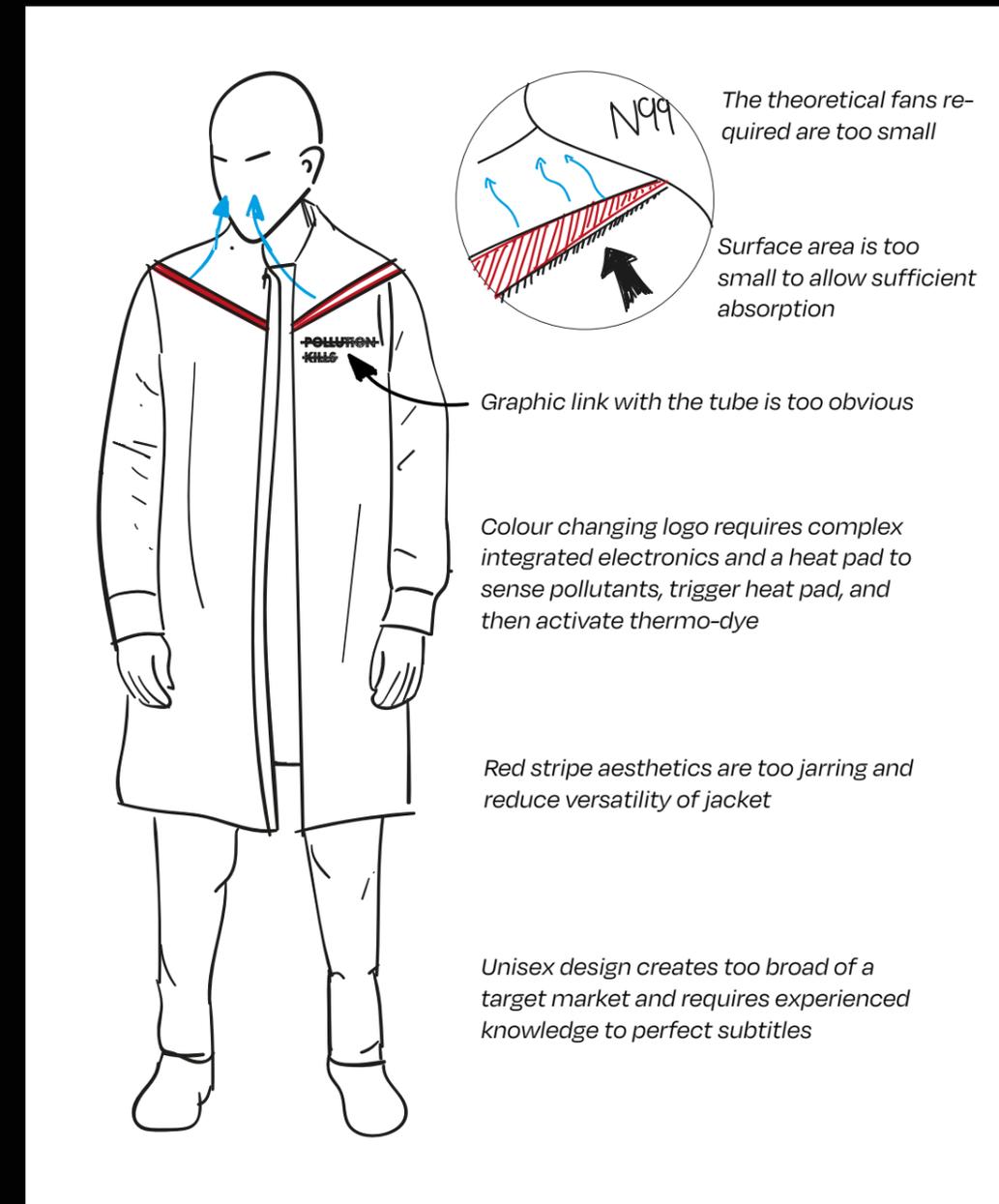
Building on the research insights, design specifications were carefully made to reflect the research findings into tangible goals during development.

The Product should:

1. Have comfortable, consistent, and sufficient air flow
2. Be resistant to the effects of weather
3. Outwardly call to action
4. Have a structured collar as to not disturb air flow
5. Light and breathable
6. Have filters that are easy to replace
7. Provide sufficient pollution absorption
8. Indicate when active

Initial Idea

From a technical analysis of the starting idea, some features were simply not feasible due to technical and economic restraints. These had to be addressed before any development could begin.



Aesthetic Development

Focused target market to only males to gain better clarity in aesthetic direction



Feedback from potential users:

- People could not distinguish that the jacket was in any way different, except from the statement on the collar.
- People mostly appreciated the length and thought it looked cool and slightly different
- "I would actually wear that."
- "It looks quite normal!"
- "I didn't even realise that it was, like, a tech jacket."

Overall, the feedback was positive and people barely recognised that the functionality was embedded and thought the collar statement was cool. However, some thought that it was boring and would not wear it. As a proof of concept, the goal is to keep the jacket's design minimal, and then extend the range once the product has seen some success.

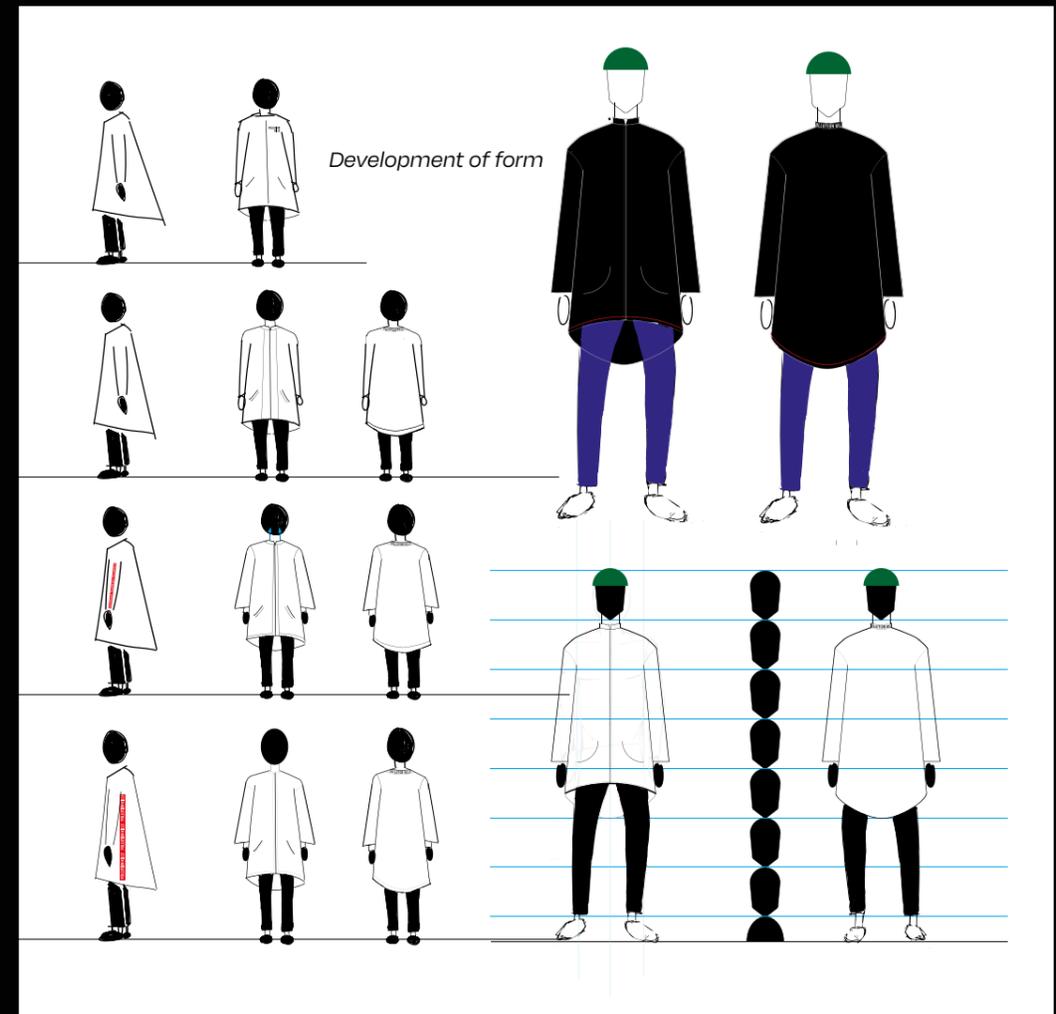
LMFW 18



Further exploration of ideas

Created a failed looks-like jacket that was tested on users. It was ill-fitting due to bad proportions, regardless of the size of the user.

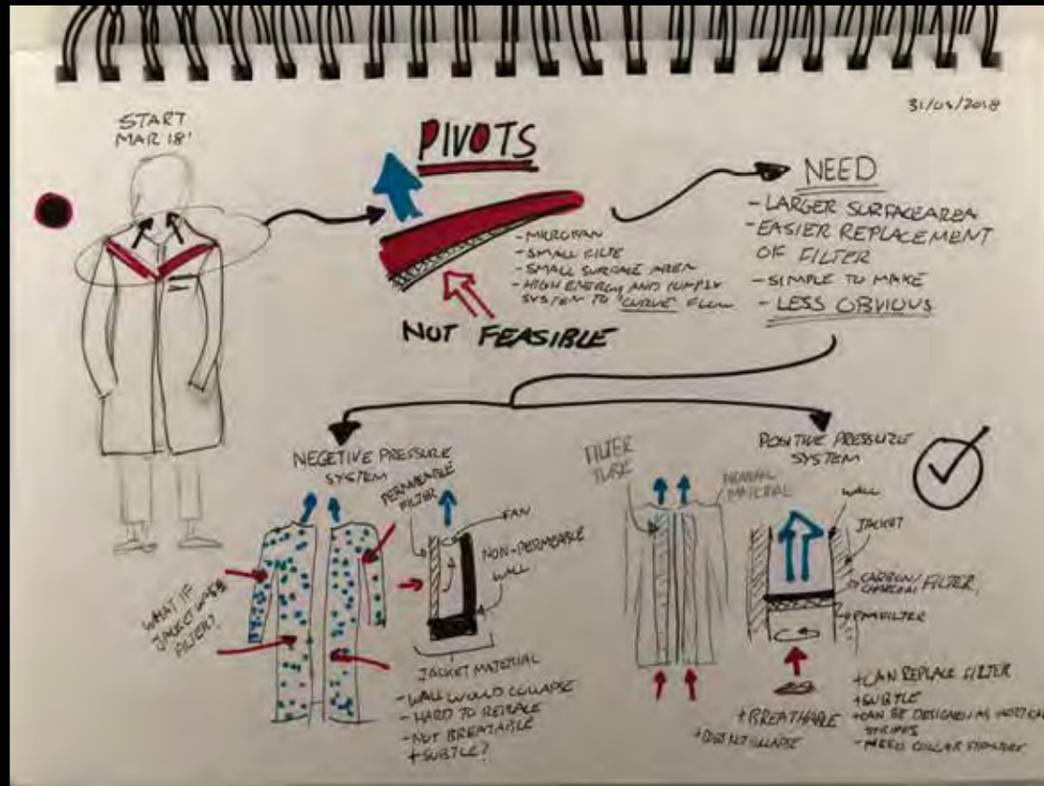
Used an existing jacket as a pattern block and made adjustments accordingly.



Researched into current and upcoming trends



Technical Development



Testing Results:

- Flow direction was mostly good, except when the collar keep moving and falling
- Airflow was sufficient, but the pressure drop due to the filter media almost completely reduced the static
- Air flow was comfortable without filter media
- Plastic had smell
- Further experimentation found that placing the filter before the fan intake reduced the pressure drop by a small, but noticeable, amount. This was then used.

Technical Validation:

- Meeting with Prof. Peter Childs
- Discussed the feasibility of the positive and negative pressure systems
- Was told that the positive system could be produced realistically
- Discussed air flow requirements relating to human breathing per minute
- Said the idea was feasible and could realistically be made

Fans:

After purchasing and testing various fans, the best micro-fan that could be used with a 5 volt supply had 65 Pa of static pressure and 0.25 m³/L of air flow.

Increasing the supply to 12 volts would enable a more powerful fan to be used that would be sufficient, however, these parts were significantly more expensive and therefore not be used.

Filter:

A triple layer filter arrangement (consisting of an two N95 filters and a carbon filter to capture odours) was attached to the fan.



Construction



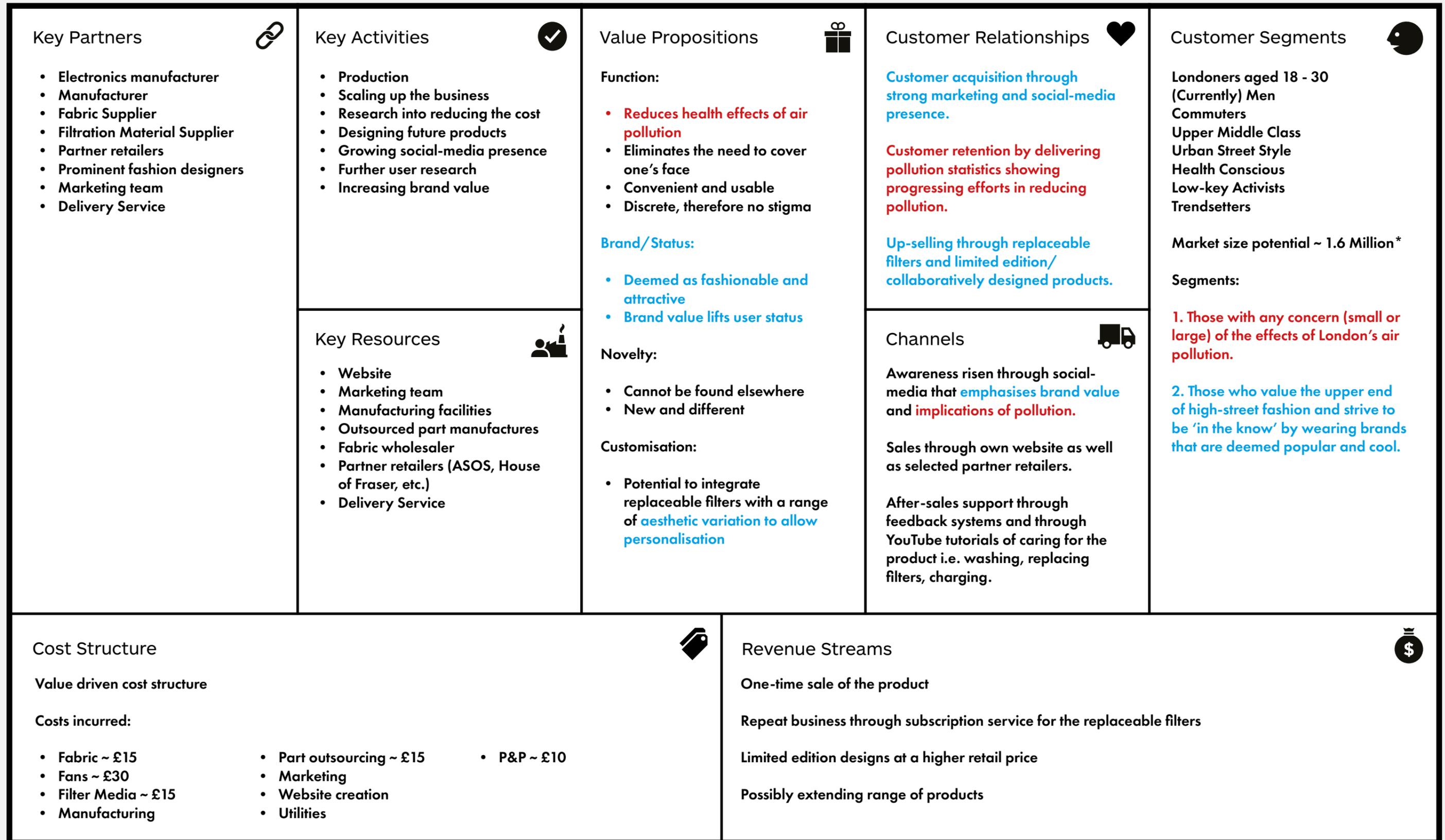
The Business Model Canvas

Designed for: ITIO: Anti-Pollution Wearable

Designed by: Muhammad Saym Hussain

Date: 28/06/2018

Version: 3



-  Aimed at Customer Segment 1
-  Aimed at Customer Segment 2
-  Aimed at both Customer Segments

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POLLUTION KILLS







Next Steps

Further Research and Development

A large investment would be needed to fund further research and development, looking in more sophisticated battery packs and fan, and exploring novel methods to implement discrete filtration in the jacket. A key change would be to increase the power from 5 volts to 12 volts to allow for a more effective fan systems, which would in turn, increase the air flow, efficiency and quality of clean air.

Expand the range

With the technical concept proved on the minimal jacket design, the next step would be to design a collection of items with the embedded filtration system to target a wider audience and ensure more people have access to clean air.