



FOOD PRESERVATION

Homa



Homa
WE TAKE CARE OF YOUR DREAMS

FORE- WORD



Michael Yao, CEO and Co-founder, Homa Appliances

While on one hand food technology has become ever more futuristic and sophisticated in the production, the processing and the preservation of our everyday staples, on the other hand the interest for wholesome, natural foods as part of a healthy lifestyle is literally booming. Today, when it comes to domestic appliances, the market is demanding high-tech, leading edge innovation and at the same time needs to be reassured by a feeling of ancestral wisdom and harmony with mother nature.

This apparent contradiction in terms has to do with the ever growing importance of the emotional and social side of food, for in our modern society, it is much more than simple nourishment. Energy saving and sustainability have also come into the picture and need to be taken into account with much more than simple greenwashing.

Food, and its domestic shrine the refrigerator, have taken center stage in the social representation of our lifestyles as we fill our social media accounts with pictures and stories of our heroic culinary deeds. When entertaining at home, the kitchen has become the focus point of the event, and the refrigerator, sitting right in the middle of what is now the most important room in the house, is a privileged witness of society's trends.

For an OEM producer serving the global community of appliance makers, retailers and wholesalers, early insight on those trends is

paramount. Knowledge about what clients' customers might look for in an appliance in the near future will help select the most meaningful innovation and design at the right time, and also how to market and promote products and their features.

Society is fast-changing, and so are our domestic appliances which reflect our ever-evolving way of life. What hasn't changed is the way the needs of others can best be served: by listening, understanding and caring. It has been the secret of Homa's continuing success since its foundation, nearly twenty years ago. Now, with the publication of this white paper, we've added a new dimension to that philosophy, that of sharing.

A stylized handwritten signature in black ink, appearing to be the Chinese characters '姚吉平' (Yao Jiping).

TRENDS 2022

TREND 2022

12

THE TRANSITION DIET

20

THE REFRIGERATOR,
A STAGE FOR
OUR CHANGING
LIFESTYLES

32

TOTAL COOL, TRUE
NO-FROST FOR ALL

Interview with Simon WU,
Vice President R&D and co-founder,
Homa Appliances

08

THE GENTLE GIANTS

Interview with Federico Rebaudo,
Head of Homa Appliances
European Office

16

THE KITCHEN
IS BECOMING A
MULTIMEDIA HUB

26

FOOD PRESERVATION:
CURRENT AND
(POSSIBLE) FUTURES

FOOD DESIGN



38

FOOD DESIGN
EXPERIENCE

46

MARTÌ GUIXÈ,
THE GURU OF
FOOD DESIGN



FOOD WASTE

60

THE MULTIPLE
IMPACTS OF FOOD
WASTE ON A
GLOBAL LEVEL

66

FROM WASTE
TO OPPORTUNITY

54

FOOD WASTE:
A HUGE PARADOX

THE GENTLE GIANTS

An interview with Federico Rebaudo,
Head of Homa Appliances European Office

8 **Homa's global marketing approach and proposition to client brands seems to revolve around the concept of Food Preservation. Can you tell us what this means to you?**

Food Preservation is one of the three concepts behind our marketing strategy, the other two being Care and Design. Food preservation as opposed to food storage, carries a sense of focus and attention to detail that resonates with consumers worldwide. Preserving also means protecting: our loved ones, our precious nourishment, our planet. It also brings technology into the picture. In our vision, the purpose of technology is to

serve the ideal of caring from a concrete, technical point of view. In today's world, a refrigerator is no longer a simple cold box to store food supplies, it has become an important part of our newly-found interest in caring for our families, our health and the environment. The concept of care also refers to Homa's culture of building and maintaining relationships over the years, with partners, clients, and suppliers. It's in our soul. Finally, Design, in its augmented connotation of both aesthetics and engineering, has a fundamental part to play in this as it is the driving force enabling both form and function.

How important is form, i.e. the aesthetic part of design, in Homa's proposition?

If we consider the current lifestyle trends in most societies around the world, form is becoming increasingly important. Food, and its representation, is possibly the strongest way to express our cultural identity, our education, our social status, and the refrigerator is instrumental in this collective dedication to the staging of our lifestyles. Hence the importance of its appearance, I'd say appeal. In the kitchen we talk, we exchange ideas, we love, argue, cry, we get proposed, we entertain, we mourn. In fact the most important moments in our life are likely to occur in the kitchen, and the refrigerator is the largest and most visible appliance in it. When you come to think of it, it's the first thing we open in the morning as we prepare breakfast, and also the last one, at night, when we drink that glass of milk before going to bed. We interact with it multiple times during the day. As a cooling appliances manufacturer exporting worldwide, we simply couldn't avoid taking all this into consideration.



9 **How did that impact the technology and the design of your refrigerators?**

The need for a more natural, wholesome diet with plenty of fresh produce was at the basis of the introduction of No-Frost technology across our entire 2022 range. Fresher foods that last longer at every latitude, with all their vitamins and nutrients is ultimately what we want to offer, and we're using the most appropriate technology to serve that purpose, even if it's considered high-end. Can we afford it and still be competitive? Yes, because of our size

and of the economies of scale we can achieve. Another example of lifestyle-driven technology in our products is the AI inverter. Sustainability and energy-savings are subjects consumers around the world are increasingly sensitive to, and about which they are less and less prepared to compromise. AI inverter technology, applied to the compressor system of our refrigerators, not only more than offsets any potential consumption increase due to No-Frost, it also helps avoid temperature fluctuations, maintaining a precise temperature inside the cavity, with the result of further energy savings and better preservation of food. In fact, you can say all the technology in our products is conceived and validated under that perspective. As far as design is concerned, this meant, for instance, more metallic parts and less plastic ones, for higher recyclability and lower impact on the environment. Also, the general glamourisation of food and personal lifestyles vindicates our efforts to produce appealing, stylish appliances that seamlessly fit into any kitchen layout,

and steal the show! We are partnering with leading European design firms that help us infuse that special glitch of international, cool sophistication into our refrigerators, and our 2022 collection is a beautiful example of this. Also, perhaps due to the recent restrictions, we tend to stay-in more, and entertain at home, hence the need for larger appliances. The reduction of the frequency of shopping trips, with larger supplies to stock every time, also goes in that direction. Entertaining at home also triggered the appearance of our first ice-maker and dispenser in some of our side-by-side models. To help our



clients best convey the relevance of these innovations to their customers, we went beyond our traditional role of OEM producers and started creating the elements for a memorable and shareable storytelling around our products for the global market.

How do you know what technology works for you and when to introduce it?

The timely introduction of relevant technology is the foundation of our long term strategy. We know a technology is relevant with respect to consumers' aspirations and needs through the constant dialogue with our clients and partners. It's in our soul. Listening and sharing are timeless skills that will take you a long way in understanding the market. As for the concept of timing, the right time seldom means fast, or first, but more often corresponds to the "time of opportunity", the Kairos of the ancient Greeks, i.e. when a technology is totally reliable and the market is ready for it as it can really make a difference in terms of customer experience. That, for us, is the precise moment when we want to

introduce a technology on a mass scale. Exclusive, and accessible to all.

Tell us about Homa's vision and mission, and how you create value.

As a corporation, we've abandoned the old terminology of vision and mission you find on boardroom walls, collecting dust in their golden frames. We'd rather find some other way of defining the essence and the purpose of our business, and talk about our soul. Our global scale and reach, the beautiful products we manufacture for our clients, our way of caring and of being part of our clients' team, and our belief that people and relationships are the key ingredients to our success: this is what defines us. This is what guides us in every business decision we take every day. Yes, like everyone else, we are in business to create shareholder value, but we know that this requires satisfying stakeholders, starting with our clients and their customers. Value is therefore a natural consequence of our ability to deliver on our unique and different proposition.

THE TRANSITION DIET

Research confirms the growing interest for plant-based foods on the part of consumers, but consumption of meat is still stable.

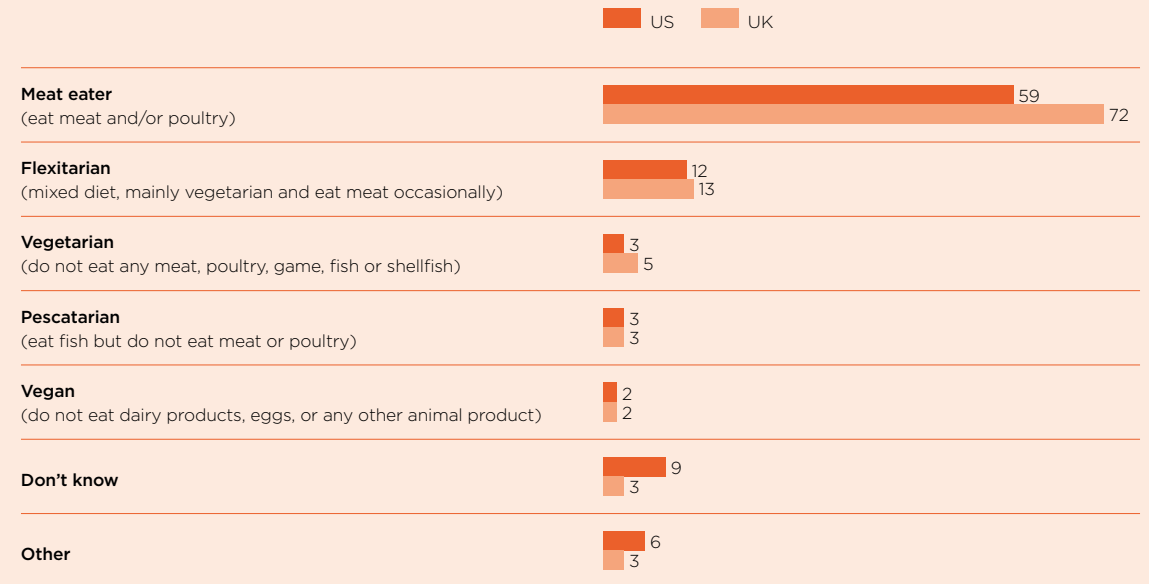
Food production, from field to plate, currently accounts for over a quarter of the world's greenhouse gas emissions. Yet it is possible to reduce our environmental footprint through the diet we choose to adopt. The growing attention to health, sustainability and ethics issues is pushing consumers to include more and more plant-based foods in their diets, a trend that emerged last year and that seems set to last. Yet, according to FAO's latest data,

the world's production of meat was more or less the same as the previous year since the production of poultry compensated for the decrease in the consumption of beef and pork. In fact, at global level, consumers are replacing red meat by white meat, and despite the fast growth of meat-alternatives, these haven't really affected the sales of real meat; for now they represent an addition rather than a substitute.

According to a recent [survey by YouGov on food habits in the US and the UK](#), 59% of the total US adult population are meat-eaters; 72% in the UK.

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Only 3% of American adults, and 5% of UK adults, practice vegetarianism. Occasional meat-eaters in the US represent 12% of the adult population, 13% in the UK.



Around 2050, the forecasted population and income growth will require 70% more food at global level, and up to 100% more in developing countries.



Let's imagine we have two options for dinner: a steak with fries, and a microwaved potato with beans.

The steak is 20 times worse for the environment than the meal with beans, even when considering the cooking process.

Sarah Bridle teaches Food, Climate and Society at York University's Environment and Geography Department. In "Food and Climate Change without the hot air" she gives a detailed description of the carbon footprint of the food we typically eat in the course of a day.

2022 FOOD TRENDS

The year to come will be about proximity agriculture and shared wellbeing.

Zero waste:

consumers put the planet's wellbeing first, even before their own, which has been the top priority in the past months. According to Innova's Global Lifestyle & Attitude Survey, a sense of co-responsibility for the planet is guiding consumer choices: 43% of interviewees are committed to reducing waste, and 32% pledge moderation in eating.

Talking labels:

Trust and transparency are inescapable values for any brand wanting to attract ever more educated, far-sighted and connected consumers. From a survey conducted by Label Insight and the Food Marketing Institute, it appears that 75% of consumers want more, and more accurate, information about the origin of the food they put on their table.

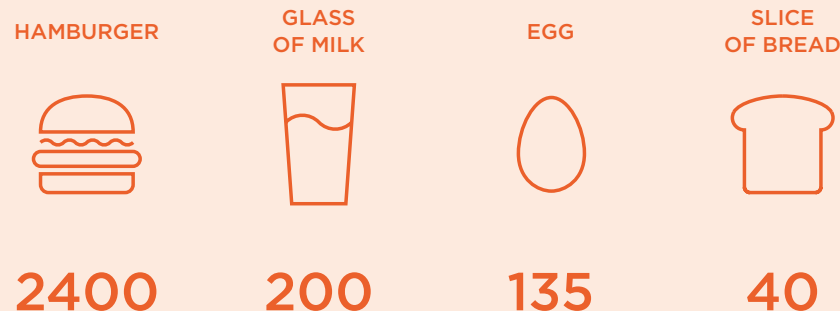
True omnivores:

there's a growing number of consumers who, instead of concentrating on avoiding certain foods, are now open to non traditional foods such as offal, lab-grown meat, insects and algae, indicated by the FAO as "the foods of the future".

Laboratory superfoods:

The demand for foods high in vitamin D, Magnesium and probiotics is definitely on the rise. According to a survey by Innova Market Insights, 3 out of 5 consumers are constantly in search of food that can benefit mental health and improve the quality of sleep. Among trending foods, phytonutrients are natural compounds rich in proteins and vitamins that can help strengthen the immune system: research conducted by Businesswire shows that by 2023 they will represent an estimated 24 Billion dollars market.

Quantity of water, in litres, to produce the foods we usually eat.



www.fao.org/news/story/en/item/86991/icode

E-food and automation:

online shopping for food has become part of the new post-pandemic normality. However, digitalisation not only concerns sales, but the entire production and consumption process. In the restaurant industry, automation will grow significantly, in particular for what concerns repetitive tasks involved in food preparation so that people can concentrate on more value-adding service activities.

Boom of alcohol-free and carbonated functional drinks:

Whole Foods foresees the growth of carbonated soft drinks and probiotics beverages with botanical ingredients. It also confirms the growth forecast for low-alcohol and alcohol-free drinks.

Urban agriculture:

Urban agriculture, with its "zero km" and sustainable lifestyle aura, keeps on a steady growth path. According to some observers, the urban farming market, at global level, will reach the 9.9 Billion dollars mark by 2025 (it was 1.2Billion dollars in 2015). Also on the upward trend, the interest for exotic fruit grown locally, and the re-discovery of traditional foods.

THE KITCHEN IS BECOMING A MULTIMEDIA HUB

It will be more and more connected, with joined up design from start to finish: attention is on all phases of production, from concept to disassembly of the different components

In the last eighteen months the kitchen has played a key role never experienced before in family life. Most people have spent an unprecedented amount of time at home for work, study and leisure, giving rise to new needs and habits that are impacting inevitably on the kitchen

environment. People want more space for the preservation of food, both fresh and preserved, equipment and surfaces that are easy to clean, and appliances that provide an experience that is more and more connected and personalised. Additionally, there is the need to



combine long-lasting performance with timeless design, unaffected by fashion – stone, marble, wood are synonymous not only with durability and quality but also with attention to local raw materials – as well as being sustainable in all phases of production, from design to post-use. Hand in hand, consumers are tending to seek interiors that provide

a new idea of wellbeing that translates into sophisticated air and water filtration systems, sterilisation of surfaces by means of infrared technology, and lighting systems synchronised to circadian rhythms. From an aesthetic perspective, colours and finishes are selected that provide joy and inspiration in the most creative room in the house.

FIVE DEVICES THAT WILL BECOME POPULAR

Counter top projector:



allows control of other appliances, scans the thickness of the food, provides cooking suggestions.

Smart refrigerator:



with an internal camera, voice assistance and a screen on the front panel for note-taking, shopping lists and reminders of upcoming events.

Digital Blackslash:



a touch screen display will allow you to watch TV, search for recipes and control your appliances from every corner of the kitchen.

Connected hood:



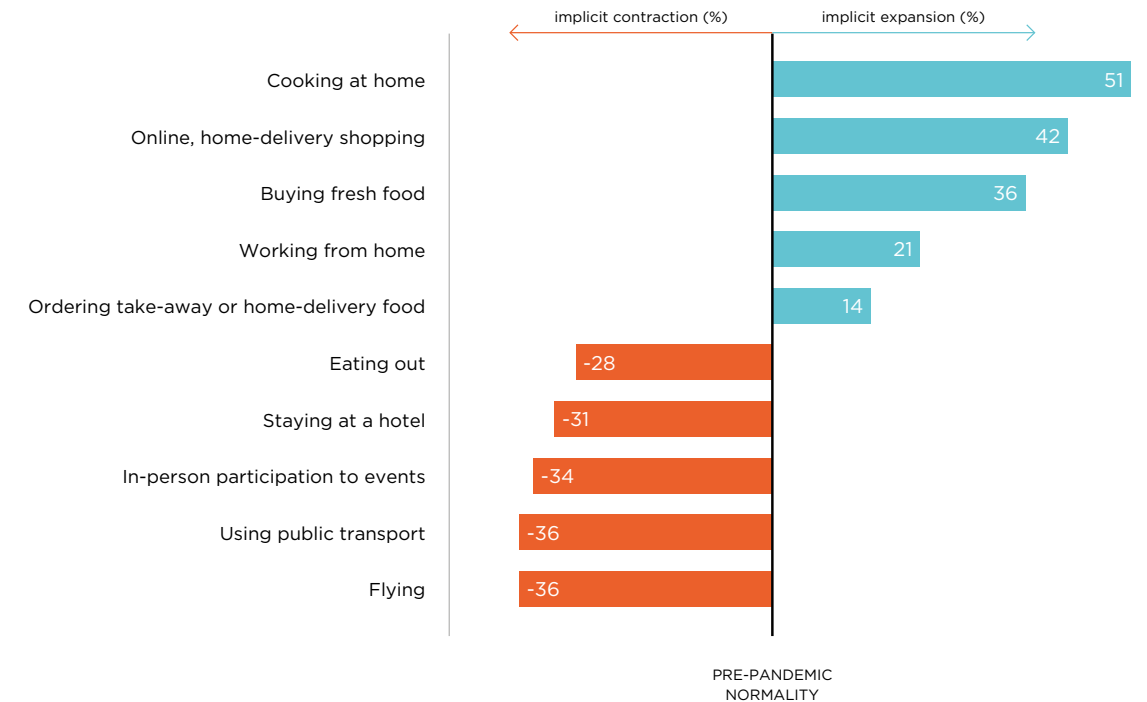
this will soon include digital screens for consulting your favourite apps and integrated cameras so you can livestream your cooking.

Smart rubbish bin:



scans the products you are throwing away and adds them to the shopping list.

According to Deloitte Global state of consumer tracker which gathers the opinions of more than 40 thousand consumers in eighteen countries, some habits acquired during the Covid 19 period will continue beyond the end of the health crisis. In particular, more than half of consumers think that after the pandemic they will cook more than they did before, 42% will continue to order takeout food and 36% to buy fresh food.



THE REFRIGERATOR, A STAGE FOR OUR CHANGING LIFESTYLES

Understanding global changes through the lens of the evolution of domestic cooling appliances.

As the principal piece of furniture in the kitchen, the refrigerator is the domestic appliance that better lends itself to the interpretation of the current changes in society, also because of its sophisticated design and its use of latest-generation materials and technologies. The fridge revolution is synonymous with total respect for food, with stylish design and advanced connectivity. All this with expanding capacities and

higher-than-ever levels of efficiency. 2021 will go down in history as the year of the multi-door, which is rapidly replacing single and double door models. Consumers around the world are privileging models capable of holding larger quantities of food while providing additional advantages too: a modular internal architecture, lower electricity consumption and reduced food waste thanks to technologies

able to considerably extend the life of fresh produce.

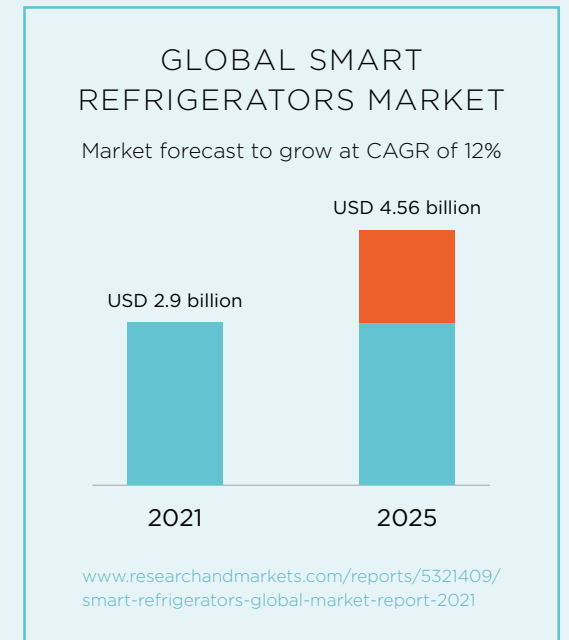
Based on different cooling systems and storage compartments, latest-generation refrigerators offer the possibility to create different microclimates adapted to the various types of food, packaging or recipes. All the research in the field points at connectivity and voice technology as leading the evolution of

cooling appliances in the coming future. A trend which seems already underway in the “smart” market, with numbers definitely on the uprise. The Global Market Report 2021: COVID-19 Growth and Change to 2030 estimates its growth at 2.5 billion dollars in 2020 and 2.9 billion dollars in 2021. The forecast is for it to reach and exceed 4.5 billion dollars by 2025.



The number of domestic devices globally should increase threefold with respect to 2018 estimates, and reach 43 billion units by 2023.

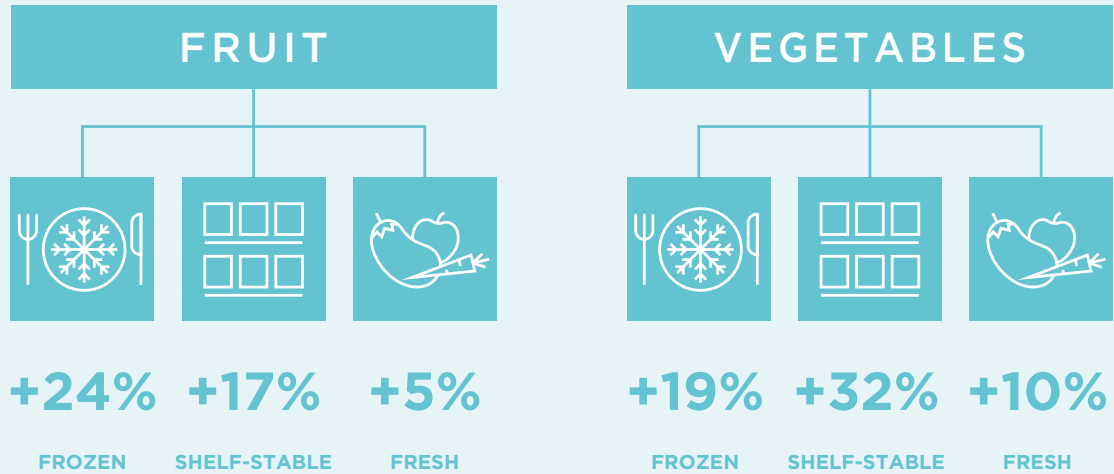
McKinsey & Co



EMBRACING PRODUCE ACROSS THE STORE

A market research by Nielsen shows that the capability to preserve fresh produce for longer has gained considerable and renewed relevance for American consumers during the pandemic. Sales of fresh fruit and vegetables have increased by 5% and 10% respectively compared to 2019.

\$ % Growth - U.S. Produce Sold Across the Store



Nielsen Retail Measurement Services, Total Food View, Total U.S. All Outlets Combined (xAOC), UPC-coded and random-weight/Non-UPC data, Calendar year-to-date period ended Apr. 4, 2020 vs. year-ago

2022 COOLING TRENDS

Ice cubes galore

Ice makers are here to stay. In the future we should expect more and more ice, produced more and more quickly. Recent research shows that every American uses up to 180 kg of ice every year. The latest hype in ice-cubes is... round cubes! Or rather, spherical ones: the shape is meant to minimise the contact surface with the liquid so that the icicle doesn't melt so fast in your drink, which also stays cool for longer.

Ethylene filters

Another novelty is the filter getting rid of ethylene and other gases naturally produced by fresh fruit and vegetables, keeping them fresher for longer. Such filters are also meant to prevent unwanted odours from contaminating other foods stored in the fridge.

Convertible box

Among the most recent innovations, controlled temperature boxes make for a better management of supplies according to the specific needs of the items they hold, keeping food fresh for longer and avoiding contamination.

Transparent doors

See-through doors are becoming increasingly mainstream. The concept is very simple: you can check the content of your fridge without opening it, effectively reducing the number of times you actually open it and helping maintain even temperatures. The use of glass doors will also impact smart displays, which will become transparent and with augmented reality functionalities to provide all kinds of information about the food items inside the refrigerator, from expiry dates to possible recipes for your next dinner party, which the fridge can even help you plan and organise.

SURVIVAL CELLS FOR FOOD

Two concepts to fight food waste

Some designers are working at solutions to keep food that's left out of the fridge, either leftovers or items waiting to be eaten.

Yoonji Park created Odny.BOX, a kind of transparent dome that can keep food, hot or cold, in the best conditions for several hours. Yu Seojoung also worked on the issue and came up with Mother's Heart, inspired by the traditional Sang bo, a sort of blanket used in Korea to keep food at its optimal temperature. The system can be

set on the desired temperature and keep food hot or cold according to need.



www.behance.net/gallery/54839767/Food-storage-device

URBAN GARDENING TAKES OVER THE KITCHEN

In the future, food preservation will be increasingly tied to proximity farming, especially for what concerns fruit and vegetables.

In the past eighteen months, food insecurity caused by climate change and by the pandemic, sparked a surge in indoor gardening. More than a quarter of American consumers claim they have started a vegetable garden because of the pandemic, according to a 2021 survey by market research

company Packaged Facts. According to the Korea Invention Promotion Association, the internal market for plant cultivation will grow by 50 times in 4 years, skyrocketing from 7 billion euros in 2019 to a whopping 368 billion forecasted for 2023.

FOOD PRESERVATION: CURRENT AND (POSSIBLE) FUTURES

26

The length of time we can store food and food safety are already central and will become ever more so to consumers' purchase choices. The goal will be really effective antibacterial solutions with inspiration from the medical and air treatment sectors.

The pandemic has focused attention even more sharply on health and domestic hygiene, and on a desire for healthier eating. This has translated into a slow but growing movement towards a diet based on biological and vegan foods, vegetarian or vegetable based, as well as greater purchases of fresh fruit and vegetables. Storage time therefore bears a new and ever more significant role for consumers, as much as food safety.

Paradoxically, it is actually in the home refrigerator that this food safety risks being lower. From [research commissioned by the English magazine Which? in 2019](#) we learn in fact that seven in ten refrigerators contain harmful bacteria, with the greatest risk of proliferation in the fruit and vegetable compartment. To overcome this phenomenon, caused essentially by an excess of humidity inside the compartment, the production world has turned towards solutions that are only partially capable of solving the problem. However, there is no doubt that the future of refrigeration

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is destined to move towards innovations capable of ensuring ever higher quality levels in terms of food preservation. It is equally true that at the moment there is no clear reference framework for evaluating this parameter. The current classification of household appliances is made on the basis of energy efficiency and does not take into account the quality of food preservation; the storage temperature that is now checked during energy tests is only one of the factors that contribute to proper food storage.

Yet something is moving. At the international level, [the EIC in June 2020 published a first standard](#), currently unique, on the preservation and storage of food in the refrigerator. The legislation is not specifically dedicated to food preservation and, like all regulations, its application is on a voluntary basis. But this is the sign that we have begun and that we are working towards a future regulatory framework for this aspect as well.

27

On the technological front, the most significant innovations related to antibacterial treatments are probably the prerogative of the professional and medical world as well as the broader and more cross-sectoral one of air treatment (see box *ndr*). It is therefore to these sectors that we need to look, if not actually draw on the know-how necessary to develop dedicated antibacterial solutions for the refrigerator. In this context, HOMA as always intends to be in the forefront, applying these innovations as soon as they prove to be significant and really useful for its consumers.

28

THE FUTURE OF FOOD PRESERVATION? AIR TREATMENT

Four questions to Luca Cantorelli, Senior Engineer, Studio Volpi.

What solutions are offered today to counter the presence of bacteria in the refrigerator?

Today there are antibacterial filters and ultraviolet LED lights placed near the ventilators or attached to the shelves. Alongside these, in the world of professional cleaning and in the medical field, antibacterial films or antibacterial plastic are used, obtained by combining antimicrobial additives with the materials. These are partially effective solutions, and in the case of the healthcare and professional world the results are certainly more valid and lasting. Total elimination rather than just controlling the proliferation of bacteria is undoubtedly the trend of the future

of food preservation, but there is still a long way to go.

In what direction?

In my opinion, we need to look at the technical solutions being used in other areas that are already suitable for use inside a refrigerator.

For example?

The world of sanitisation and air purification. Taking on board what already exists in the world of air treatment, we could begin by utilising the ventilation systems, primarily at this point forced ventilation based on No Frost technology, that includes purification using UV lamps or filters, for the elimination of bacteria. It's not a cheap or easy route, but in my opinion, it's where we should be heading in the near future so we can succeed in our efforts to offer really long lasting and permanent solutions. In the future, I think we'll need to completely rethink the design of the refrigerator, taking into account larger amounts of food being stored,



29

so we can offer products that meet the needs of new generations, the consumers of tomorrow.

And in the meantime, what can we do?

What the industry can do today, and what some have already started to do via dedicated applications or Point of Purchase materials, is educate the consumer to adopt new approaches to using the refrigerator for the best food preservation.

Innovative antibacterial solutions to look at

THE MATERIAL THAT ELIMINATES DOMESTIC POLLUTION

Heflomi is a modular home furniture system that can eliminate bacteria, volatile substances and allergens present in the air, also absorbing and eliminating unpleasant odours from cleaning products and food.

The air purification system was created by Missaglia Spa, a company specialising in the development of technology and furnishings for the sanitisation of the air in hospitals and care homes.

Each panel is constructed with The Breath®, a material produced by partner company Anemotech, that harnesses the natural air flow to extract polluting molecules once they come into contact with the surfaces.

The material performs an absorbent function, anti-bacterial and anti-odour, trapping and separating polluting atoms, ions and gaseous molecules. With customisable graphics and colour, the panel becomes a decorative element integrated into the space, and is easily installed with the bio-adhesive provided.

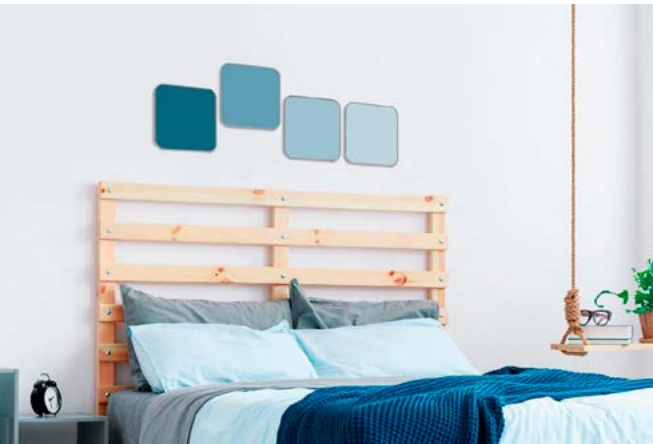
→ www.missaglia.com

THE LED LIGHT THAT SANITISES THE ENVIRONMENT

Biovitae is a patented LED (UV free) lighting device that sanitises surfaces and environments, without sterilising them thanks to a particular combination of visible light frequencies. It controls the proliferation of bacteria and viruses, acting in synergy with the immune system. The technology is effective on viruses, all GRAM+ and GRAM- bacteria, spores, mould and fungi, and prevents the development of outbreaks of infectious diseases securely for humans and animals. The device can be installed and powered by all existing electrical systems with no need for any modifications, not even to the bulb socket. It can be integrated into vehicles with no modification to existing structures.



→ www.biovitae.it



TOTAL COOL, TRUE NO-FROST FOR ALL

An interview with Simon Wu, Vice President R&D and co-founder, Homa Appliances

Being among the founders of one of the largest cooling products manufacturers in the world and in your position as VP R&D, you have been a privileged witness and actor of technological evolution in the cooling industry over the past twenty years. How did R&D in this field evolve over the years?

In the past, R&D concentrated mostly around the industrialisation stage of a product's lifecycle. It was mainly about finding ways of optimising production while constantly improving product

performance, which substantially amounted to the capacity of an appliance to produce cold efficiently. Over time there has been a shift in focus, from the product, i.e. the "container", to the "content", i.e. the food items it is meant to preserve. A lot of research was conducted on food, and the industry learned a lot about how it kept over time, and how different foods reacted to temperature and humidity, hence the re-discovery of crispers, the appearance of cool boxes and an increased

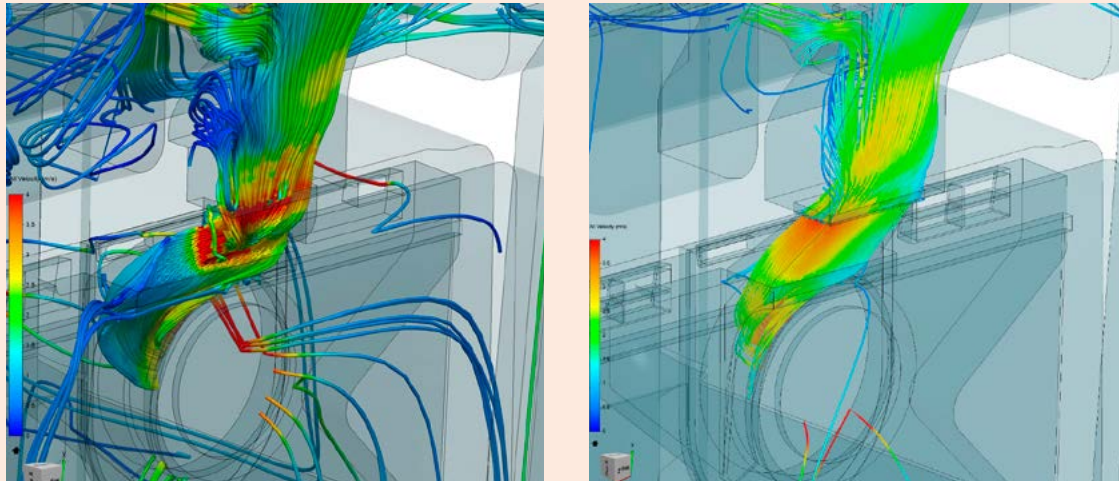
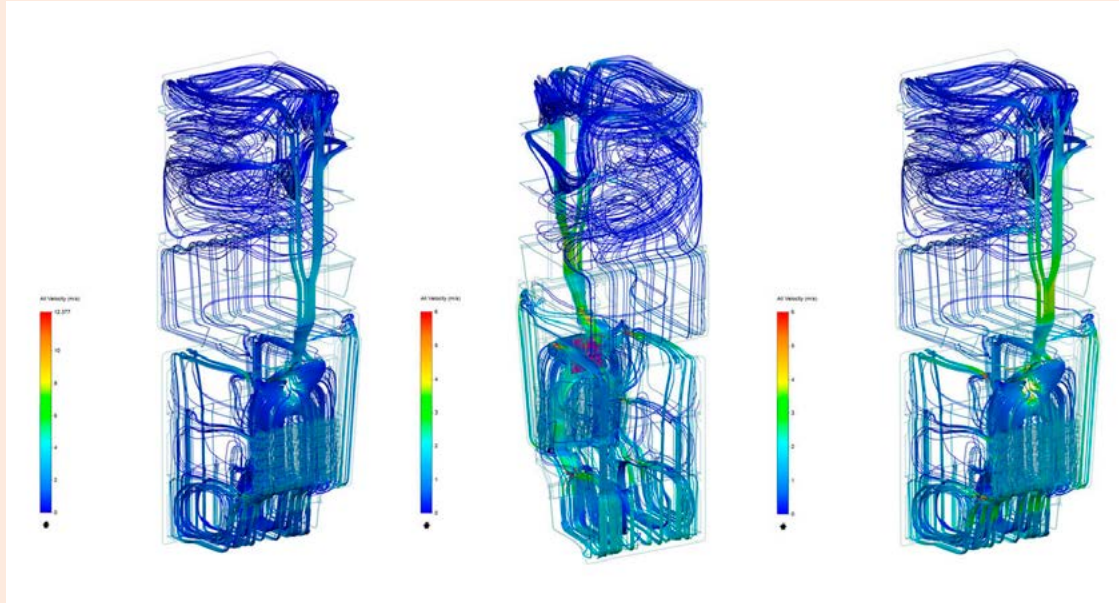
degree of flexibility for consumers to set temperature and humidity levels themselves. It's as if R&D had moved out of the factory and into the consumers' homes.

What's in store for us now? What are the current trends and scenarios that will influence the cooling industry in the near future?

Today, the name of the game is "food preservation" as opposed to "producing cold", and another effect of this changing perspective is that consumers lifestyles have also come into the equation. That produced a huge leap forward both under the technology aspect and in terms of design. The objective of R&D isn't simply meeting technical specifications anymore, but also satisfying consumers' expectations in terms of emotions, status and eating and shopping habits. In recent years, there's been a growing attention on the part of consumers to environmental issues. Healthy eating, translating into increased demand for wholesome foods and well-being in general, are also

trending. That's a clear indication of what the market expects of us: products that are respectful of our planet and serve our new, healthier lifestyles. Add to that the fact that the refrigerator has become the centrepiece of the most important room in our homes, the kitchen, and a leading character in the staging of our lifestyles, and you'll know





where we're going next: mean-looking, energy-efficient, environmentally friendly and food-savvy fridges featuring innovative, leading-edge technology.

How do you go about matching that brief-for-the-future?

For us, it's not as much a brief-for-the future as it is the current status of our proposition! Homa is OEM by vocation, and serving global leading brands gave us invaluable insight into both technology advances and consumer trends. Also, working in close collaboration with suppliers, technical partners and University research organisations, helped us gain a unique understanding of which technologies are significant and when they are mature enough to be most effectively used and become mainstream. It is the case of No-Frost. We haven't invented it, and it's been around for a while, but it's come a long way and is now ready for us to take it to the next level and systematically feature it across our entire range of products.

How do you do that, and how can you take No-frost to the next level?

Since our beginnings as OEM, which we still proudly are, we've also achieved true ODM status and are offering client brands our own take on the industry's state-of-the-art. No-Frost is substantially about having air constantly flowing around the cavity, removing excess humidity and preventing the formation of frost while at the same time ensuring even temperature levels throughout the appliance. This way, food lasts longer and in fresher conditions. Only, No-frost systems do use up energy. AI inverter technology, applied to the compressor, helps offset the relative increase in energy consumption and even improves the refrigerator's overall energy performance. The intelligent use of LED lighting also reduces energy consumption and elevates the product from a design standpoint. In the end, we can offer a product that saves energy, with high-end features, and this on a scale few other producers in the world can attain. As a matter of fact, we're offering exclusivity, but for all. With the

timely introduction of leading-edge technology that can be immediately scaled to any dimension, we are offering our clients a key competitive advantage. A claim we can sustain because in our industry, size does matter, and our being specialised in cooling and at the same time having such a large production footprint further boosts our relative scale, and edge, over generalist players, and offers our clients compelling and competitive products in a record go-to-market timeframe.

What other innovations are you introducing?

We tend to infuse the same sense of care that customers have toward their food into every aspect of development, and new features in our products reflect this state of mind. We like to describe our approach to design and engineering as “nature-inspired”, though every intuition is tried out and validated through testing and prototyping with external, specialised partners. So, just like no-frost is inspired by the air masses constantly moving around in

a natural context, we have introduced the new concept of “Multi Climate Zones”. Different levels of temperature and humidity to preserve other foods in conditions that are best adapted to them and as close as possible to their natural environment. Sometimes we draw on the idea of simple, traditional ways of keeping certain foods fresh and wholesome, like the beds of ice in market stalls, which keep fish and seafood cool without freezing it. We recreated this situation in our “reverse cool” converter box that can reach temperatures below 0°C. Flexibility and choice are also critical to a new customer experience, with larger boxes and drawers to accommodate larger shopping, more freedom to organise the internal spaces of the refrigerator, and even switch the basic function of individual compartments from refrigeration to refrigeration to freezing. New, intuitive and precise User Interface solutions are also being introduced and will enhance customer experience, which ultimately is the principal driver of the current trends in our industry.



We infuse the same sense of care that customers have toward their food into every aspect of development, and new features in our products.

Simon WU,
Vice President R&D and co-founder, Homa Appliances



FOOD DESIGN EXPERIENCE

The Master in Food Design and Innovation of Milan's Scuola Politecnica di Design is quite unique in promoting growth and innovation in the Food & Beverage industry through a systemic approach having Design as its strategic driver.

Italy is considered as an international point of reference in many fields, including design, and food. Given today's general hype around the aesthetics of food, its symbolism and its communicative power, the two have been fused together in a single concept, that of food design.

So it is no accident that Milan, the capital of design, was chosen as the seat of a new and distinctive international educational project aiming at stimulating innovation in the food industry under a holistic approach and according to design's typical methodology.

We are talking about the Master in Food Design and Innovation promoted by SPD, Scuola Politecnica di Design, in collaboration with IULM University. The latter has long been aspiring to creating a new generation of managers and designers capable of combining marketing and communication skills with design's sensitivity and project methodology in a field for which Italy is recognised for its absolute excellence: food.

"No design school has ever done anything like this: bringing together the entire food value-chain under a single strategic driver, design, to stimulate innovation in the agri-food industry" underlines Antonello Fusetti, founder of the Master and director of the Scuola Politecnica di Design. "Our school is unique".

The faculty is composed of managers, marketing and communication professionals, designers, researchers, chefs, entrepreneurs and food-and-wine journalists.

The Master was born in 2015. Again, not a coincidence: at the time, Milan was the international capital of food on the occasion of Expo2015, and it's not a coincidence either to find, among those who inspired the project, the founder of food design himself, SPD alumni Martí Guixè as a prestigious member of the Master's faculty (see his interview on pag. 46).

Another element making this course unique is the long established collaboration of the SPD with PepsiCo, the first multinational in the industry to



Antonello Fusetti, Director of the Scuola Politecnica di Design

The Master in Food Design and Innovation in a nutshell

11 MODULES:

- The Food and Agriculture System
- Food Science
- Wine and Food Culture
- Food Marketing & Communication
- Food Experience
- Food Design
- Food Design: Design Food and Objects
- Food Design: The Places of Food
- Food Design: Packaging
- Food Service Design
- Food Design and Tourism

COLLABORATIONS

Alce Nero, Bahlsen, Bauli, Cioccolati Italiani, Coop, Esselunga, Guzzini, Illy, Majani, NaturaSi, PepsiCo, Whirlpool.

“

We have great potential and we want to collaborate with companies worldwide, who must understand that design thinking is the way forward to grow and add value to what they do.

Antonello Fusetti,
Director of the Scuola Politecnica di Design





elevate design as the central element of its development strategy.

This collaboration translates into the opportunity for students of doing research work under the supervision of PepsiCo's design centre, headed by Mauro Porcini.

The school also has a Food Design department that acts, across the various disciplines, as a training centre on food research and design in the agri-food industry.

The curriculum is made up of 11 modules, all taught in English, that provide students with the know how and the skills to design new foods, develop new concepts for bars and restaurants, invent new distribution formats, create new tools and fruition rituals, experiment with packaging and communication, and conceive strategies for food design tourism as a way to enhance local communities' competitiveness.

"The whole world is interested in our Master" says SPD director Fusetti, "our students come from 20 different countries, and we are interested in

exporting our model abroad. We had started talks with Shanghai's East China Normal University, but the project was interrupted by the outbreak of the pandemic. We have great potential and we want to collaborate with companies worldwide. I'm also referring to home appliances and consumer electronics producers and retailers. In these fields, design thinking would help introduce a completely new and disruptive approach to the product and its in-store declination, which is the way forward to bring value and growth."

Born in Barcelona in 1964, Martí Guixè studied interior Design in Barcelona and Industrial Design at Milan's Scuola Politecnica di Design, where he is currently part of the faculty of the Master in Food Design & Innovation. In 1997 he starts exhibiting his works, revolving around the world of food and its presentation, through the concept of performance. He lives and works in Barcelona and Berlin; he likes to call himself an "ex-designer" and works for established companies such as Alessi, Camper, Estrella Damm, Danese, Droog Design, and Magis. His works have been shown in some of the world's most important museums, like New York's MoMA, Lausanne's MuDAC, Barcelona's MACBA and the Centre Pompidou in Paris.

Image courtesy:
Inga Knölke.



MARTÌ GUIXÈ, THE GURU OF FOOD DESIGN

The Catalan designer, or ex-designer as he likes to call himself, was the first to apply design principles to food and, to-date, is the most revolutionary proponent of this discipline.

You are considered the founder of food design. How did this extraordinary project come about?

I started working on food design in 1995 when I became fascinated with food and its rituals. I realised that nobody at the time saw food as an object, yet it was already being perceived as such. If food could be considered as an object, it could be treated as a design project. In 1997 I did my first exhibition on the food design theme at the H2O gallery in Barcelona.

48 The idea underlying my work in this field is the perception of food as a consumable object, and thus the possibility to engineer it as part of a design project and according to principles such as ergonomics, usability, functionality... all the complexity of such projects can be applied to the food object. If a chair needs a cushion because it's uncomfortable, that's due to a fault in design, a mistake in terms of ergonomics. Likewise, if you need cutlery and a plate to eat, you're dealing with something that's been badly designed.

A good edible object shouldn't need any cutlery nor plates, the issue of how to eat it should already have been solved and the solution built-in in the object itself.

If food is designed in an optimal way in terms of ergonomics, its enjoyment becomes less ritual. For instance it doesn't require sitting down at a table to be eaten.

Initially, the design community was rather skeptical, so I was adopted by the world of art and lifestyle. This is the reason I call myself an ex-designer: I'm not an artist, I'm really a designer but I don't work according to the traditional criteria of design.

You also define yourself as a design generalist.

Yes, since the beginnings of my career I have worked on several projects that weren't very specific, possibly because the starting point of my projects is more conceptual, and as a consequence theory can be translated through any kind of formal expression.

What is a food designer, according to Martí Guixè?

The most important for me is the design project, thus food is principally an object of experimentation. I always make a distinction between doing and thinking: the design project is pure theory, it's an exercise of the mind, while doing belongs to the craftsman and has nothing to do with the designer, so the chef has nothing to do with the food designer. Cooking is doing, designing is thinking. The food designer is someone who works with food without having any idea of cooking. I don't cook, I can't cook and I have no intention of learning how to do it. Today, 25 years on, I still haven't changed my mind. I'm ever more oriented towards the conceptuality of a project and less focussed on its formal contextualisation. The projects I work on are not conceived to be real but are more of an exercise to influence people, to make them think.



"Meta-territorial kitchen" project, 2003. Image courtesy: Inga Knölke.



Marti Guixè's 2017 project 'Digital Food' uses a feeding system to 3D print food.

Image courtesy:
Inga Knölke.

In the recent Casa Mondo Food essay, you explain your theory about the relationship between the home, food and its new means of fruition in the 21st Century, also in the light of the current pandemic.

Yes, the book features the drawings I made for the Casa Mondo digital exhibition held in June 2020 at the MAXXI museum in Milan. They reflect the changes in the way we cook and eat at home.

An interesting concept that emerged was the substitution of the figure of

the mother as the endower of gastronomic knowledge across the generations by that of the internet, through videos and tutorials. This new non-mother cook, which I called SIC SIRICHEF de Cuisine, is cosmopolitan, chaotic, without any rules and possesses all the information in this world. The consequence is that we will be witnessing a progressive loss of the sense of food geography. The local and regional culinary traditions will get mixed up inexorably, giving birth to a new poli-cosmopolitan cuisine.

“

The design project is pure theory, it's a project of the mind. Doing belongs to the craftsman and has nothing to do with the designer, so the chef has nothing to do with the food designer.

Marti Guixè

I-Cakes, 2001.
The cake has a pie-diagram shape showing the relative percentages of its ingredients on the outer layer, while the inside is conventional.

Image courtesy:
Inga Knölke.



On the occasion of the recent Salone Internazionale del Mobile, Marti Guixè and Milan-based chef Marco Ambrosino from 28 Posti, launched the Social Warming project. This dinner-manifesto delivered a strong message about the concrete possibility to change consumer habits. Its aim was to prove that, through a model of sustainable catering, it was possible to fight food waste.

Image courtesy:
Claudia Zalla for 28 Posti.

You've also focussed on the lifestyle changes occurring inside our homes.

Exactly, and I would sum it up as follows: similarly to what happened in 2001, after the terrorist attacks, with the pandemic, we invited the world inside our homes through the social media. We've given it hospitality through the food published on Instagram and the online sharing of our recipes.

Consequently, the home, as the object of personal representation, was replaced by food, by what we eat and the way we cook it. Today, our social image is built through food and our own body becomes the formal element of the house. Food has become a stage around which people gather to shoot videos and photos of the dishes they prepare.

Thinking about industrial products, do you think refrigerators are missing anything in terms of food preservation?

In 2003 I worked on a project, meta-territorial kitchen", in which I called the refrigerator "temperature-control", because its function is not to produce cold but to manage and control

temperature and humidity according to the type of foods it contains. We need solutions that are more focussed on a better food preservation. Right now it's the mushroom season: I'd love a fridge I could grow my own mushrooms in.

Have you designed one recently?

Yes, 5 or 6 years ago I designed a fridge that could produce a one-and-a-half metre long transparent stalactite, but haven't been able to have it built yet.

→ www.guixe.com
→ www.food-designing.com

FOOD WASTE: A HUGE PARADOX

A third of global food production is lost in the production chain or wasted in the chain of consumption, with severe consequences in the social, environmental and economic spheres. Reducing the volumes of this shocking waste is one of the objectives of the 2030 Agenda for Sustainable Development.

It is estimated that global food production is sufficient to feed 10 billion people, more than 2 billion more than the current world population. In contrast, the FAO annual report – The State of Food Security and Nutrition in the World – reveals that in 2020 between 720 and 811 million people in the world went hungry, 161 million more than in 2019. In the same period almost 2.37 billion individuals did not have access to adequate nutrition, 320 million more than the previous year.



The annual global average of 74 kg per capita of wasted food is remarkably similar in high, medium-high and medium-low income countries.

This problem particularly affects children under 5: hunger or malnutrition cause stunted growth (149.2 million), wasting (45.4 million) or overweight (38.9 million), particularly in Africa and Asia. Obesity in adults has also registered an increase on a global level, with no sign of a reverse trend. Among the leading causes of the nutritional problems that are the scourge of the world's population, food waste is especially striking due to the serious nature of its implicit paradox.

Food loss refers to the decrease in the amount of edible food along the supply chain of food for human consumption. It occurs in the production, post-harvest and processing stages of the supply chain.

Food waste refers to losses occurring at the end of the supply chain during retail sale and final consumption, with reference to the behaviour of retailers and consumers. The waste or loss of “food” is measured only with regard to products intended for human consumption, excluding feed and inedible parts of products.

www.fao.org/3/i2697e/i2697e.pdf



Of the 931 million tons of food waste, almost 570 are produced in the home.

www.unep.org/resources/report/unep-food-waste-index-report-2021

Food waste 2021
(kg/head/year)



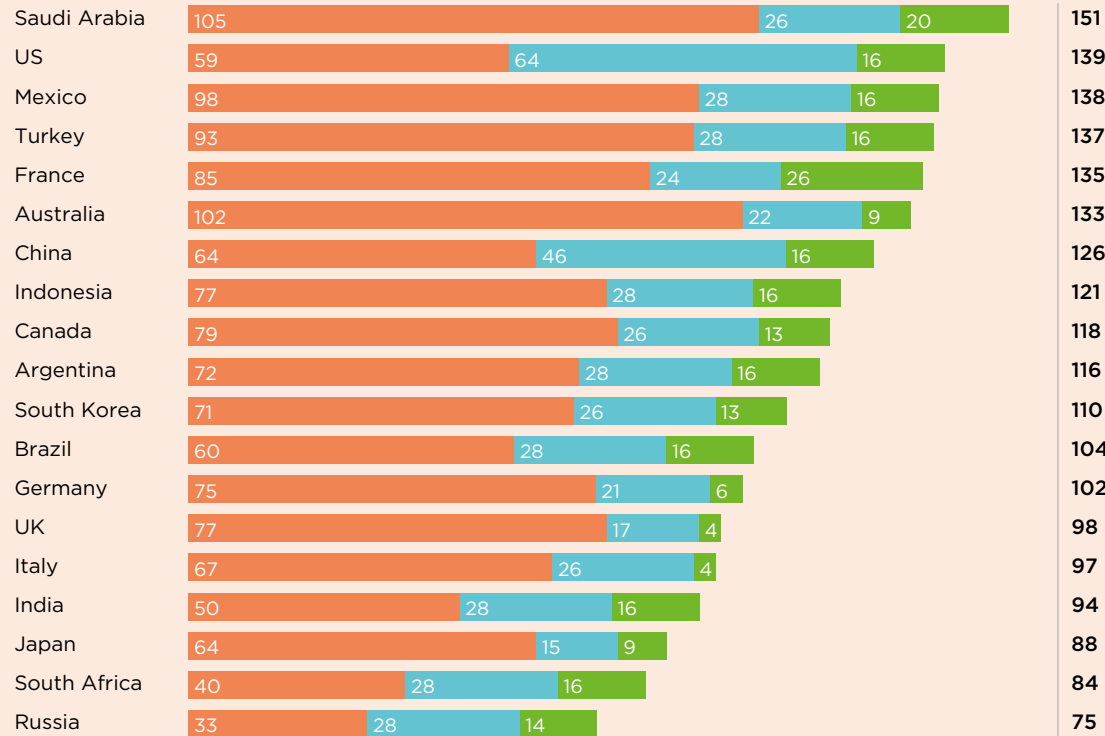
Household



Food service



Retail



56



Although the data does not allow for a solid comparison over time, food waste by consumers (families and caterers) appears to be more than double the previous estimate by FAO in 2011.

In its report - Food Waste index Report 2021 - the FAO estimated that a third of the global food volume produced is lost in the production chain, or wasted in the post production network. Of the approximately 931 million tons of food waste generated in 2019, 61% is

produced in the family setting, 25% in catering, while 13% derives from the retail sector. In global terms this waste represents 17% of world food production, with responsibility lying 11% with families, 5% with the catering sector, and 2% with retail.

Compared with previous evaluations, new evidence has emerged:

- The production of domestic food waste - average per family - is largely similar and significant in high, medium-high and medium-low income countries, in contrast to previous statements, which concentrated on consumer food waste in developed countries, and the food production, stock and transport losses in developing countries;
- The food waste generated by families and caterers appears to be more than double previous FAO estimates.

57

Food waste is one of the 169 targets of the 17 Sustainable Development Goals (SDGs) declared in 2015 by the United Nations. The topic is included in Objective 12: “Responsible consumption and production”, and specifically in

target 12.3: “By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest”

www.fao.org/sdg-progress-report/2021/en/.



The FAO has calculated the value of wasted food as 2.6 trillion US dollars a year (data from 2014, the most recent in which high quality data is available), a sum approximately equivalent to the annual GDP of the United Kingdom

www.barillacfn.com/media/pdf/Non-sprechiamo-monografia2019.pdf

The reduction of food waste has a positive effect on people and the planet. It implicitly improves food security, has a positive impact on climate change, and contributes to reducing the exploitation

of soil and water, as well as the stress on waste disposal systems. The Objective of Sustainable Development 12.3 is to halve food waste by 2030 in all phases of the supply chain.

The close relationship of food with the environment, agriculture and social issues places food waste in the targets of 7 of the 17 Sustainable Development Goals (SDGs), as follows:



sdgs.un.org/goals

THE MULTIPLE IMPACTS OF FOOD WASTE ON A GLOBAL LEVEL

Food waste causes greenhouse gas emissions and uses non-renewable resources. Around the world, the causes are shared across borders.

The “FAO food wastage footprint impacts on natural resources” estimates that the global volume of food waste amounts to around 1.6 Gtons (1 Gton = a million tons), “of equivalent primary products”, while the edible part is 1.3 Gtons, out of an agricultural production of 6Gtons. According to this estimate the carbon footprint of food produced and not eaten is 3.3 Gtons of CO₂ equivalent; if this was a country it would be third on the podium as a source of gas emissions, after the United States and China.

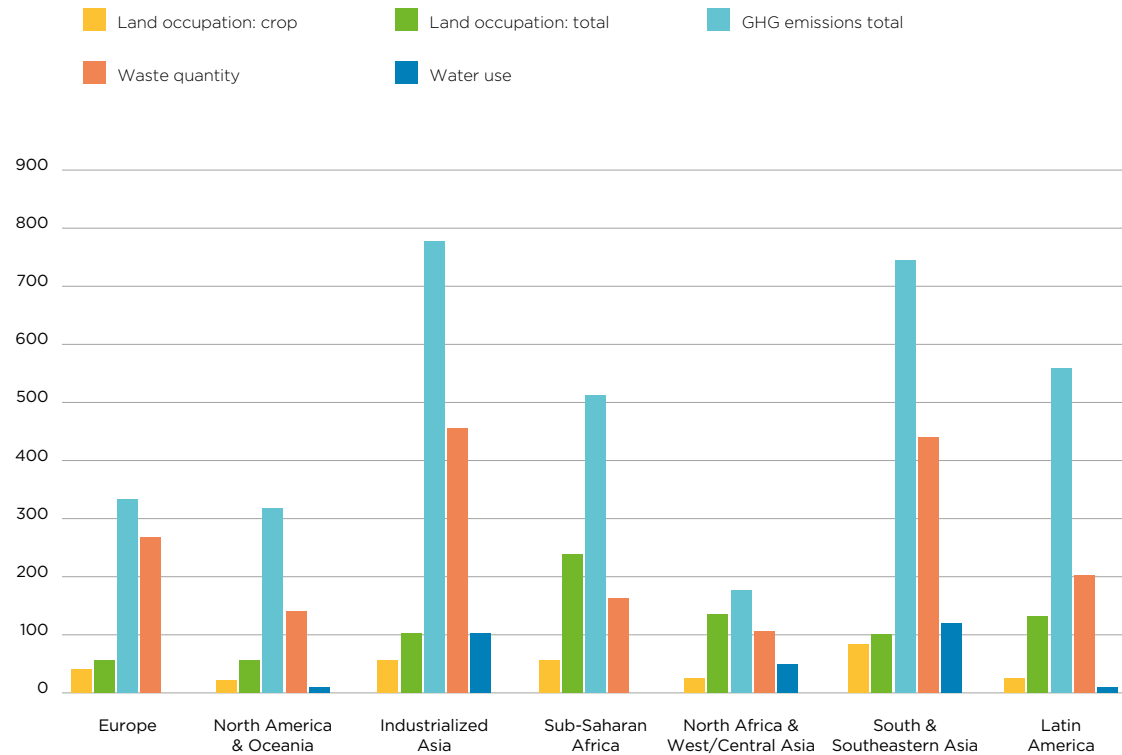
Things are no better on the ‘blue’ podium. Globally, the water footprint – the consumption of surface and underground water resources – linked to food waste is around 250km³, a volume equivalent to three Lake Genevas. Regarding the land, the volume of food wasted in various ways needlessly takes up 1.4 billion hectares of soil, or almost 30% of the global agricultural area.

Food waste also negatively affects biodiversity, causing damage that

is difficult to quantify. Certainly intensive farming, monocultures and the increasing agricultural exploitation of the soil are impacting natural and uncontaminated areas, with negative consequences for ecosystems. For all these reasons, food waste is associated with climate change.

The economic impact is no less shocking. The Barilla Foundation (Non sprechiamo! Let’s stop waste!), reports: food waste equals 2,600 billion US dollars a year, calculated thus: 1,000 billion for the value of lost products; the environmental costs of greenhouse gas emissions, loss of soil, water and biodiversity are valued at 700 billion; while the social costs linked to lack of food, such as damage to health and risk of conflict are estimated to be 900 billion. Last but not least, looking ahead, reducing food waste would decrease the pressure on agri-food production in anticipation of the increased demand which, it is estimated, will be needed to feed the global population in 2050.

Environmental impact of food waste in the world: greenhouse gas emissions, soil waste (compared to the total employed); water waste.



If food loss and waste were a country, it would be the third biggest source of greenhouse gas emissions.

www.unep.org/resources/report/unep-food-waste-index-report-2021

Blue water footprint:

is an indicator of the consumption of fresh water. The blue water footprint of an individual, a community or a company is the total volume of fresh water consumed to produce goods and services, measured in volume of water (evaporated or incorporated into a product) and polluted per unit of time.

Carbon footprint:

expresses in equivalent CO₂ the total emissions of greenhouse effect gases associated directly or indirectly with a product, organisation or service. In addition to carbon dioxide (CO₂), it includes: methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF₆), and perfluorocarbons (PFCs).

Italian Ministry of Ecological Transition

THE TREND OF FOOD WASTE IN THE HOME

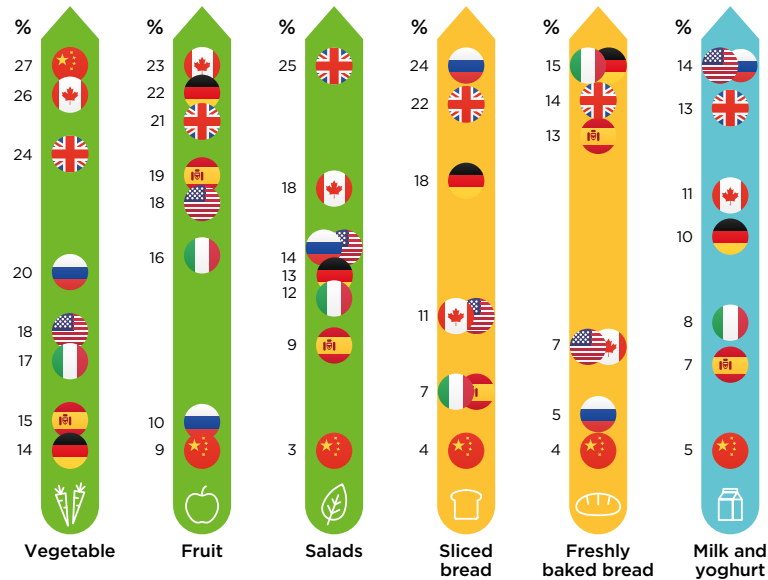
The first global survey of domestic waste is the Waste Watcher International Observatory on Food & Sustainability study, under the direction of Andrea Segrè Professor of Agricultural Policy, International University of Bologna, Italy.

The International Cross Country Waste Watcher report sketches a picture of current global food habits. [OPEN LINK](#)

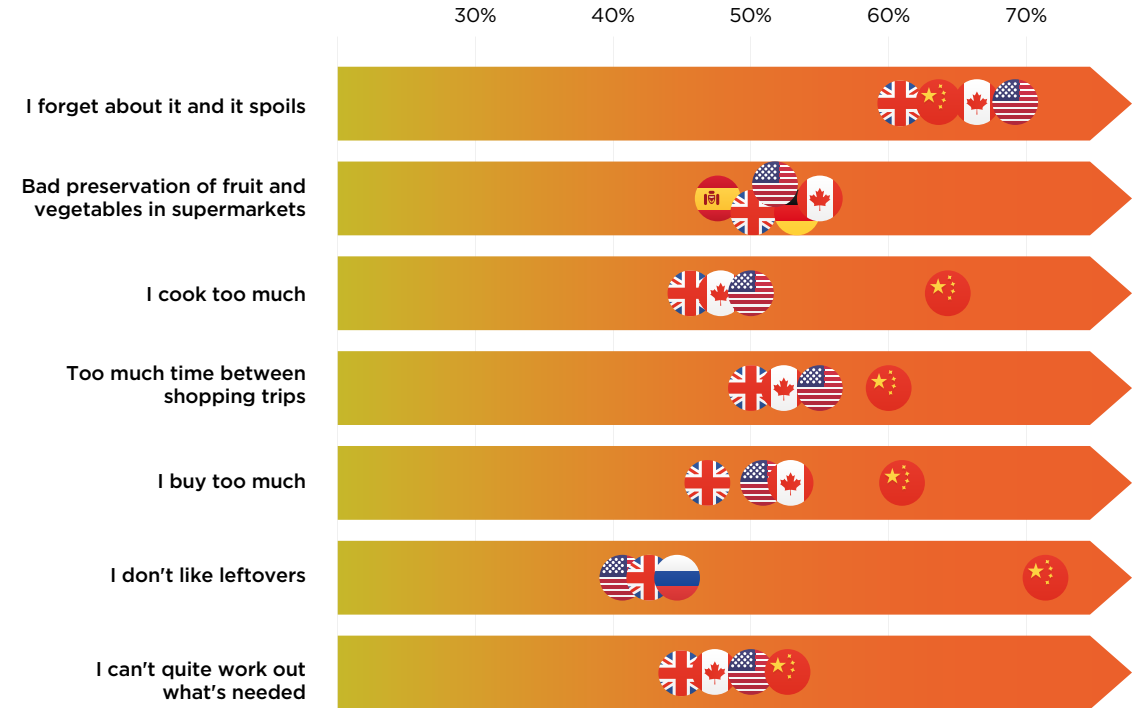
The survey took place in eight countries on a statistical sample of 8,000 people with 1,000 interviews per country.

What do we waste most?

All around the world, fresh and perishable foods – fruit, vegetables, dairy – are those which are most frequently wasted. Fruit and vegetables most specifically, with a weekly percentage of 42.6 grams of fruit per person in the USA, to 24.5 per person in Russia, to 24.5 per person in Russia. Another 'big waste' is fresh bread: the USA is ahead again, with 38.3 grams, followed by the English with 33.8 grams, and Italy with 22.3 grams a week.



www.sprecozero.it/wp-content/uploads/2021/10/Waste-Watcher-Cross-Country-Finale-ITA.pptx-1.pdf



www.sprecozero.it/wp-content/uploads/2021/10/Waste-Watcher-Cross-Country-Finale-ITA.pptx-1.pdf

Why do we waste?

In families around the world, waste occurs for similar reasons: on average, 44% let food go out of date; 40% buy more than they need; and around 33% wrongly cook more than required. Of those interviewed, it is mainly the Chinese who let food go out of date (64%), buy too much food (61%), or cook too much (64%), while 72%

say they do not like to use leftovers. Forgetting about the food they have bought is another bad habit that affects people in all the countries surveyed: one in two of the Italians, Spanish and Germans interviewed confessed to this, while the Canadians and British are even worse, respectively 'guilty' in 65% and 61% of cases.

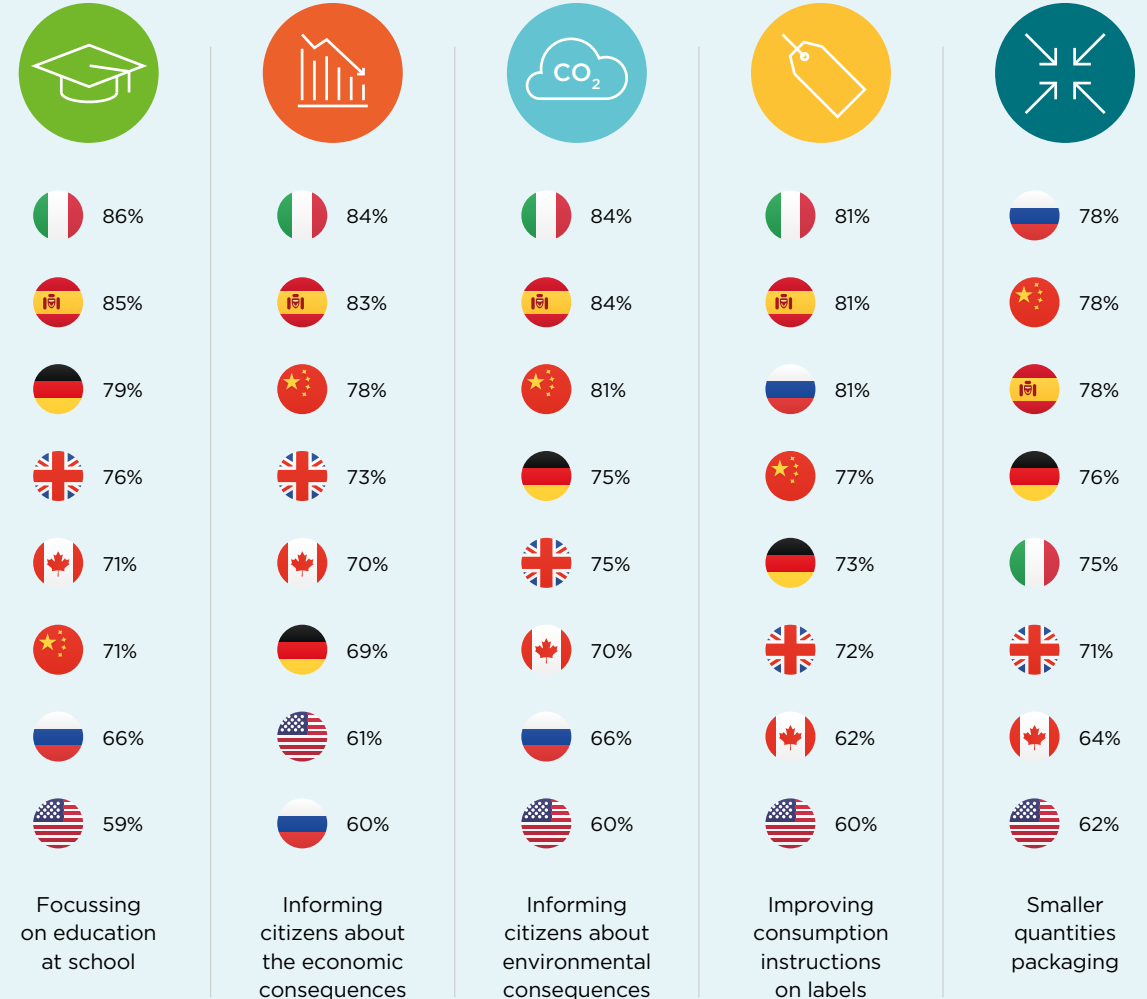
FROM WASTE TO OPPORTUNITY

66

Improving awareness and the right behaviour are weapons to combat domestic food waste. It is up to research and industry to give a second life to waste materials. And governments to educate their citizens in correct behaviour.

The fight against food waste is overall well represented by the SDG 12.3 commitment of the 2030 Agenda which has been a United Nations initiative since

2015. One of the main focuses regarding the high volumes of wasted products is consumers' behaviour.



67

HOW TO REDUCE WASTE: WHAT THE PUBLIC WANT

In houses around the world food is wasted in similar ways. But the solutions for combating this paradoxical food loss at the domestic level are also cross-border and shared, at least according to the statements of those interviewed by the Cross Country 2021 survey carried out by Waste Watcher International Observatory. More food education in schools and to the public is the most shared proposal by the people of eight countries questioned, and held to be useful in developing greater knowledge about food waste and to incentivise virtuous behaviour to reduce this phenomenon at the domestic level. Holding this opinion are 86 in 100 people in Italy and Russia, 85 in Spain and 8 out of 10 in Germany and the United Kingdom. There is a certain consensus also around initiatives to raise awareness on climate and economic

damage caused by waste, and proposals such as creating information labels on the correct use of products. After this, in the opinion of the interviewees, smaller packages are helpful, while the idea of an anti-waste tax linked to the squandering of food is less popular.



Let us all shop carefully, cook creatively and make wasting food anywhere socially unacceptable while we strive to provide healthy, sustainable diets to all.

Inger Andersen - Executive Director -
United Nations Environment Programme, March 2021
www.unep.org/resources/report/unepl-food-waste-index-report-2021

A NEW LIFE FOR WASTE

The recovery of industrial waste offers great development opportunities for companies and savings for non-renewable resources. For some time, the agri-food processing and production chain has been studying systems to reuse often large quantities of processing waste, which finds its way back into the production process in the form of components for animal feed, fragrances for cosmetics, edible packaging, compostable plastics. Or textile fabrics.

Such is the case of Orange Fibre, an Italian company founded in 2014 in Catania, Sicily, an area of excellence in the production of citrus fruit. "In Italy every year more than 700,000 tons of citrus fruit by-products are produced" says Enrica Arena, co-founder of Orange Fiber. "We decided to transform what was a problem for many processing industries into an opportunity. In collaboration with the Milan Politecnico, Orange Fiber developed an innovative



and patented process for producing sustainable textile fibres, using citrus processing waste, amounting to 60% of the original weight of the processed fruit. The result is a silky, resistant and sustainable fibre, used more and more in the world of conscious fashion.

→ www.orangefiber.it

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