wbcsd

FUTURE OF HOME

A Lighthouse for future living, today

Context + people and market insights + emerging innovations

FOREWORD: CREATING THE FUTURE WE WANT

If we are to create a world in which 9 billion people live well within planetary boundaries, then we need to understand why we live the way we do today. We must understand the world as it is, if we are to create a more sustainable future.

The cliché is true: we live in a fast-changing world. Globally, people are both choosing, and having, to adapt their lifestyles accordingly.

While no-one wants to live unsustainably, and many would like to live more sustainably, living a sustainable lifestyle isn't a priority for most people around the world. In reality, it isn't even a possibility – neither the infrastructure nor the goods and services that a sustainable lifestyle requires are available or affordable.

The normal way of approaching the sustainable lifestyles challenge is to think about it in terms of reducing material consumption. This isn't attractive for business. It's not that interesting for policy-makers either, who rely on GDP growth and tax receipts, and it's not even that great for individuals, most of whom like to spend their money, or would like to have more money to spend. That is the reality of the world today. People don't tend to aspire to less.

Nonetheless, we believe that we can work within this reality – that there are huge opportunities available, for business all over the world and for sustainable development, in designing solutions for the world as it is.

This "Future of" series from WBCSD aims to provide a perspective that helps to uncover these opportunities. We have done this by looking at the way people need and want to live around the world today, before imagining how business can help transform lifestyles for the better. Finally, we asked if these "better" lifestyles can also be more sustainable?

Our aim is to provide companies with a more positive view of what lifestyles could be like in the future, encouraging new ideas about how business can offer people "better", rather than "more". A surplus of good, actionable ideas is essential to all progress – without them, we can expect nothing better than more of the same.

"WBCSD is committed to creating a sustainable world – one where 9 billion people can live well, within planetary boundaries. This won't be achieved through technology alone – it is going to involve changing the way we live. And that's a good thing – human history is an endless journey of change for the better. Forward-looking companies are exploring how we can make sustainable living both possible and desirable, creating solutions in line with people's aspirations. With these companies, we're seeking to understand how we can leverage what is already technologically possible to make human life better, rather than bigger. We believe that sketching out a vision of a different future is the first step to creating a different path for all to follow."

Peter Bakker
President and CEO
WBCSD

CONTENTS

This Guide has been produced in collaboration with PwC USA.
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HOW TO READ THIS DOCUMENT

There is a daunting amount of material in this report and you may not have the time to read it all in detail! We've tried to make it easy for you to get the most of out of the document, digging into it in different ways depending on the amount of time you have available.

Here's a quick guide:

5 minutes:

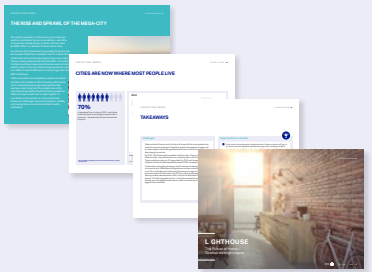
If you only have 5 minutes, then we recommend that you just read the introduction. It will give you an overview of the Sustainable Lifestyles challenge, why we think that this Lighthouse approach offers a valuable opportunity to business, all the different areas that we have looked into as part of our research, the overall vision of future homes (the Lighthouse) that we have developed, and how to interpret that vision.

See pages: 4-13

15 minutes:

If you have a bit more time, then we recommend that you read the introduction (as described above) and then go on to read the section introductions, the titles on each page (which form a coherent narrative on their own), the key takeaways at the end of each section, and the Lighthouse section at the end of the document.

See section pages: 15 / 23 / 30 / 36 / 42 / 53 /59 / 66 /73
See takeaway pages: 34 / 57 / 80



1 hour:

You really can read this document from cover to cover in 1 hour! Enjoy!

See pages: 1- 92

INTRODUCTION

Essential background reading: Understanding the power of this research and Lighthouse

THE SUSTAINABLE LIFESTYLES CHALLENGE

Living well (beyond our means)

As a global population, we place greater demands on the earth's systems than it can supply, straining both the environment and our social structures. We're living well, but well beyond our means.

Much of this demand is driven by the lifestyles, activities and consumption of the global middle class. As incomes rise, so do impacts because income provides access to similar things – a bigger home, a richer diet, personal transport and more disposable income. These also happen to be the things that people, all around the world, aspire to.

Currently, some 140 million people are entering the middle class each year. They are all aspiring to, and expect, the lifestyles that the middle class currently enjoys. This is great for business in the short term, but we know that it is not sustainable, environmentally or socially.

People have a right to aspire to a higher quality of life. The question is therefore how we can offer this quality of life to people but with a fraction of the impacts, in an aspirational way. How do we make Sustainable Lifestyles both possible, and desirable?

The problem with "Sustainable Lifestyles"

We haven't done a very good job of offering people appealing sustainable lifestyles to date. One reason is that sustainable lifestyles are complicated. Consumption impacts don't occur in isolation. They occur as people live their lives: eating a meal, visiting relatives, doing the shopping, taking a shower, reading a book. As a result, no single company can create a sustainable lifestyle on its own. Systemic solutions are required; ones that extend up and down value chains and that apply across our lifestyles.

But the other reason is that we have tended to forget that people actually have to live with the solutions we propose. Traditional solution design involves identifying the impacts and suggesting a fix to reduce them: live in a smaller home; don't drive; stop eating meat. It is very hard to persuade someone that they should aspire to less – that they shouldn't want "the Good Life".

What if we instead think about how we can offer lifestyles that people need and desire, and then work out how to make them better (and sustainable)? Wouldn't that make it easier to encourage change, with our customers and within our companies?

WBCSD SUSTAINABLE LIFESTYLES

Making sustainable lifestyles possible, and desirable

WBCSD has a long track record of working with companies to help them address sustainability challenges in ways that make sense for business. When it comes to sustainable lifestyles, business focus cannot be on people not spending their money. Business must focus on how to maintain a healthy economy and help people spend their money in the best way. Business must therefore ask how it can make sustainable lifestyles both possible (innovation) and desirable (marketing).

The importance of aspirations

We have known for a long time that "more" doesn't lead to happiness. In fact, there are significant financial and social costs to the lifestyles that we have been trying to lead. Around the world, we see people beginning to question these costs – wanting to know more about where their food comes from, questioning the health implications of their diet, downsizing rather than upsizing their homes, choosing not to use their cars. They are redefining what it means to live well – away from Good Life 1.0 notions of bigger, faster, more, and towards a new Good Life 2.0, which is smarter, cleaner, healthier.

WBCSD explored the emergence of The Good Life 2.0, publishing the findings in its Good Life 2.0 Playbook. It presents the aspirations appearing in society that celebrate a world in which people aspire to lifestyles that are better rather than bigger, but without trade-offs or settling for less.

The Playbook inspires companies to explore how they can make the Good Life 2.0 desirable, but they also want guidance on how to make The Good Life 2.0 possible. **At the moment, companies aren't clear on what the Good Life 2.0 should look like in practice – so how can we expect them to create it?**

WHY THIS LIGHTHOUSE WORK IS NEEDED

We believe that we need a shared vision of what it means to live well – a more positive view of what lifestyles could be like in the future. That's why we have created this human-centric lighthouse, a simple, shared, high-level vision that inspires and guides us to uncover new opportunities in pursuit of aspirational (sustainable) lifestyles.

This "Future of Home" research provides companies with a snapshot of how their customers are living today in order to create a shared vision of how people would like to live well in the future.

By understanding the world as it is today, we can explore what people need and expect, and offer guidance to companies on how to provide this to them in a sustainable way. We hope that the research, together with the Lighthouse, will help to reveal the infrastructure, products, services and business models that need to be made available and accessible if companies are going to shape and create this new Good Life 2.0.

A LIGHTHOUSE

The best imaginable future of home that leads to a happier, healthier (& more sustainable) lifestyle.

An inspiring people-centric vision of a (sustainable) lifestyle that:

1. highlights people's needs and wants from their lifestyles (today, tomorrow, in 5 years, in 15 years), and
2. identifies spaces in which innovation needs to occur to be able to deliver this vision.

Use this research and Future of Home Lighthouse as a foundation for conversations with colleagues in R&D, Innovation, Insights, Marketing, Brand Strategy, and explore:

- a shared (customer-centric) positive vision of the future that your company can play a role in creating
- the areas where your company can begin adding value towards this vision today
- future potential innovation opportunity areas in support of this vision
- evidence of where your company will require support for its innovations to scale and where you must therefore collaborate
- how you can demonstrate to all of your colleagues how your company can meaningfully and profitably support pathways towards the Good Life 2.0.

OUR APPROACH TO THE RESEARCH

How we uncovered our vision, and where it applies

We need to present an updated aspirational global lifestyle.

To get to a shared vision of sustainable lifestyles, we knew we needed a shared understanding of today's realities and trends; a shared sense of what people increasingly want and how those desires are showing up in the marketplace; and a preview of the innovations that are emerging in order to further shape and deliver on them. From there, we can explore how to offer people what they need, want and expect, but in a more sustainable way.

The research is intended to be global, with a focus on the emerging (urban) middle class – after all, it is these higher income lifestyles that drive aspirations globally. Where possible, we sought out data for countries with the largest growing middle class* and on track to be most populous by 2050. Our research includes, but is not limited to India, China, U.S., Indonesia, Brazil and Mexico – and, as is unavoidable today, much of the focus is on millennials, given their cultural influence and runway for behavior change.

Two realities skewed our research towards a U.S. perspective: First, we recognize that Western aspirations and practices, which the U.S. projects further than any other place, tend to be adopted elsewhere. Second, reliable public data, on trends related to food, home and mobility, is not widely available, but there is a good selection of quantitative research focused on the U.S.

The research provides a snapshot of how the middle class are living today, all around the world, and a shared vision of the types of inspirational (and sustainable) lifestyles that they are aspiring to.

This insight has been used to create the "Future of Home" Lighthouse – a vision of the role of our homes within lifestyles that are aspirational, inspirational and just so happen to be more sustainable. It is supposed to be timely and yet timeless, rather than revelatory or exhaustive. It's there to help you reach your own "a-ha" moments as you explore the research.

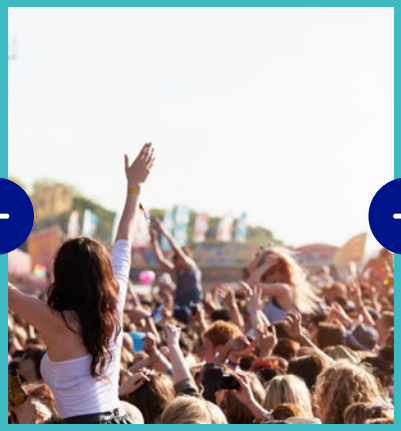
*** measures of what constitutes middle class vary significantly by country**

OUR RESEARCH & LIGHTHOUSE CREATION PROCESS

Understanding
the context for the future

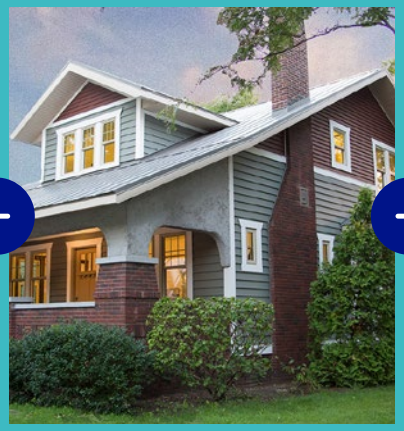
What are the macro trends, realities & shifts that serve as the backdrop for the future of our homes?

Uncovering
people and market insights



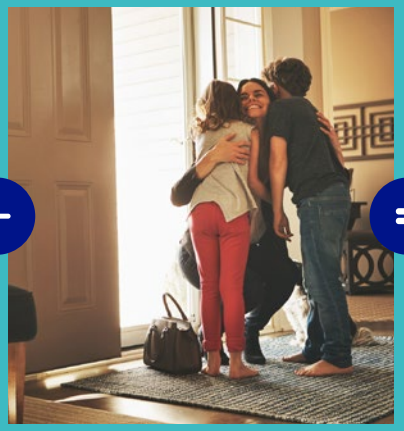
How are people's preferences changing, and how are these changes showing up in the marketplace?

Identifying
emerging innovations



What are the emerging innovations that have the potential to change how we live, for the better?

Exploring
elements of the Good Life



What do people need their home to do or be in order to live well? What do people want to feel?

Revealing
the home lighthouse

What is the best imaginable future of home that leads to a happier, healthier (& more sustainable) lifestyle?

WHAT DID WE EXPLORE TO INFORM OUR HOME LIGHTHOUSE?

Our discovery process yielded insights on the following trends and topics:

CONTEXT AND TRENDS

Summary of macro trends, shifts and realities that will impact the future of home

- Population growth and the rise of the middle class
- Urbanization
- The rise of megacity-regions and their immense economic power
- Urban sprawl & multi-city clusters
- New urbanism
- Family structures
- Single person and multi-generational homes
- Changing housing stock
- Size of homes
- Deferred home ownership
- Affordability of accommodation
- Impact of homes on our health
- Geographical environmental risks
- Impact of our homes on the environment

PEOPLE AND MARKET INSIGHTS

Data-backed insights about people's changing preferences, and how they're showing up in the marketplace

- Decluttering and minimalism
- Balance, "Hygge" and "Lagom"
- Health & well-being at home
- The need for peace & quiet
- Sleep as a status symbol
- Tiny houses, micro & nano apartments
- Multifunctional furniture
- Versatile spaces
- Co-living
- Asset-sharing
- Public spaces and quality of life
- The city as a living room
- Green homes and building practices
- Energy efficient devices
- Smart and voice-activated devices
- EVs, EV charging, and energy management

EMERGING INNOVATIONS

The technologies, business models and other disruptors that have the potential to change how we live, for the better, and opportunities for businesses to act on them today

- Nature in the home for air quality and well-being
- Technology solutions for air quality
- Technology solutions for health monitoring
- Light, noise and scent solutions for stress management
- Building well-being into buildings
- Designing well-being into communities
- Connected homes
- Robotic furniture
- Robotic home help
- Micro-grids, community energy, and blockchain
- 3D printing of homes
- Green building solutions
- Grey water technologies
- Home agriculture
- Home composting
- Policy levers and incentives

A LIGHTHOUSE FOR THE FUTURE OF HOME

LIGHTHOUSE VISION
The Meaning of (URBAN) Home

Home AS Springboard

a safe haven from which to tap into the promise of urban life

WHAT THIS MEANS
For a Person's Life

What This Means, For a Person's Life

Protect against the urban environment	**Care** for body, mind, spirit	**Recharge*** the urban ecosystem *give and take in balance	**Cultivate** one's self and one's memories with family & friends

WHAT THIS MEANS
Practically

What This Means, Practically

Whether it's a micro apartment in the urban core or a multi-generational family home just outside the city...
Home is a safe haven for healthy recovery and recharge; it is also place to nurture, grow, play, learn, love, celebrate and create lasting memories.
It is a transformable space, connected 24/7 to the endless possibilities of urban life. The home extends beyond a physical place of residence.
It exists within the urban ecosystem in super-smart, connected networks of clean energy, waste repurposing, local food, sanitation and transport.
Our homes allow us to live not just smarter, but wiser – in relationship with ourselves, others, our environments and our beloved communities.

INNOVATION SPACES

Backstage				Frontstage						
Urban planning that solves for density & offers the space and services that people need	**Building materials** that add to the working of the urban environment	**Cooling and heating** systems for home	**Protection** from noise overload, indoor air & water pollution	Design of **resource positive home infrastructure** (energy, water, waste)	Space-defying **multifunctional**, versatile design that adapts as you grow and evolve	**Health** monitoring and self-care at home	Body/ mind/spirit **relaxation, rest, refresh and recharge**	Immersion in **nature**	Frictionless replenishment and **shopping** experience	Connection to social ecosystem for **sharing and creating urban life**

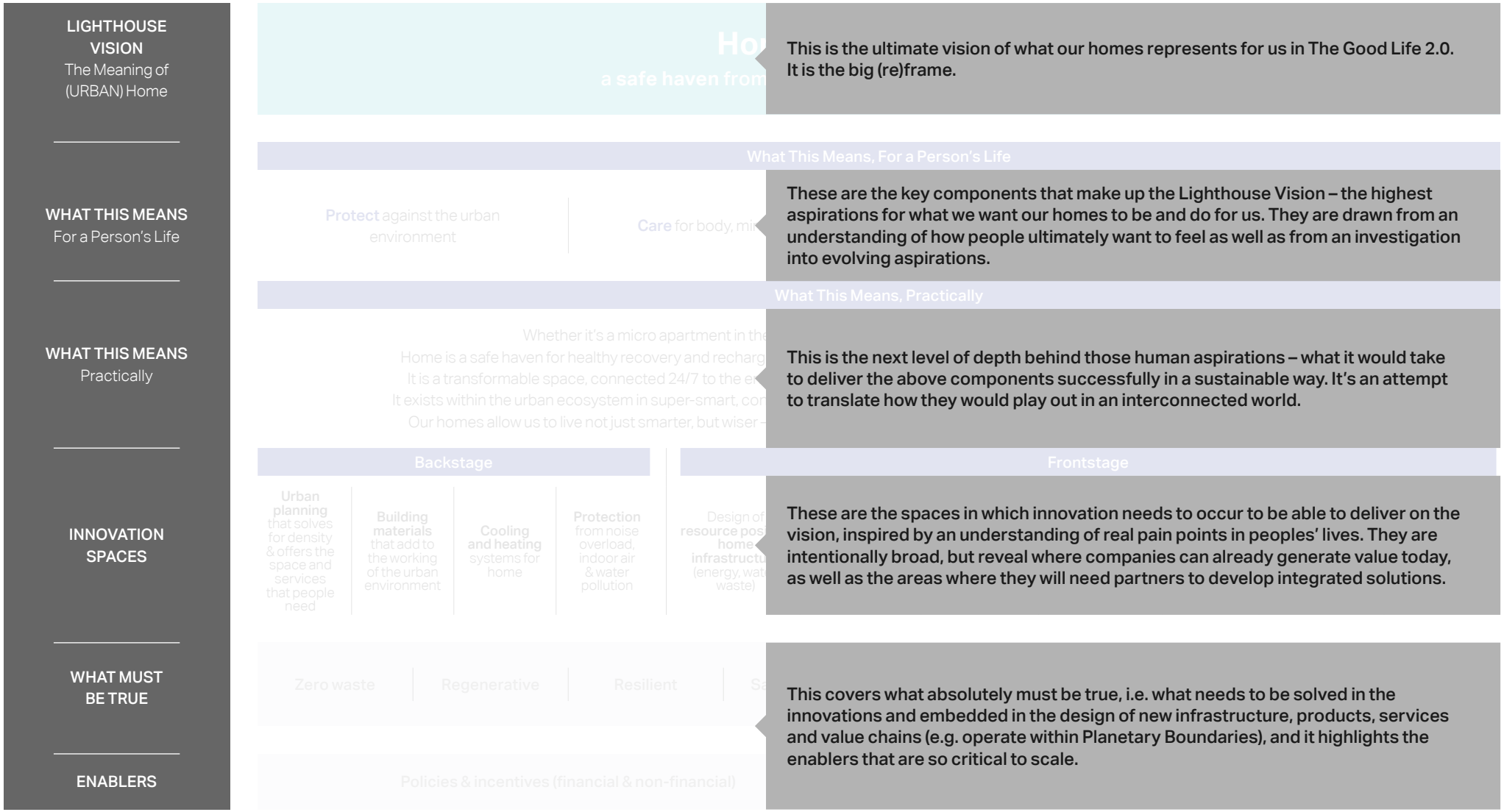
WHAT MUST BE TRUE

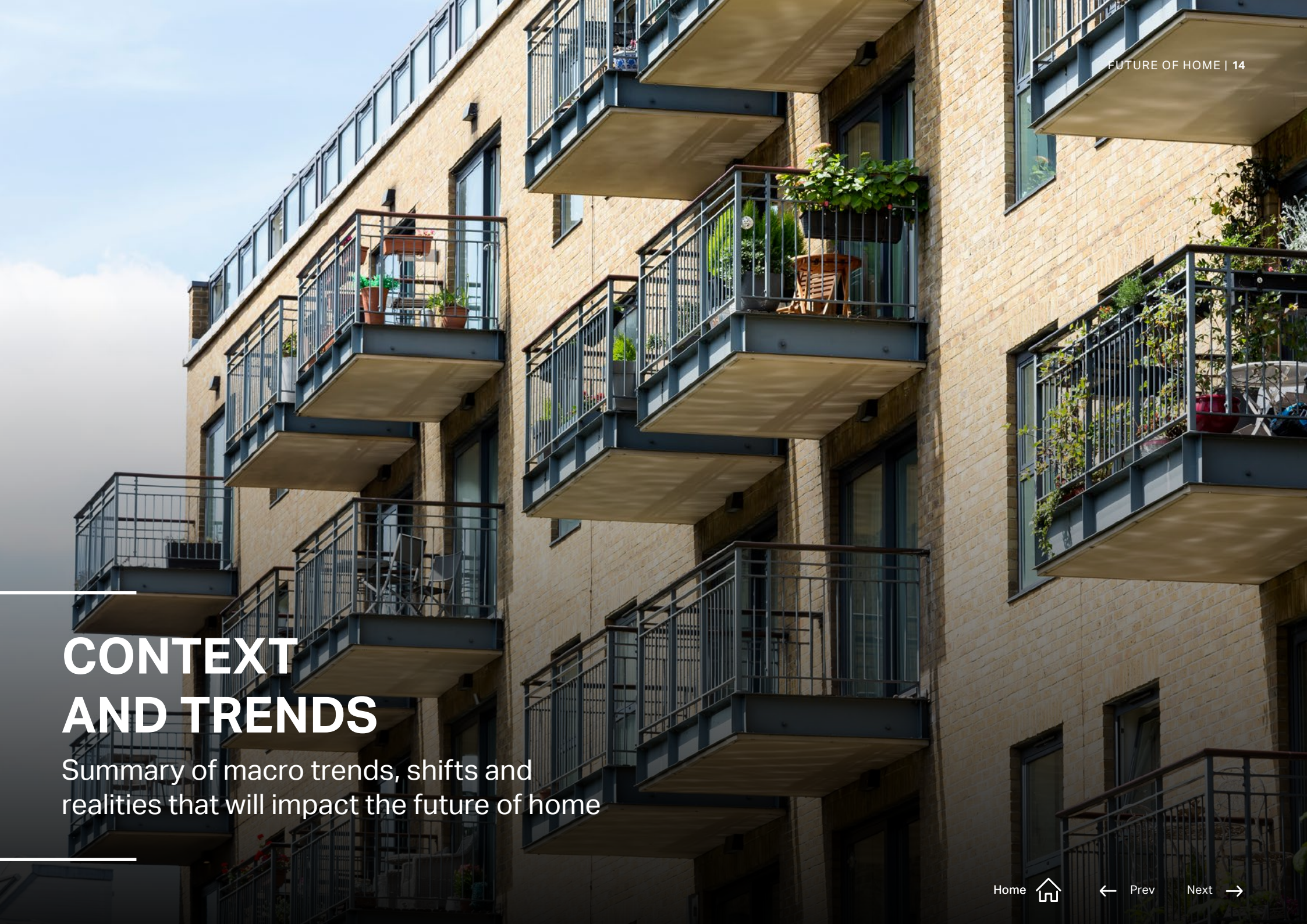
Zero waste | Regenerative | Resilient | Safe & secure | Within planetary boundaries | Inclusive & equitable | Shared | Fair labor

ENABLERS

Policies & incentives (financial & non-financial) | Promoting new aspirational behaviors

DECODING THE LIGHTHOUSE





CONTEXT AND TRENDS

Summary of macro trends, shifts and realities that will impact the future of home

THE RISE AND SPRAWL OF THE MEGA-CITY

The world's population continues to grow, in size and wealth, and to urbanize. By some calculations, over 50% of people are already living on middle class incomes. By 2030, 70% of us will have flocked to cities.

As a result, cities themselves are growing. Not just in size, but in power. Delhi has a population over four times that of Denmark and certain mega regions have economies that are nearly as big as their national GDPs – for instance, the Kanto and Kinki regional prefectural economic blocks (which contain Tokyo and Osaka megaregions) account for over 50% of Japan's GDP, and are nearly bigger than the GDP of Germany.

Cities everywhere are sprawling as people are drawn into their orbit. A lack of affordable housing within urban cores means suburban areas are growing globally, with average urban footprints (the physical size of the city) expanding significantly faster than populations. Cities and regions will need to work together to coordinate and cooperate across jurisdictional borders on challenges such as housing and mobility, and making these conurbations healthy and human.

THE WORLD'S POPULATION & MIDDLE CLASS IS GROWING

The current world population of 7.3 billion is expected to reach 8.5 billion by 2030, 9.7 billion by 2050.[1]

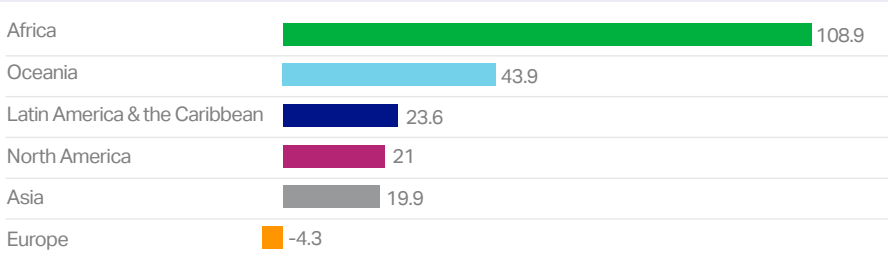
In 2015, the global middle class was comprised of about 3 billion people and accounted for 60% of consumer spending. By 2021, the middle class could surpass 4 billion, making it a majority of the world's population.

In fact, according to one recent study, we may have reached this tipping point in September 2018, since when over 50% of the world's population, some 3.8 people, live in households with enough discretionary expenditure to be considered "middle class" or "rich."[2]

According to International Monetary Fund (IMF) economic growth forecasts, China and India could add 1.5 billion people to the middle-class by 2020. Brazil, Mexico, Pakistan, Indonesia, and, a few years later, Egypt, Nigeria and Vietnam could each have middle classes that exceed 100 million people.[3]

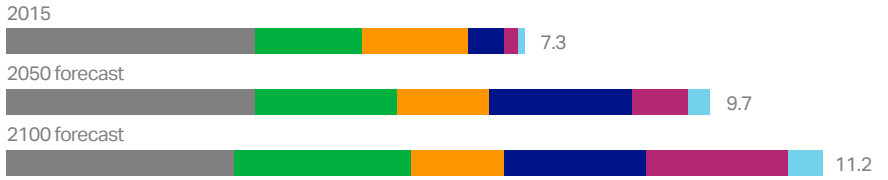
The World's Population

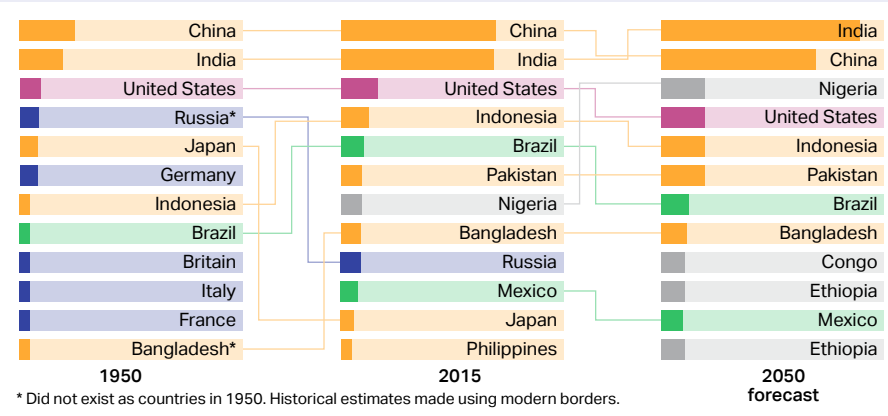
Regional % change, 2015-50 forecast



Total World Population

Billion





Source: Graph and data form Economist

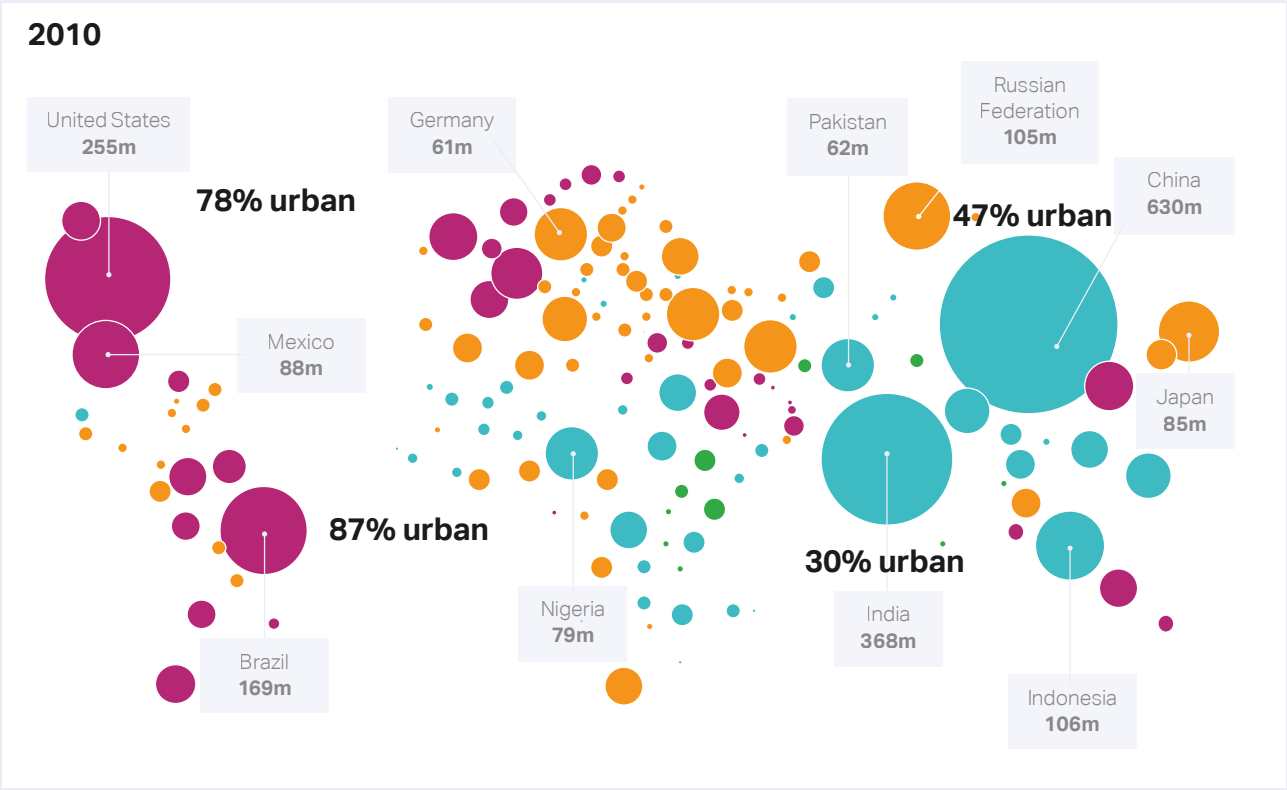
[1] "Global Demand for Food Is Rising. Can We Meet It?" HBR, 2016
[2] "A global tipping point: Half the world is now middle class or wealthier", Brookings, 2018
[3] "How a Growing Global Middle Class Could Save the World's Economy", Pew Trusts, 2016

CITIES ARE NOW WHERE MOST PEOPLE LIVE

70%

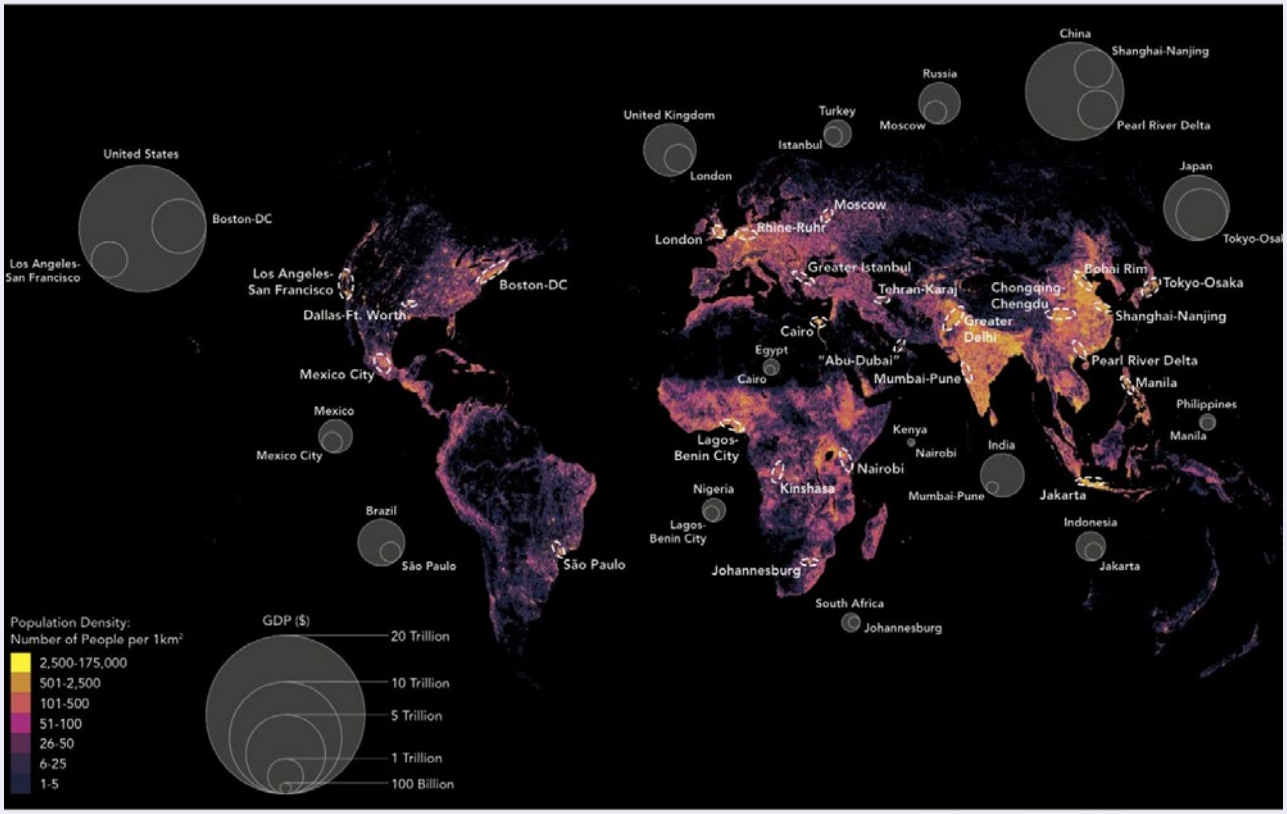
of people will live in cities by 2030 – and these cities will play an increasingly important role in the world – equal at least to the countries that they're in.

* Connectography: "Mapping the Future of Global Civilization", Parag Khanna, 2016



Source: unicef, An Urban World

AND SOME MEGACITY-REGIONS NOW RIVAL NATIONS IN ECONOMIC POWER



Source: "Connectography: Mapping the Future of Global Civilization", Parag Khanna, 2016

Megacities (cities with populations over 10 million) may become the world's dominant, social structure. They represent an ever-increasing share of the economic value of the state. By 2025, there will be at least 40 megacities.[1]

Most populous cities in 2050 will include:[2]	Population (millions)
Mumbai, India	42.4
Delhi, India	36.2
Dhaka, Bangladesh	35.2
Kinshasha, DRC	33.0
Kolkata, India	33.0
Tokyo, Japan	32.6
Lagos, Nigeria	32.6
Karachi, Pakistan	31.7
New York, U.S.A.	24.8
Mexico City, Mexico	24.3

It is projected that by 2050 there will be 50 cities with populations >10 million, six of them being in China.[2]

[1] "Connectography: Mapping the Future of Global Civilization", Parag Khanna, 2016
[2] "Socioeconomic Pathways and Regional and Regional Distribution of the World's 101 Largest Cities", Global Cities Institute, 2014

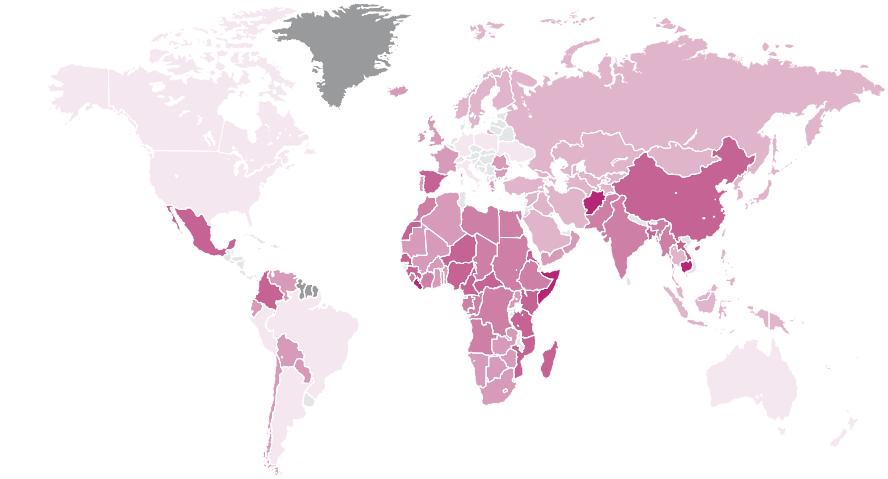
DRAWING PEOPLE INTO THEIR ORBIT AND LEADING TO INCREASING SPRAWL

People may be moving towards cities, but most will not end up living in their centers, largely due to urban housing costs. In developed and developing countries, suburban areas are growing faster than cores.[1, 3]

Looking forward, while the average population growth in 200 cities around the world between 1990 and 2050 is expected to reach 300%, the average footprint – the physical form of the city – will likely expand by nearly 500%.[2] In developing countries, a 1% decline in urban densities per year between 2000 and 2050 would quadruple the land area required by cities.[2]

Although some argue sprawl has its upside (e.g., access to improved air quality, better schools, more room for family), it unquestionably has negative consequences, both environmental (e.g., higher spread of air and water pollution, loss of natural habitat) and social (e.g., increased car dependency and related health issues).

The Rich Spread Out
Median density of large cities



Source: "A Planet of Suburbs", The Economist, 2015

[1] "A Planet of Suburbs", The Economist, 2015
[2] "A City that Plans: Reinventing Urban Planning", World Cities Report, 2016
[3] "Globally, Sprawl is Getting Worse", CityLab, 2016

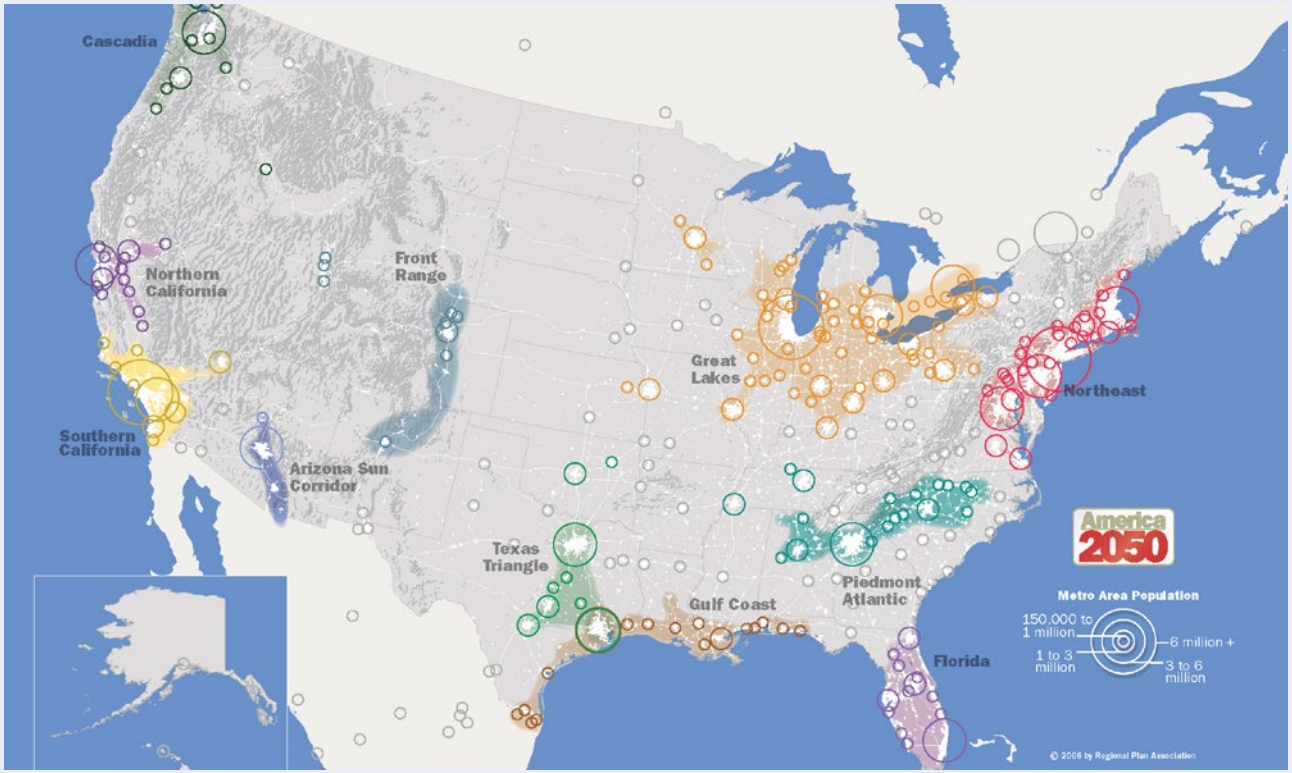
GIVING RISE TO NEW MULTI-CITY CLUSTERS AROUND THE WORLD

More Americans are moving out of cities than into cities.

In the U.S.A., the fastest growth is occurring in lower-density suburbs of large metros – and most are in the South and West of the country.[1] Lower income suburban populations have grown faster than any other, increasing 64% over the past 10 years.[2]

Most of the population growth, and an even larger share of economic expansion, is expected to occur in 11 megaregions – large networks of metropolitan regions.[3]

As these megaregions continue to grow, there will be increased need for coordination and cooperation across jurisdictional borders to address specific challenges, such as urban housing developments and mobility between cities and regions.[3]



Source: "Megaregions", America 2050, 2014

[1] "Americans' Shift to the Suburbs", FiveThirtyEight, March 2017
[2] "One-Fifth of America: A Comprehensive Guide to America's First Suburbs", The Brookings Institution, 2006
[3] "Megaregions", America 2050, 2014

BUT NEW URBANISM IS WORKING TO MAKE CITIES MORE HUMAN (FRIENDLY)

A growing trend in cities across the U.S. (and globally) is the development concept known as New Urbanism.

The design and development principles associated with New Urbanism emphasize a focus on walkable blocks and streets, housing and shopping in close proximity, and accessible public spaces.[1]

Charter of the New Urbanism

"We advocate the restructuring of public policy and development practices to support the following principles: neighborhoods should be diverse in use and population; communities should be designed for the pedestrian and transit as well as the car; cities and towns should be shaped by physically defined and universally accessible public spaces and community institutions; urban places should be framed by architecture and landscape design that celebrate local history, climate, ecology, and building practice.[2]

83% vs. 17%

Percent of office tenants that would rather be located in suburban vibrant centers than in typical single-use office locations.[5]

[1] "What is New Urbanism?", Congress for New Urbanism
[2] "Charter of the New Urbanism", Congress for New Urbanism
[3] "Ersatz urbanism", The Economist
[4] "Normal, Illinois", Smart Growth
[5] "Preferred Office Locations", NAIOP, the Commercial Real Estate Development Association

HOUSEHOLDS, HOUSES AND HOMES ARE CHANGING

Family structures are changing. In some countries, this means that kids are staying at home for longer, in others, single person households are becoming the norm. An increase in loneliness may be linked to this. Multigenerational households are declining in emerging markets, but seem to be on the rise in developed countries.

Along with increasing urbanism, all of this influences the types of homes that are built around the world. Apartments make up an increasing share of new homes and this means that there are places where homes are starting to get smaller again (having been increasing in size for decades).

Demand continues to increase as well, and with it, cost. For some, this means deferring home ownership – for others, even renting is a struggle. Today, hundreds of millions of people around the world sacrifice essentials, such as healthcare, in order to afford their homes.

FAMILY STRUCTURES ARE CHANGING AND MORE PEOPLE ARE LIVING ALONE

The delay of serious relationships & kids to pursue careers, education and fun – coupled with the growing widowed and divorced elderly group, especially in large developed countries – have important consequences for housing.[1]

In response to these trends, single-person households are skyrocketing around the world. Over 30% and 45% of households are single-person in Japan and Denmark, respectively, with Scandinavia having the highest rates in the world. In the U.S., single-person households have grown from 13% in 1960 to 28% in 2016.[2]

According to Euromonitor's 2017 research, between 2016-2030, single-person households will see faster growth than any other household type globally, with around 120 million new single person homes to be added over the period.[2]

In this context, we should be aware that rates of loneliness (meaning the want of intimacy) and social isolation are increasing dramatically worldwide, particularly in more affluent countries and among adult males.[3] Some studies show that lacking social connections is as damaging to our health as smoking 15 cigarettes a day, and that loneliness is potentially twice as bad for older people's health as obesity, and almost as great a cause of death as poverty.[4]

1 in 10

Delaying Families

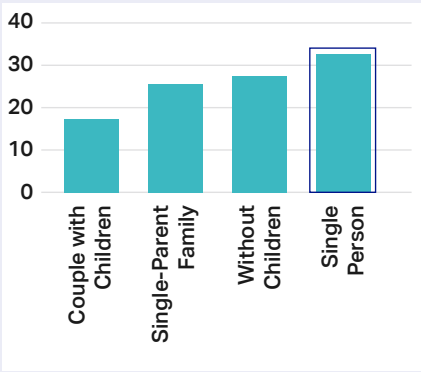
Among developed nations, one in ten women in their late 40s have no children, and in Italy and Switzerland, the childless rate approaches one in four. In the 1960s, this rate was closer to one in thirty (3%).[5]

56%

Aging Demographic

The global number of older adults (aged 60+) is expected to grow by 56% between 2015 to 2030.[6]
In the U.S., 87% of older adults want to age in place, which will result in a necessary shift in healthy aging practices at home.[7]

Global Households in 2030:
Rise of the Singletons (% growth)



Source: "Households in 2030", Euromonitor, 2017

[1] "Social & Demographic Trends", Pew Research Center, 2016
[2] "The Future Consumer – Households in 2030", Euromonitor, 2017
[3] "Chronic Loneliness is a Modern-Day Epidemic", Fortune, 2016
[4] "Loneliness is the Global Epidemic of our Times", The Huffington Post, 2016

[5] "Childless by Choice", Yale Global, 2012
[6] "Aging", United Nations
[7] "What is Livable? Community Preferences of Older Adults", AARP PPI", April 2014

FEWER MULTI-GENERATIONAL HOUSEHOLDS IN EMERGING MARKETS EVEN AS THEY ARE MAKING AN UNEXPECTED RETURN ELSEWHERE

European homes are multi-generational again, with both elderly and aging generations moving back in with their children and younger generations living with their parents for longer. In 2011, 48% of 18-30 year olds in Europe were living with their parents. This is unlikely to change for countries experiencing continued economic instability. For instance, according to Pew Research Centre, living in the parental home is now the dominant living arrangement in the U.S. for adults ages 18–34.

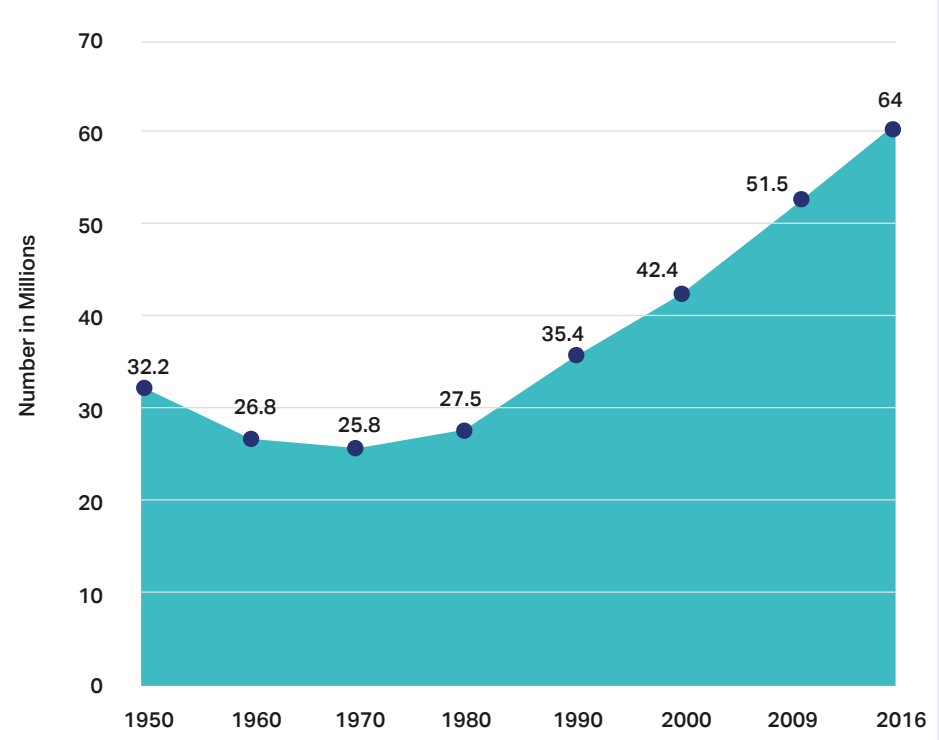
In a break from tradition, trends in China and Central American countries show a decline in multi-generational households.[1,2,3] However, nearly all households in India (90%) and Argentina (77%) are multi-generational.[6]

In the U.S., multi-generational households are increasingly the norm. In 2018, 20% of the population (64 million people) live in multi-generational households vs. only 13% in 1970 (25.8 million people).

This trend, which started with primarily Asian and Latino-families in the U.S., is increasing across all ages, genders, and races. 44% of new home buyers hope to be able to accommodate elderly parents and 42% expect to house children aged 18+ in the future.[7]

In response, U.S. homebuilders such as Lennar NextGen homes and Pardee Homes GenSmart are specifically designing multi-generation family homes.[4,5]

Number of U.S. Multi-generational Households (in millions)



Source: "A record 60.6 million Americans live in multi-generational households", Pew Research, 2016

[1] "The Dependent Generation: half young European adults live with their parents", The Guardian, 2014
[2] "Rise of Solo Living in China: 58 million one-person households", China Daily 2015
[3] "Household changes in contemporary China", Journal of Chinese Sociology 2015
[4] "The multi-generational household is back, led by Asian and Latino families", So Cal Public Radio, 2011
[5] "A record 64 million Americans live in multi-generational households", Pew Research, 2016
[6] "Global Perspectives on Multi-generational Households and Intergenerational Relations", ILC Report, 2012
[7] "Multi-generational Households on the Rise", John Burns Real Estate Consulting, 2016

URBANISM IS INCREASING (AND CHANGING) DEMAND FOR THE HOUSING STOCK THAT IS BEING DEVELOPED

Huge demand for new homes* is being driven by high rates of urbanization and a growing number of people struggling to secure affordable housing.[1] 50 million new urban dwellers move to cities each year and by 2025 1.6 billion people – a third of the total urban population – could struggle to secure decent housing.[2] Today, 330 million people sacrifice essentials, such as healthcare, in order to afford their homes.

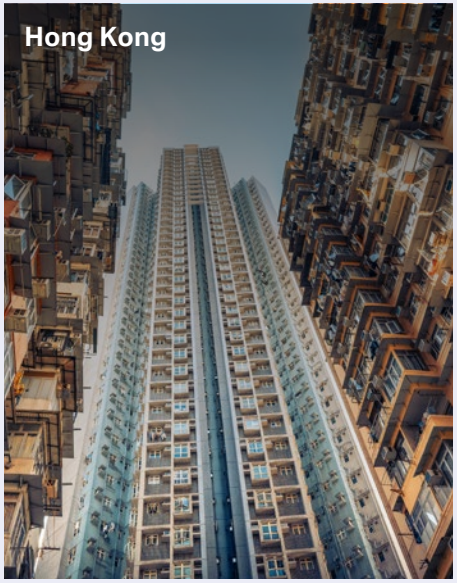
Over the next 30 years nearly 90% of the world's urban population growth will be concentrated in Asia and Africa, with India, China and Nigeria expected to account for 37% of this growth alone.[3] By 2025, 72% of expected home construction will take place in just seven countries: China, the U.S., India, Indonesia, Russia, Canada and Mexico. Most will be apartments.

In the U.S., apartments make up nearly 40% of new homes – the highest share in 40 years.[4,5] Currently, however, a majority of Americans live in single-family houses (2013), 64% U.S. households. By contrast, in Europe, more than four in ten people live in apartments (42%), one-quarter (24%) in semi-detached houses, and one-third (33%) in detached houses.[6]

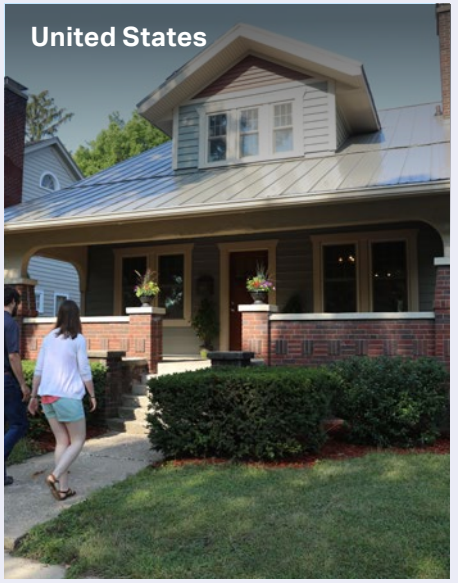
*** Home = single family house or multifamily apartment building**

The Housing Stock Varies Greatly by Country,

both what exists today – and what is needed and will be built for the future.



Typical multifamily building – "Dizzying Cityscape of Hong Kong", The Atlantic, 2016



Typical 1920s craftsman home – ReNEWW House, Triple Pundit

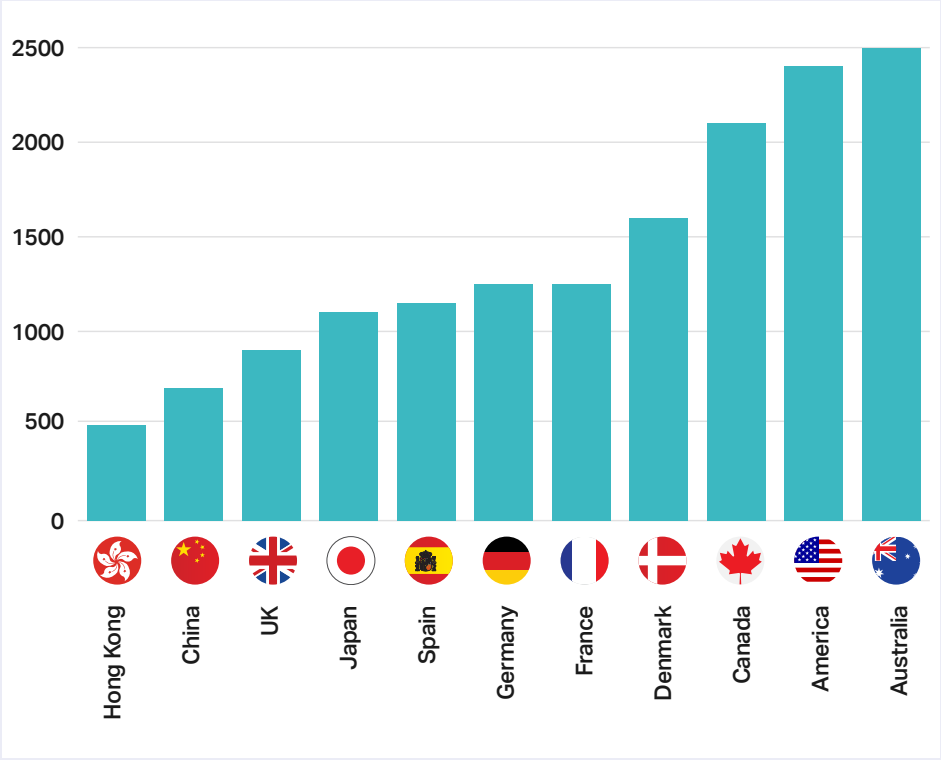
[1] "Habitat III Issue Papers", The UN, 2015
[2] "Tackling the world's affordable housing challenge", McKinsey, 2014
[3] "Real Estate 2020: Building the future", PwC
[4] "Developers See a Future With Fewer Picket Fences And More Leases", FiveThirtyEight, 2014
[5] "Residential Buildings Factsheet", University of Michigan, 2008
[6] "Housing Sâtatistics", Europa, 2017

HOMES ARE GETTING SMALLER IN MANY COUNTRIES REVERSING THE SUPERSIZING TREND OF THE PAST 50 YEARS

The American house has grown to, on average, +2,500 sq. ft., about 50% more area than the average house in the late 1970s.[1] By contrast, the average house size in Britain is 893 sq. ft., among the smallest compared to other high-income nations – and 40% smaller than the average American home.[4]

However, globally, urban apartments are shrinking in size. In Mumbai, India, apartment sizes have shrunk by 24% since 2010. In the U.S., the average size of a new apartment unit is down 70 sq. ft. (7%) compared with those built during the 2000-2009. In Hong Kong, 43% of new units are expected to be less than 400 sq. ft. by 2018, up from just 15% of units in 2012.[2,3]

Home Sizes Around the World (sq.ft.)



Source: "How big is a house? Average house size by country", Shrink that Footprint, 2014

[1] "The Shrinking of the American Lawn", The Atlantic, 2016
[2] "Nano' flats on the rise as Hong Kong homes shrink amid high property prices", South China Morning Post, 2017
[3] "Honey I Shrunk the Apartments: Average New Unit Size Declines 7% Since 2009", RCLCO, 2016
[4] "Shrinking homes: the average British house size is the lowest it's been in 90 years", Which?, 2018

MANY ARE DEFERRING HOME OWNERSHIP AS IT BECOMES INCREASINGLY INAFFORDABLE

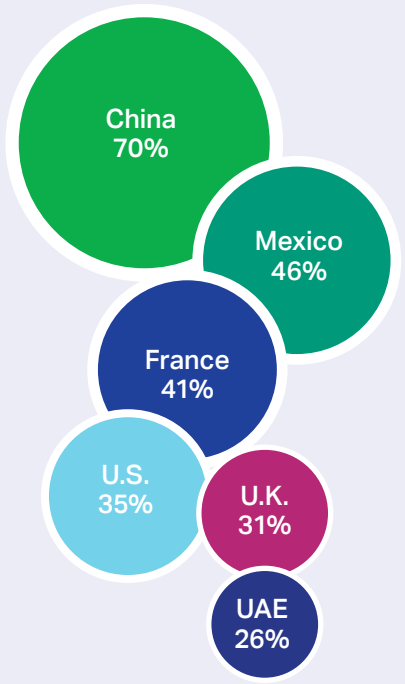
Housing is becoming less affordable in much of the world.

Home prices have outstripped income gains in about half of OECD countries since 2010.[1] Home prices have also grown faster than rents in over half the countries. Coupled with stagnating incomes, owning a house or apartment is increasingly out of reach.[1] This is especially true for lower income earners and families.[2]

Globally, 40% of millennials currently own their own home and, among those who do not own, more than four in five (83%) intend to buy in the next five years. This tells us that the home ownership dream is deferred (not dead) for millennials.[3]

[1] OECD, IMF Global Housing Watch (Q42016 vs. 2010)
[2] "Housing Market Overview 2016 Q4", Zillow
[3] "Generation Buy", HBSC, 2017
[4] "Student Loan Debt and its Impact on Millennials", Finance Solutions, 2015
[5] "Revealed: the 30-year economic betrayal dragging down Generation-Y's income", The Guardian, 2016

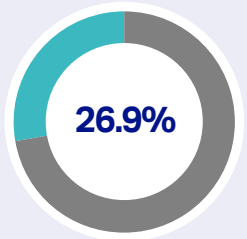
Percentage of millennials who own their own home



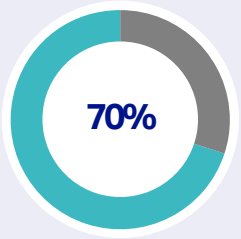
Source: "The country where 70% of millennials are homeowners", BBC, 2017

U.S. Millennials: Highly educated, heavily indebted[4]

College graduates under-employed in 2014



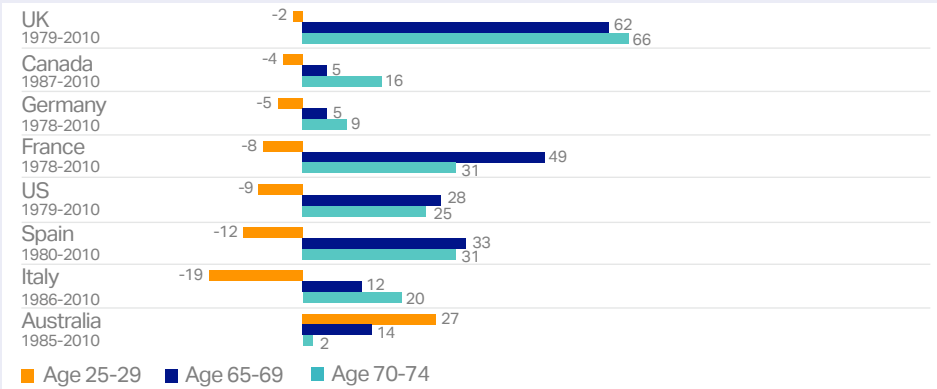
Millennials taking out student loans in 2015



Average debt upon graduation in 2015

Generation Gap

Global growth (%) in household disposable income above or below national average growth rate (by age of head of household or spouse)[5]



Source: Luxembourg Income Study database

FOR SOME, EVEN AFFORDABLE RENTAL PROPERTIES ARE INCREASINGLY OUT OF REACH

The standard of "affordable" housing is that which costs roughly 30% or less of a family's income.[1]

The global affordable housing gap is now $650bn p/a – approx 1% GDP (unaffordable rent, government assistance and the implied cost of improving substandard housing). There could be 106 million additional low-income* urban households by 2025, totaling 440 million households.[2]

In the U.S., more than half of all poor renting families spend more than 50% of their income on housing costs, and at least one in four spends more than 70%.[3]

In OECD countries, households on average spend around 21% of their gross adjusted disposable income on housing. The level of housing costs in household budgets varies from 26% in the Czech Republic a Greece to less than 16% in Korea and only 11% in Russia.[3]

*** "Low-income" is defined for these purposes as households that earn 80% or less of the median income in the area.**

The global challenge today...

96 million
urban households are financially overstretched

235 million
urban households live in substandard housing

...by 2025

440 million
low-income* households will face the affordable housing challenge

...affecting

1.6 billion or 1/3 of urban population

Source: "Tackling the world's affordable housing challenge", McKinsey Global Institute (MGI), 2014

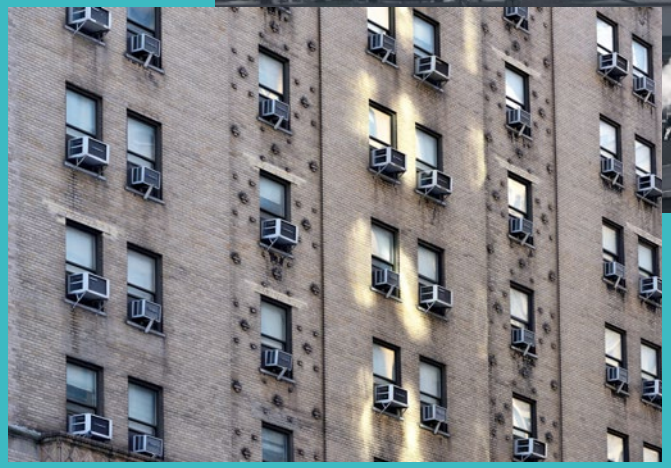
[1] "How Home Ownership Became the Engine of American Inequality", NYTimes, 2017
[2] "Tackling the world's affordable housing challenge", McKinsey Global Institute (MGI), 2014
[3] "Habitat III Issue Papers", The UN, 2015
[4] "OECD Better Life Index: Housing", 2017

HOMES HAVE AN IMPACT ON OUR HEALTH AND OUR ENVIRONMENT

Counting sleep, we spend most of our time indoors, no matter how active we are! Indoor air can be far more polluted than the air outside. Not just from exhaust and smoke, but from what's in the walls, floors and ceilings.

Many people also live in places that are becoming riskier as a result of climate change. Water scarcity, extreme weather, and rising sea levels will all force people to consider moving over the decades to come. Far from affecting only desertified or low-lying island nations, we have now seen the first US climate-refugees abandoning their homes.

And our homes themselves are contributing to these environmental challenges. Buildings account for 60% of all energy usage, 25% of all water usage, and 40% of all materials usage. While demand varies significantly between geographies, we expect to see considerable efforts to reduce domestic energy and water consumption.



(UN) HEALTHY HOMES

Most people who live in cities spend about 90% of their time indoors,* and an estimated two thirds of that time is spent in the home.[1]

According to the WHO, indoor air can be up to 8 times more polluted than the air outside.[2] The EPA holds that this is true even in buildings with state-of-the-art HVAC systems, due to the emission of volatile organic compounds ("VOCs") and toxic chemicals found in dust.[3]

Substandard housing conditions, such as water leaks, poor ventilation, dirty carpets and pest infestation, can lead to an increase in mold, mites and other allergens associated with poor health, including asthma, which currently affects over 20 million Americans. Approximately 40% of excess asthma risk among children is believed to be attributable to residential allergens.[3]

Only 16% of countries globally meet WHO standards for Household Air Quality (a measure which uses number and percentage of the population burning solid fuel for cooking as a proxy).[4] At 77%, sub-Saharan Africa has the highest proportion of households using solid fuels. There, the absolute number of people using solid fuels has roughly doubled from 333 to 646 million, reflecting both explosive population growth and the marginal changeover to modern fuels.[5]

*** including work and sleep**

Top Home Health Hazards Reported by Medical Professionals
% of respondents who ranked item as 1st, 2nd, 3rd in importance

Mold and Mildew Exposure	57%
Use of Toxic Products (e.g., cleaning, pesticides)	38%
Design Features that Lead to Slips and Falls	32%
Indoor Air Pollution	30%
Crowding	30%
Home / Building	29%
Lead Exposure	20%
Lack of Access to Fresh Air	20%
Lack of Access to Natural Light	19%
Noise Pollution	9%

Source: "The Drive Towards Healthier Buildings", McGraw Hill Construction, 2014

1 "Where We Live Matters for Our Health: The Links Between Housing and Health", RWJF, 2008
2 "Indoor air can be deadlier than outdoor air, research shows", CNBC, 2016
3 "The Inside Story: A Guide to Indoor Air Quality", EPA, 2017
4 "Environmental Performance Index", Yale, 2014
5 "Air Quality", Environmental Performance Index, 2014

(UN) HEALTHY LOCATIONS

Billions of people are living in places affected by environmental challenges that are only getting worse.

Around 1.2 billion people, or almost one fifth of the world's population, live in areas of physical water scarcity. By 2025, this number may grow to 1.8 billion and two thirds of the world's population may be living in water-stressed conditions.[1]

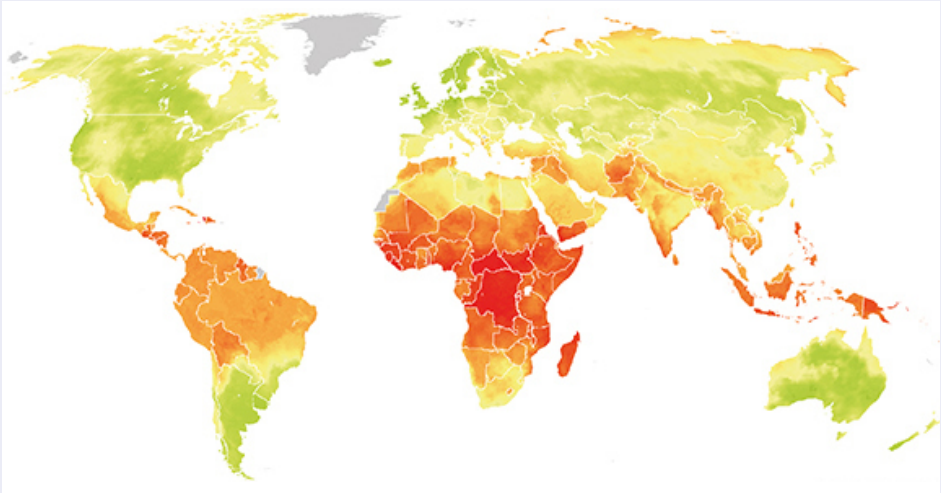
Billions of people's homes and lives are already increasingly at risk from weather-related natural disasters.

Globally, the number of reported weather-related natural disasters has more than tripled since the 1960s. Every year, these disasters result in over 60,000 deaths and destruction of homes, mainly in developing countries.[2]

Hundreds of millions of people may have to abandon their homes and relocate as climate change drives sea level rise around the world.

Sea level rise could displace tens of millions of people in low-lying areas, especially in developing countries. Worldwide, approximately 100 million people live within three feet of sea level.[3] Half of U.S. residents live within 50 miles of the coast. Inhabitants of some small island countries that lie just barely above the existing sea level are already abandoning their islands. In May 2016, the residents of Isle de Jean Charles were given $48 million to move – the first U.S.-based climate refugees.[3]

2017 Climate Change Vulnerability Index



Source: 2017 Climate Change Vulnerability Index, Verisk & Maplecroft

[1] "Water for Life Decade: Water Scarcity", UN, 2014
[2] "Climate Change and Health", WHO, 2016
[3] "Climate Change Threats and Solutions", The Nature Conservancy, 2017

OUR HOMES HAVE A MAJOR IMPACT ON THE ENVIRONMENT

If the global population reaches 9.6 billion by 2050, the equivalent of three planets will be required to provide the natural resources needed to sustain current lifestyles.[1]

Buildings are responsible for 60% of the world's electricity usage, 25% of water usage, and 40% of materials usage. Globally, households consume 29% of global energy and consequently contribute to 21% of CO_2 emissions, making it difficult to meet carbon targets without addressing emissions at the household level.[2]

Residential energy consumption varies by country. A single-family home in the U.S. consumes 1.3 GJ per sq. meter annually vs. a home in Sweden which consumes 0.49-0.56 GJ per sq. meter annually – less than half of that of a U.S. home.[3]

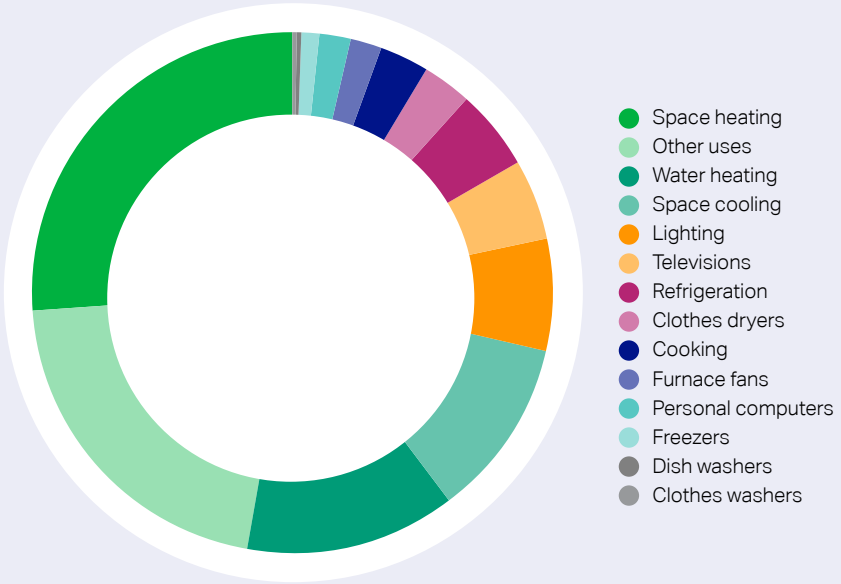
In the U.S., the average per household daily water use has decreased 22% from 1999 to 2016, largely as a result of improved water efficiency of washing machines and toilets. However, the U.S. continues to have the highest household water consumption in the world.[4]

Friendly regulation and adoption of greywater systems is not at all widespread, though there are bright spots. In Singapore, water reclamation from greywater* provides 2.5% of the country's drinking water and, in Namibia, 35% of the drinking water for the capital city. In the U.S., several states – California, New Mexico and Texas – are incentivizing responsible greywater use though tax credits to alleviate water shortages in droughts.[3]

*** Greywater makes up anywhere from 50-80% of all residential wastewater. It is made up of wastewater generated from all of the home's sanitation equipment except for sewage (water from toilets), and water containing high amounts of food waste (garbage disposal, etc.) – PureWater, LLC**

Breakdown of U.S. Household Energy Consumption, 2015

U.S. residential sector accounted for 22% of total primary energy consumption in the U.S. in 2015.[1]



Source: "Residential Buildings Factsheet", University of Michigan, 2016

1 "Residential Buildings Factsheet", University of Michigan, 2016
2 "SDG Goals: Ensure sustainable consumption and production patterns", UN, 2017
3 "From Wastewater to Drinking Water", Columbia University, 2011
4 "Residential End Uses of Water, Version 2", Water Research Foundation, 2016

TAKEAWAYS

Challenges

When we think of homes, a lot of us think of houses. But for most people in the world, a home is an apartment. Population growth, demographic change, rural to urban migration and shifting preferences and incomes in the middle class are all reshaping how and where we live.

By 2030, 70% of the world's population will live in cities. They won't look like cities do today – they will be enormous, sprawling often multi-city conurbations. There could be as many as 40 "mega-cities" by 2050, and the average land footprint of cities will have expanded by nearly 500% compared to 1990.

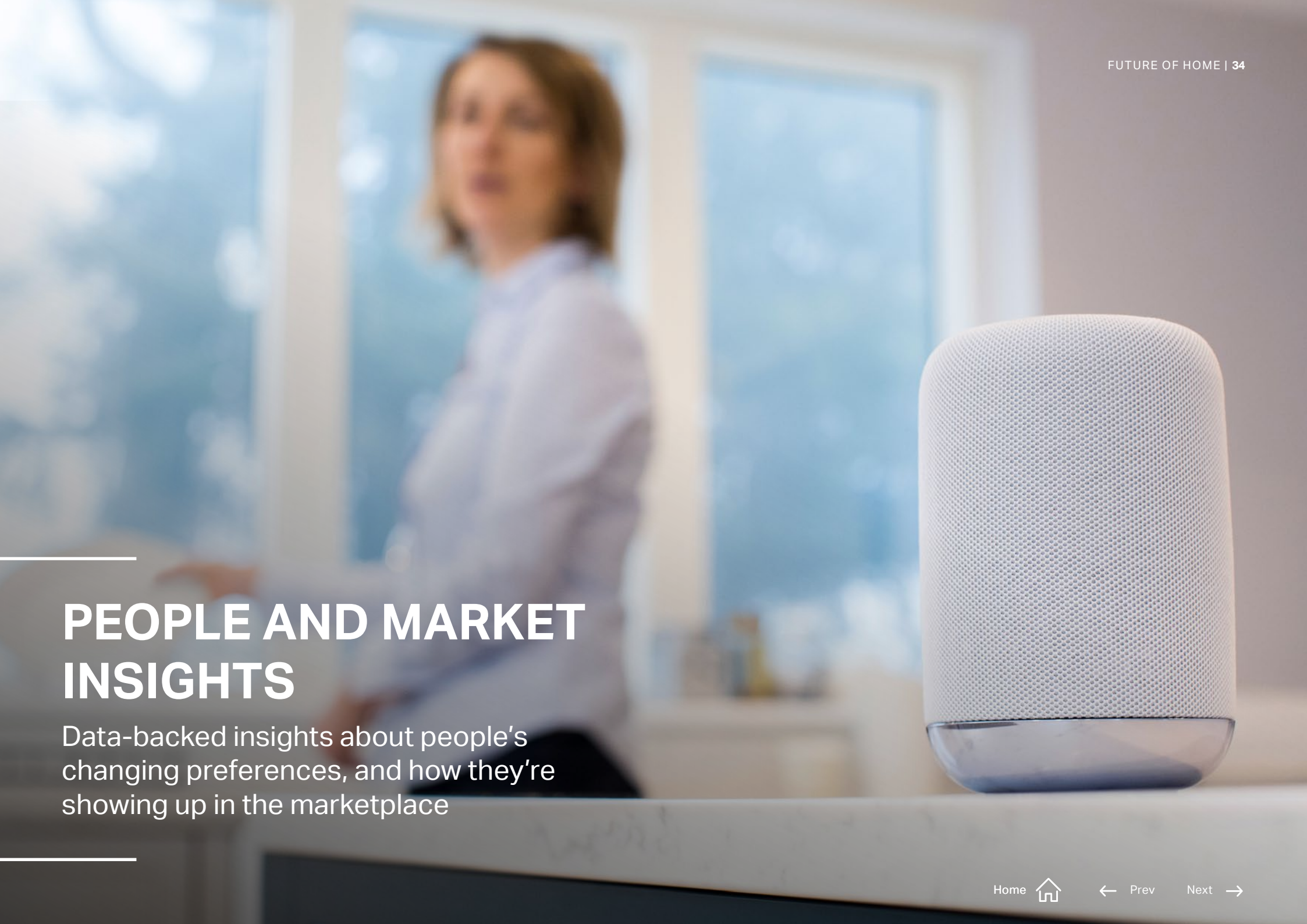
Construction is struggling to keep up, and homes are increasingly unaffordable, to buy and to rent. We are also putting pressure on the environment, and it on us. We must build more homes and yet housing is a major contributor to resource use and GHG emissions. By 2025 two thirds of all people on earth may be living in water-stressed areas. And it's not just too little water that we need to plan for: 100 million people live within 1 meter of sea level, waste continues to build up to unimaginable levels and air quality is worsening in most of the biggest cities worldwide.

Opportunities to consider

- Every new home demands a huge amount of resources and will go on to consume considerable water and energy while creating waste for decades to come. Cities are bursting at the seams, sprawling out and demanding yet further investment in infrastructure. One of the most concerning environmental (and social trends) is therefore a move to single-person households. However, there are signs that people are increasingly open to different living arrangements, including smaller housing and communal living. Developing desirable ways for more people to live together would be far less resource intensive and would counter social challenges, such as isolationism.

- Desirable homes no longer just means the buildings that people live in. "New urbanism" and increased interest in the quality of neighborhoods offers us the opportunity to rethink how our cities should work for the people that live in them, becoming an extension of their homes, and helping them to live happily and healthily within them.

- Our health has always been a priority, but we are now learning far more about how where we live affects our well-being. Many of the health impacts of housing can be alleviated with the right design or simple technologies.



PEOPLE AND MARKET INSIGHTS

Data-backed insights about people's changing preferences, and how they're showing up in the marketplace

WHAT IT MEANS TO LIVE A MIDDLE CLASS LIFESTYLE IS CHANGING

Even though the middle class is growing around the world, the middle class lifestyle isn't growing in the same way it has in the past. Our relationship with things and possessions is changing. Either through choice or necessity, there is evidence that "more" is giving way to "experiences" in some cases and "balance" in others.

Well-being is increasingly important to people and this extends to their relationships with their homes and what they put in them. Low cost examples include "greener" cleaning products gaining market share. Those with the means are willing to start building health and well-being directly into their homes.

People are also beginning to try to manage the relentless pace of modern urban living, in particular unwanted noise, light and smells. A good night's sleep in particular, is a privilege that is increasingly sought after.

REJECTING CLUTTER – EXPLORING MINIMALISM

Many families are facing a "clutter crisis" – whereby the stuff they have acquired over the years becomes emotionally and physically stressful and does not fit in their homes.[1]

Maria Kondo's guide to decluttering the home has a cult following, having sold more than 7 million copies worldwide in over 40 languages.[1] In her book "The Life-changing Magic of Tidying Up," she offers readers a vision of the uncluttered home as an oasis of calm:

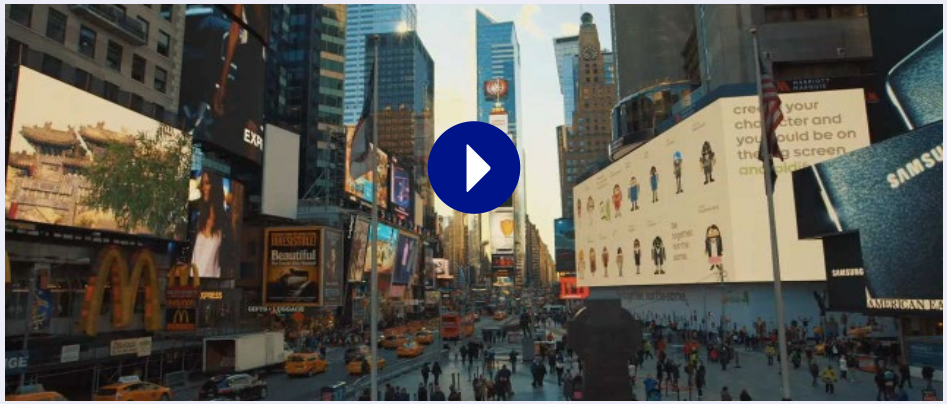
"I have time to experience bliss in my quiet space, where even the air feels fresh and clean; time to sit and sip herbal tea while I reflect on my day... Although not large, the space I live in is graced with only those things that speak to my heart. My lifestyle brings me joy."

Some are advocating a lifestyle that goes beyond decluttering, and strips possessions to no more than what is necessary. "Minimalism: A Documentary About the Important Things" was the #1 indie documentary of 2016 (largest box-office opening). Even if not living decluttered or bare-bones lifestyles, U.S. millennials prefer to spend money on experiences rather than on stuff: 78% of millennials – compared to 59% of baby boomers – would rather pay for an experience than material goods.[2]

Marie Kondo: The Cult of Tidying Up

Source: "Marie Kondo and the Cult of Tidying Up," WSJ, 2015

How Might Your Life Be Better With Less?



VIDEO: Watch the Minimalism trailer – a documentary about the important things in life.

[1] "Behind the Zen of decluttering: Why the obsession to get rid of stuff?", Chicago Tribune, 2015
[2] "Millennials Go Minimal: The Decluttering Lifestyle Trend That Is Taking Over", Forbes, 2016

BALANCE (JUST RIGHT) IS REPLACING MORE, MORE, MORE

Lagom is the Swedish concept of "not too much, not too little" and translates to "enough, sufficient, adequate, just right."[1]

IKEA (in fact, the Swedish furniture company's UK & Ireland business), created the "Live LAGOM" project, which focuses on sustainable pieces in the brand's signature simple, clean designs. Specifically, the project focuses on four key areas of sustainability: use less power, use less water, create less waste, and live well.[2]

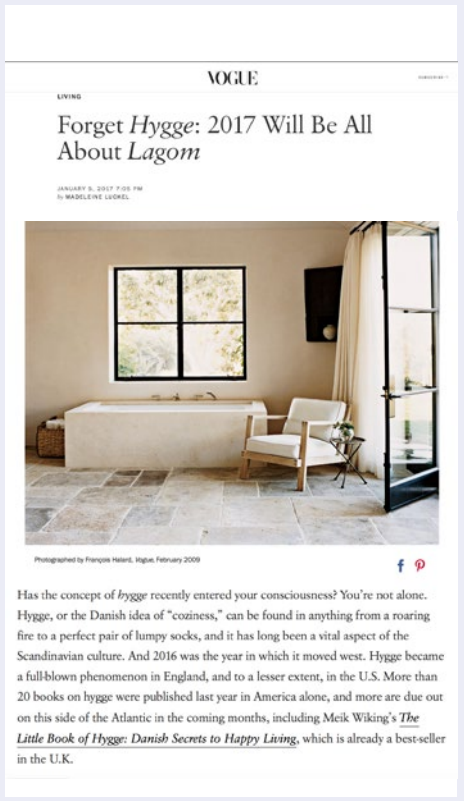
In its first year, IKEA's project had 125 households join the Live LAGOM project, 100% of which planned to continue living the LAGOM lifestyle following the project.[2]

Lagom
adverb

The Swedish word LAGOM means just the right amount – not too much, and not too little. It comes from the phrase "Lagom är bäst" – the right amount is best.[2]

Lagomer
noun

A person who is working towards living a more LAGOM lifestyle – making small changes to their everyday life to minimize environmental impact, being thrifty with resources and enjoying a fun, happy, and balanced life.[2]



VOGUE

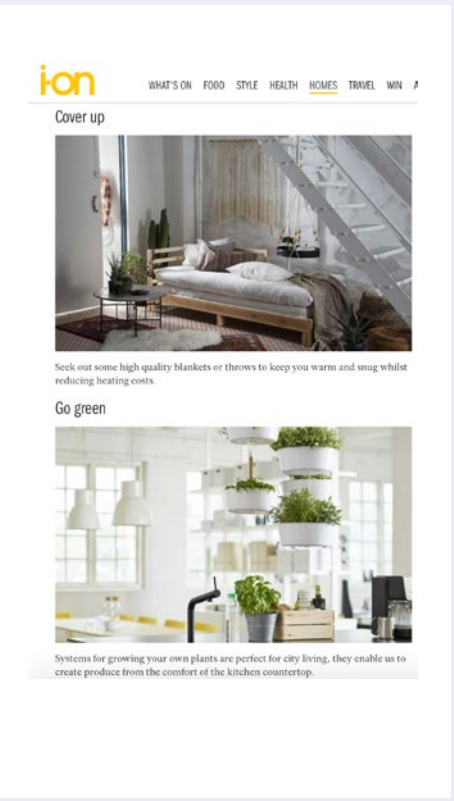
LIVING

Forget *Hygge*: 2017 Will Be All About *Lagom*

JANUARY 3, 2017 7:05 PM
by MADELEINE LUCKEL

Photographed by François Halard, Vogue, February 2009

Has the concept of *hygge* recently entered your consciousness? You're not alone. Hygge, or the Danish idea of "coziness," can be found in anything from a roaring fire to a perfect pair of lumpy socks, and it has long been a vital aspect of the Scandinavian culture. And 2016 was the year in which it moved west. Hygge became a full-blown phenomenon in England, and to a lesser extent, in the U.S. More than 20 books on hygge were published last year in America alone, and more are due out on this side of the Atlantic in the coming months, including Meik Wiking's *The Little Book of Hygge: Danish Secrets to Happy Living*, which is already a best-seller in the U.K.



ion

WHAT'S ON FOOD STYLE HEALTH HOMES TRAVEL WIN

Cover up

Seek out some high quality blankets or throws to keep you warm and snug whilst reducing heating costs.

Go green

Systems for growing your own plants are perfect for city living, they enable us to create produce from the comfort of the kitchen countertop.

[1] "Forget Hygge: 2017 Will Be All About Lagom", Vogue, 2017
[2] "Live LAGOM", IKEA, 2017

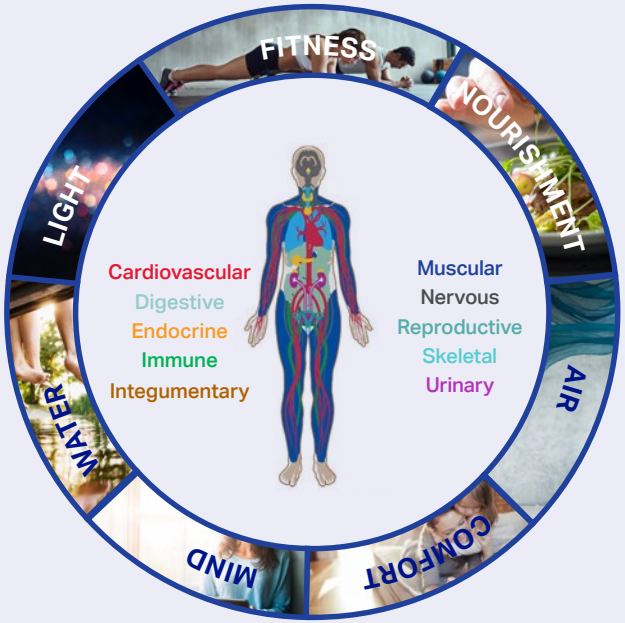
AND INTEREST IN HEALTH & WELL-BEING AT HOME IS INCREASING

People are willing to pay a premium for homes that are designed for health and wellness.

INTERNATIONAL WELL BUILDING INSTITUTE™

350+ projects

are now applying for the new WELL Being Standard, the world's first building standard focused exclusively on human health and wellness. Administered by the International WELL Being Institute, the standard encourages and rewards creating spaces* that empower people to eat, sleep, work out, perform and feel their best. The WELL Building Standard™ (WELL) addresses seven concepts in the design and operations of buildings – as well as how they impact and influence human health, well-being and related behaviors.



Source: WELL Building Standard, April 2017 presentation

Non-toxic cleaning products are the most popular products used by homeowners.[1]

Sales of green / healthy household cleaning products in the U.S. grew at a compound annual growth rate (CAGR) of 30% from 2007 to 2010; however the market declined at a CAGR of 2% from 2010 to 2014. This is in part because, although traditional green brands, such as Seventh Generation, Mrs. Meyers, and Method, performed well over the last five years, their gains haven't been able to offset the declines by mass marketers who entered the market prior to the recession, such as Chlorox Green Works.[2]

[1] "The Drive Toward Healthier Buildings", McGraw Hill Construction, 2014
[2] "Report: Growth Opportunities Remain for Green Household Cleaning Products Market", PRNewswire, 2015

PEOPLE INCREASINGLY CRAVE PEACE & QUIET

There is mounting scientific proof that sound, light & scent in one's home measurably impact health, well-being, and productivity.

Sound

Background-noise levels in cities – and in homes – can regularly reach 70 decibels. According to the WHO, that level of noise pollution goes beyond annoyance, heightening stress, disrupting sleep, and even leading to heart disease and obesity.[1]

While European countries have enforced stringent national noise standards, the U.S. and developing countries are noisier than ever; one third of Americans may be at risk of noise-related health problems.[1] In the latest "Noise Attitudes Survey", noise moved up from 9th to 4th place in a list of 12 environmental problems when respondents were asked which affected them most.[2]

The amount of money spent on noise-canceling headphones more than doubled between 2011 and 2014, and the demand for better noise-canceling technology is one of the top factors motivating innovation and competition in the industry.[3,8]

Lighting

95% of Americans regularly use screens shortly before going to sleep. Incandescent bulbs have been replaced by LED and compact fluorescent lights that disrupt circadian rhythm – and this increased nighttime light exposure tracks with increased rates of breast cancer, obesity and depression.[5]

Amazon Alexa users give home-related commands – such as "turn on the dining room lights" – millions of times a day. The number of such commands by Alexa users grew 500% from March to May 2017, as compared to the year before.[6]

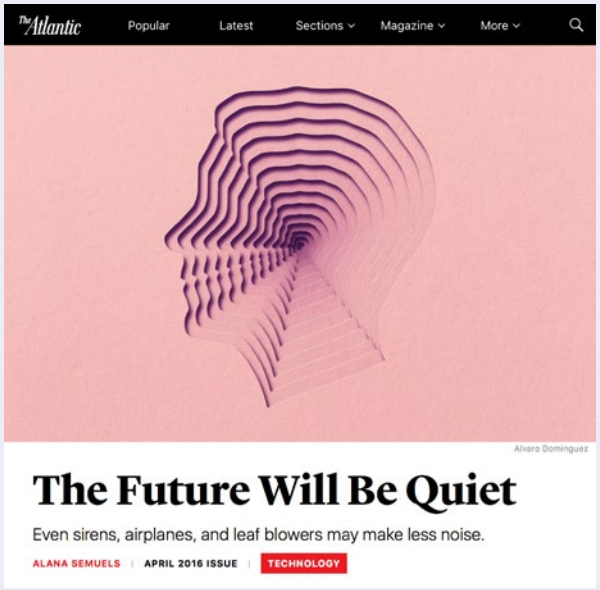
Scent

Odors influence moods and behaviors: odors people like make them feel energized, strong, relaxed – whereas malodors can cause unease, stress and stifle creativity.[7]

The global market for aroma chemicals and essential oils used in homes, is projected to reach $1.79 billion by 2025.[4]

"Our senses are connected to what it means to be alive."

David Edward, inventor and Harvard professor



1 "The Future Will Be Quiet", Atlantic, 2016
2 "National Noise Attitude Survey", DEFRA, 2012
3 "Enjoy the Silence", The New Yorker, 2014
4 "Fragrance Fixatives Market to Reach $1.7 Billion by 2025", BusinessWire, 2017
5 "Screens May Be Terrible for You, and We Now Know Why", Wired, 2015
6 "Need Mood Lighting to Go With Your Music? Ask Alexa", NY Times, 2017
7 "Do scents affect people's moods or work performance?", Scientific American
8 "Earphone and Headphone Market Analysis", Grand View Research, 2017

AND SLEEP BECOMES A NEW STATUS SYMBOL

92%

of adults globally believe sleep is crucial to their overall health and well-being.[2]

$32 billion

value of the sleep market in 2012. Estimates suggest the sleep aide market will grow to $80.8 billion by 2020.[1,3]

1 out of 10

employed adults across the globe value their job over a good night's sleep; pressures in U.S. seem greater.[2]

$500

amount Aetna, the health care company is paying its workers per year if they can prove they have slept for 7+ hours for 20 days in a row.[1]

Growing market of sleep aides

Dreem is a headband that uses soundwaves to induce sleep.[1]

Casper makes high-quality mattresses, pillows, and sheets affordable – and available online. Sales are expected to double to $400M in 2017.[4]

"Sleep with Me" Podcasts and bedtime stories designed to cure insomnia are downloaded at a rate of 1.3 million a month.[1]

Re-Timer, a pair of goggles fitted with tiny green-blue lights that shine back into the user's eyes, aims to reset the body's clock.[1]

Meditation studios like Inscape in NYC are popping up globally, offering "deep rest" and relaxation classes.[1]

All of this could, in future, be offered by Alexa-like products. Sense made a product that monitored bedroom conditions, but shut due to this market reality.[5]

"Sleep today is a measure of success … a skill to be cultivated and nourished."[1]

NY Times


The New York Times

FASHION & STYLE

Sleep Is the New Status Symbol

Leer en español

By PENELOPE GREEN APRIL 8, 2017

Sleep today is a measure of success, a skill to be cultivated and nourished. Tim Robinson

1 "Sleep Is the New Status Symbol", NY Times, 2017
2 "Philips releases survey findings on World Sleep Day", Phillips, 2017
3 "Global Sleep Aids Market Will Reach US$80.8bn by 2020", NASDAQ, 2015
4 "An online bed business doubled sales to $200 million last year — and could double them again this year", Business Insider, 2017
5 "Sense sleep tracker maker Hello is shutting down", TechCrunch, 2017

HOMES THEMSELVES ARE CHANGING

Smaller, repurposed & shared spaces are offering cost-effective and even aspirational alternatives for urbanites to consider

As space becomes less available and therefore more expensive, people are finding novel ways to do more with less. This includes numerous new types of home, including tiny houses, micro- and even nano- apartments, and versatile rooms and furniture that allows spaces to fulfill multiple functions.

People are also beginning to explore different living arrangements, such as co-living or temporarily renting out previously spare rooms. In fact, sharing of assets is becoming less of a niche activity, with everything from kitchen appliances to community gardens on offer.

With so many people crammed into urban centers, cities are looking to improve quality of life for residents through the provision of more public spaces. As such, people are able to think of "the city as their living room".

SOME PEOPLE ARE LEARNING TO LOVE TINY HOUSES

A growing number of people are aspiring to smaller, more manageable spaces as a way of life that frees them up to focus on relationships and experiences, save money, and acquire fewer possessions.[1] This aspiration is showing up in the demand for tiny houses (typically less than 500 sq. ft.) and micro apartments (150-360 sq. ft. – see next page).

In the U.S., tiny houses are appreciating twice as fast as the overall market. In December 2016, the median list price of tiny homes was $119,000, up 19% from last year. The overall market median list price is up just 9%.[2]

Tiny houses require fewer raw materials and less energy to heat and cool[2] – and as a result, have 14 times lower greenhouse gas emissions compared to average houses.[3]

One of the greatest challenges of tiny house living is finding a place where they are allowed. In the U.S., building codes in most municipalities set a minimum size for dwellings. The top five states where going tiny is a bit easier are California, Oregon, Texas, North Carolina and Florida.[4]

Source: "65 Impressive Tiny Houses That Maximize Function and Style", Country Living, 2017

[1] "Could You Survive in 150 Square Feet? The Lowdown on Tiny Homes", CNBC, 2015
[2] "Tiny houses grow in popularity, yet drawbacks abound", CNBC, 2017
[3] "The Top 5 States for Tiny Homes", Ecobuilding, 2015
[4] "Living Small: The Tiny House Trend", Economy Matters, 2016

AND MICRO & NANO APARTMENTS

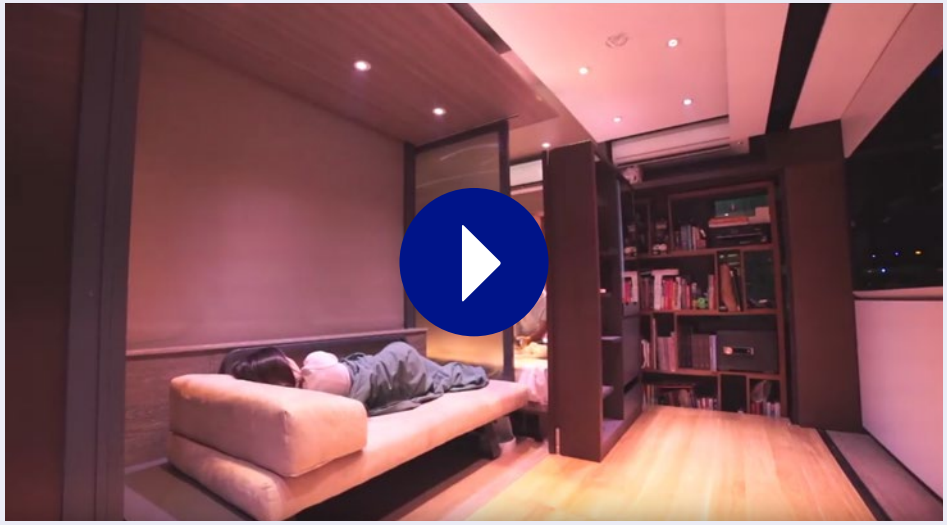
While micro-apartments (typically 150-360 sq. ft.) are aspirational for some, they are the only option for others.

Nearly half of all apartments constructed in Hong Kong in 2018 will be under 400 sq. ft. in size. In 2016, 1.4% of all new apartments were "nano," under 200 sq. ft. With housing prices continuing to soar, these micro apartments provide opportunities for young and single people to buy property.[1]

In New York City, the city's first modular, micro-unit residential building received 60,000 applications from potential tenants for its 55 apartments, each under 300 sq. ft. in size. NYC has building regulations that residential units be a minimum of 400 sq. ft.; however, these were waived for these new, affordable units.[2]

Universities are also taking on to the concept. The University of British Columbia (UBC) has unveiled new 140 sq. ft. student apartments to be completed by 2019. Each apartment will have a kitchen, bathroom, a study area that turns into a bed – and will cost up to 50% less than other housing options on campus.[3]

Small Home Smart Home by LAAB Architects



VIDEO: Watch a micro-apartment shape shift and transform before your eyes.

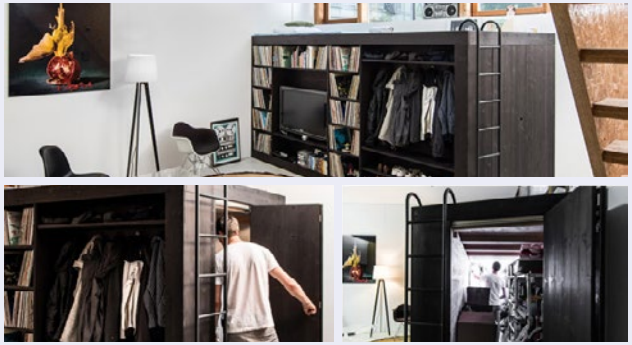
[1] "Nano' flats on the rise as Hong Kong homes shrink amid high property prices", South China Morning Post, 2017
[2] "UBC Unveils Tiny 'Nano' Apartments", HuffPost, 2016
[3] "Photos released of New York's first micro-apartment tower by nArchitects", Dezeen, 2016

SMALLER HOMES MEAN PEOPLE ARE DEMANDING MORE VERSATILE FURNITURE

Urban living requires more versatile, multifunctional furniture and spaces that can evolve over time.

Renters and owners are maximizing their micro-pads by using multi-functional furniture and transforming spaces that convert a living room into a dining room into a bedroom with ease.

Furniture designers are targeting two key markets: millennials willing to sacrifice space for location and older or vulnerable populations benefiting from an adjustable environment tailored for safety and comfort. Combined, there is expected to be demand for hundreds of thousands of units in the U.S. alone.[1]



The Hub ↗

Containing a kitchen, shower and toilet, these 161 sq. ft. modules are designed to instantly transform any building with water and electricity hookups into a livable space. A "BedHub" variant features sliding doors with a sleeping area inside.[3]

↖ Living Cube

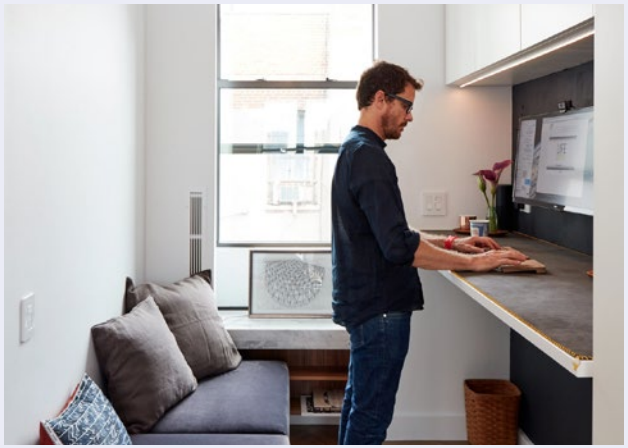
Originally conceived for a one-bed flat, the "Living Cube" combines many pieces of furniture into one freestanding cube. The structure fits a sleeping area up top and a dozen storage spaces on the sides, including larger openings for a television or for hanging clothes.[2]

[1] "YO! Home: Rise of the transformer house", CNN, 2015 2 "7 'apartment-in-a-box' designs for tiny spaces", Curbed, 2017
[2] "The Living Cube by Till Könneker saves space in micro apartments", Dezeen, 2014
[3] "7 'apartment-in-a-box' designs for tiny spaces", Curbed, 2017

AND MORE VERSATILE SPACES

People are creating the functionality of an area more than twice their apartment's size by leveraging concepts such as fluid layouts, custom moving walls and transformable furniture; this experimentation is celebrated as a new source of abundance in top architectural magazines such as Dwell.

Graham Hill renovated his own 350 sq. ft. apartment in NYC "to start a conversation about how doing more with less could improve our lives from an environmental, financial, and even emotional perspective."[1]



[1] "At His 350-Square-Foot Apartment, Small Space Champion Graham Hill Practices What He Preaches", Dwell, 2016 (photos: Photo by Christopher Testani for Dwell).

CO-LIVING IS EMERGING AS A MORE AFFORDABLE (AND DESIRABLE) FORM OF HOUSING

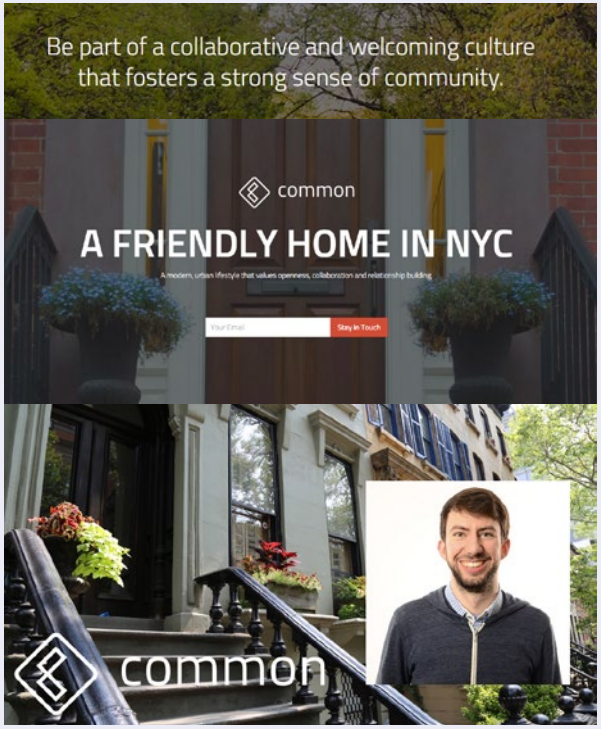
Co-living or co-housing is an emerging trend (globally) for those who want to live not just lighter, but collectively. It attracts people looking to enrich the living experience with meaningful relationships and experiences at home.[1]

Landlords focus on simplifying "life admin" – minimizing the friction that can arise between housemates and creating an environment for people to unleash their collaborative, creative spirits. As such, they tend to offer flexible, short leases as well as flat monthly fees that cover rent, bills, cleaning and shared activities.[2]

These types of apartments are on the market globally; Fellowship for Intentional Community, an organization that champions communities "where people live together on the basis of explicit common values," lists 1,539 co-living communities around the United States.[3]

Organizations that offer co-living include: Ollie, The Collective, Quarters, WeLive, Campus, Common, PMG (who, alone, are launching 3,500 units in next 5 years).[4]

"Shared housing for those who live life in common. We're a community of passionate and creative people who live, work, and play together."



In 2016, Common received about 10,000 applications to fill its nine residences across three major U.S. cities. Common says it hasn't been able to keep up with demand for its co-living spaces and receives 300 applications for rooms in its buildings each week.

[1] "How Co-Living Is Changing the Housing Market", Paste, 2017
[2] "Co-Working Becomes Co-Living", Financial Times, 2015
[3] "New Millennial Housing Trend Is a Repeat of Middle Ages", Atlantic, 2016
[4] "Co-living Isn't Just for Startups", Fastcompany, 2017

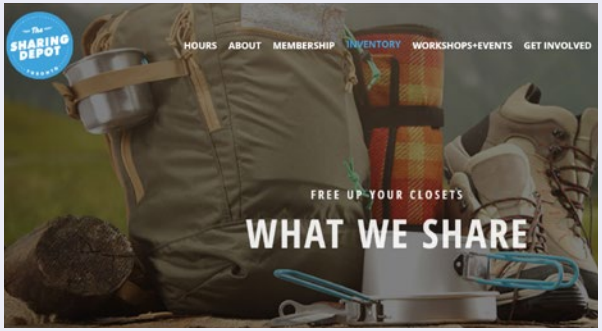
AND PEOPLE ARE SHARING ASSETS* (AGAIN)

Community-based libraries and sharing apps for tools, appliances, house party supplies, board games and toys are popping up in cities as a way to save money, resources and space and live more simply with less stuff.

In some, the products are free for borrow (e.g., Kitchen Share in Portland) and in others, pay-by-use (e.g., washing machines in Shanghai) or part of a membership (e.g., Sharing Depot in Canada) or subscription (e.g., Bundles in Netherlands).

According to Pew Research Center, 72% of Americans believe that they will use services through the sharing economy in the next two years.[1]

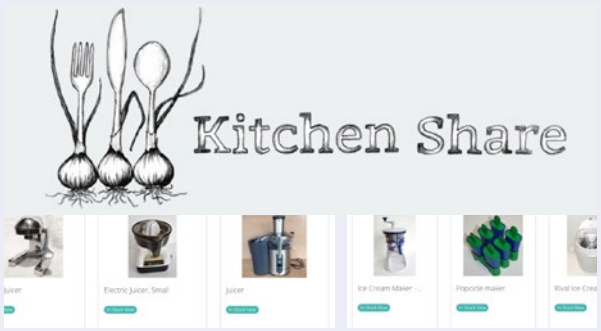
China is expected to become the world's largest sharing economy. According to the government-run "Sharing Economy Research Center", the sharing sector grew 103% in 2016 and is expected to grow 40% in the years ahead. Research indicates that by 2025, the sharing economy will account for 20% of the country's GDP.[2]



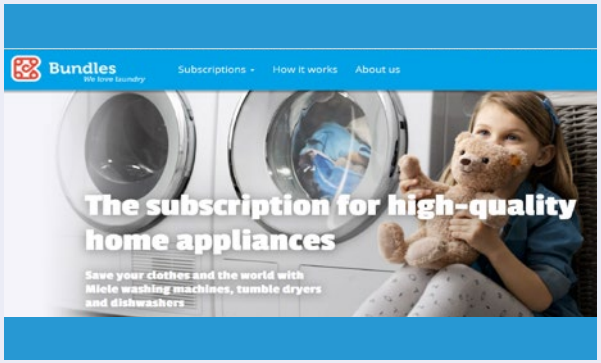
The Sharing Depot is a Canadian community hub giving members access to a wide range of things without owning or storing them.

Pedestrians walk past shared washing machines on a street in Shanghai, east China, May 19, 2017. Shared washing machines are served for public use here and users can pay with either smartphone or cash. (Xinhua/Ding Ting)

Shanghai: Washing machines have been made available in a number of downtown public spaces, with users able to pay using WeChat & Alipay.



As a public lending library, Kitchen Share in Portland strives to build community through the sharing of tools, traditions, skills and food.



Netherlands: Bundles offers Dutch households the opportunity to rent washing machines and even supplies auto-dosed detergent.

*** sharing economy or collaborative consumption**

[1] Shared, Collaborative and On Demand: The New Digital Economy, Pew Center, 2017
[2] State Information Center, 2017

EVEN THEIR HOMES

Home sharing has become a way to make extra money from unused space as well as to connect with others. In opening our homes up, they become extensions of ourselves. They say something about us.

There are 3 million+ home listings on Airbnb in more than 65,000 cities and 191 countries. 150 million guests have stayed in Airbnb listings since 2008.[1]

In cities like Paris, San Francisco and Seattle, the size of Airbnb's host-and-guest community in 2016 approached or exceeded 20% of the population. In key U.S. markets, 85% of millennials support allowing residents in their cities to rent out their extra living space on Airbnb.[1]

Seniors are Airbnb's fastest-growing host demographic, helping them afford to "age in place." Home sharing on Airbnb brings the typical U.S. host aged 65 and older an extra $8,350 a year, equal to a 52% increase over a typical Social Security income. 58% of older American hosts report that Airbnb has helped them stay in their homes.[1]

Nonetheless, this popularity has not been without consequences, for instance, contributing, along with low cost air travel, to the new challenge of "mass tourism". Both countries, and cities, are exploring regulations and taxes as a result.[2]

[1] "Airbnb's 2016 highlights and 2017 trends we're watching", Airbnbcitizen, 2017
[2] "How the world is going to war with Airbnb", The Daily Telegraph, 2018

AND INCREASINGLY, PUBLIC SPACES TOO

An example of this, is the increasing interest that people are showing in community gardens and farms.

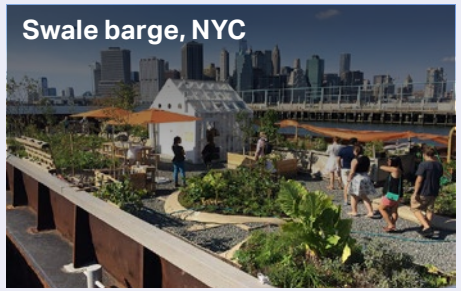
Today, approximately 15% of food worldwide is grown in urban centers.[1] In developing nations, city dwellers farm for subsistence, but in the U.S., urban agriculture is more often driven by capitalism or ideology.[1]

Community gardens are being built in urban areas across the world, increasing access to quality, fresh, local food as well as vibrant community life.

In the U.S., there was a 200% increase in the number of households actively taking part in community gardens from 2008 to 2014. With 600+ community gardens, NYC has the largest concentration.[2]

According to a National Gardening Association (NGA) survey, nearly 25% more Americans grew their own food in 2015 than in 2008 – 36 million U.S. households in 2008 as compared to more than 44 million in 2013. The number of households headed by Millennials (ages 19 to 35) growing food also increased by 63% from 2008 to 2013.[2,3]

In 2008 in Philadelphia, 226 community gardens grew roughly 900 tonnes of mid-summer vegetables and herbs, worth $4.9 million. In Camden, New Jersey, a city of 80,000 with only one full-service supermarket, community gardeners at 44 sites harvested almost 14,000 kg of vegetables – enough food to feed 508 people three servings a day for the entirety of the growing season (late spring through early autumn).[1]


Swale barge, NYC


Berlin, Germany

Agrocite project, France


Rooftop paddy, China


Washington, D.C., U.S.A.

London, UK

[1] "Urban farms now produce 1/5 of the world's food", GreenBiz, 2015
[2] "Food Gardening in the U.S. at the Highest Levels", National Gardening Association, 2014
[3] "Research: More Americans Are Growing Their Own Food", Ecogarden House, 2015

CITIES ARE SUPPORTING THIS TREND, UNDERSTANDING THE LINK BETWEEN PUBLIC SPACES AND QUALITY OF LIFE

UN HABITAT defines public spaces as: "all places publicly owned or of public use, accessible and enjoyable by all for free and without a profit motive. Public spaces are a key element of individual and social well-being, the places of a community's collective life, expressions of the diversity of their common, natural and cultural richness and a foundation of their identity".

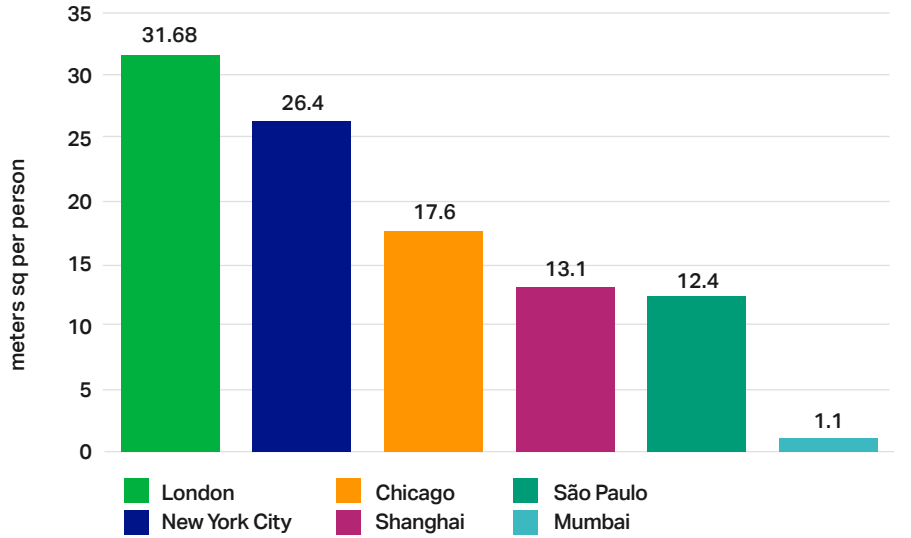
Public spaces have been historically neglected and undervalued, but their role in enhancing community cohesion and promoting health, happiness and well-being is increasingly being recognized.

In 2011, UN HABITAT launched its Global Public Space Programme[1] in over 20 countries including Bangladesh, South Africa, Peru, Kosovo and Mexico, with the aim of improving the quality of public spaces world-wide.

Shanghai is working to increase the amount of public space per capita – since 2011, the city's municipal government has been making pledges to expand and improve city parks and open green areas.[2]

While the amount of public space available per person is important, access to public space is also a significant factor. For example, São Paulo's public areas are not distributed equally across the city, but in Minneapolis, 94% of residents are within walking distance of a park.[3]

Public Space Per Person

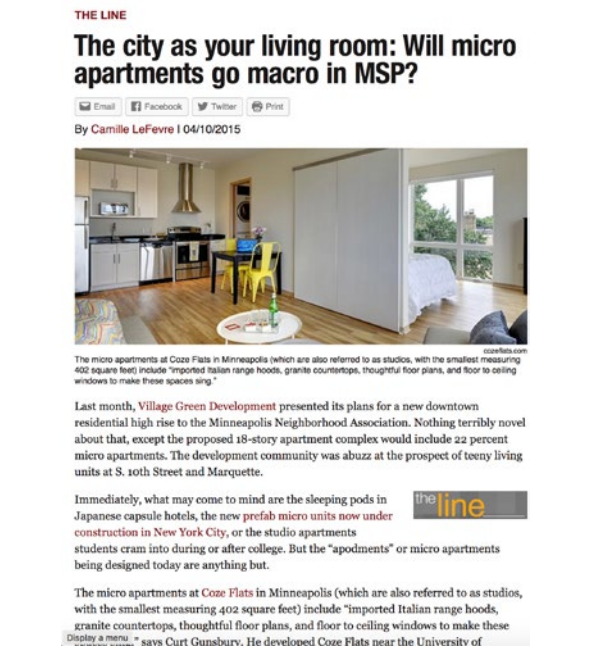


Source: Teleport, 2017

[1] "Global Public Space Programme", UN Habitat, 2017
[2] "Shanghai reveals open spaces plan", China Daily, 2007
[3] "Public Space in Cities – What's the Measuring Stick?", The City Fix, 2016

MORE AND MORE, THIS ALLOWS CITIZENS TO SEE THE WHOLE CITY AS THEIR LIVING ROOM

The outside and the city are increasingly considered part of one's home. This includes but goes beyond reconnecting with nature through our gardens and terraces.



THE LINE

The city as your living room: Will micro apartments go macro in MSP?

Email | Facebook | Twitter | Print

By Camille LeFevre | 04/10/2015

The micro apartments at Coze Flats in Minneapolis (which are also referred to as studios, with the smallest measuring 402 square feet) include "imported Italian range hoods, granite countertops, thoughtful floor plans, and floor to ceiling windows to make these spaces sing."

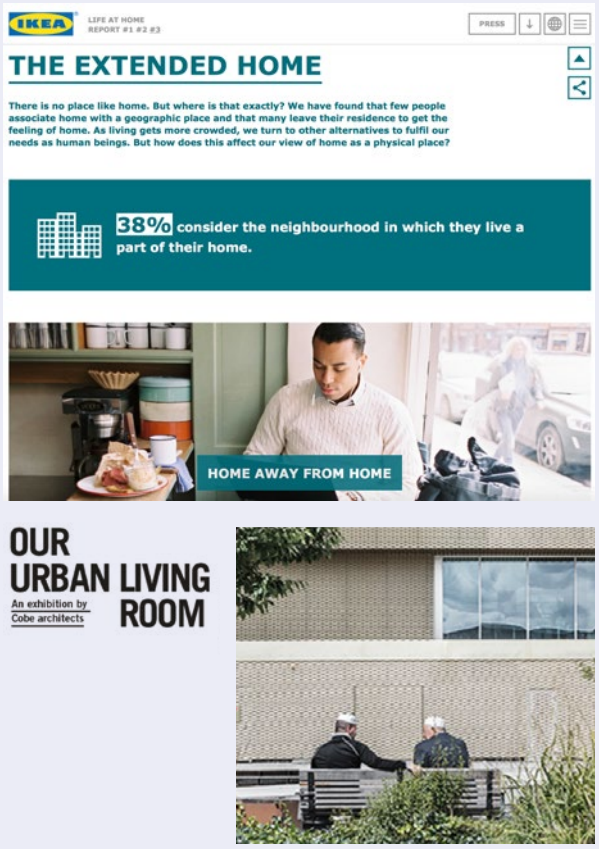
Last month, Village Green Development presented its plans for a new downtown residential high rise to the Minneapolis Neighborhood Association. Nothing terribly novel about that, except the proposed 18-story apartment complex would include 22 percent micro apartments. The development community was abuzz at the prospect of teeny living units at S. 10th Street and Marquette.

Immediately, what may come to mind are the sleeping pods in Japanese capsule hotels, the new prefab micro units now under construction in New York City, or the studio apartments students cram into during or after college. But the "apodments" or micro apartments being designed today are anything but.

The micro apartments at Coze Flats in Minneapolis (which are also referred to as studios, with the smallest measuring 402 square feet) include "imported Italian range hoods, granite countertops, thoughtful floor plans, and floor to ceiling windows to make these

Display a menu " says Curt Gunsbury. He developed Coze Flats near the University of

Source: The city as your living room: Minnpost, April 2015



IKEA LIFE AT HOME REPORT #1 #2 #3

PRESS

THE EXTENDED HOME

There is no place like home. But where is that exactly? We have found that few people associate home with a geographic place and that many leave their residence to get the feeling of home. As living gets more crowded, we turn to other alternatives to fulfil our needs as human beings. But how does this affect our view of home as a physical place?

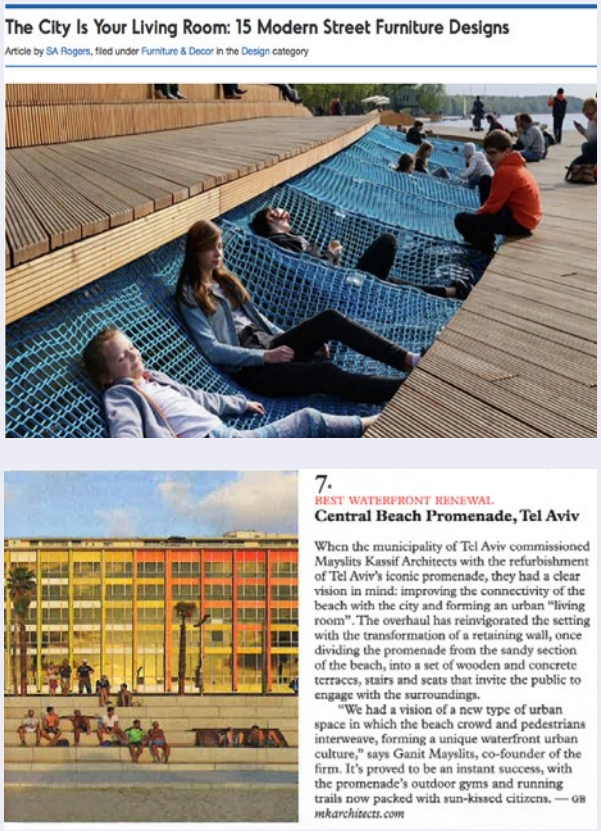
38% consider the neighbourhood in which they live a part of their home.

HOME AWAY FROM HOME

OUR URBAN LIVING ROOM

An exhibition by Cobe architects

Source: Our Urban Living Room, COBE Architects @Danish Architecture Centre 2016-7



The City Is Your Living Room: 15 Modern Street Furniture Designs

Article by SA Rogers, filed under Furniture & Decor in the Design category

7.

BEST WATERFRONT RENEWAL

Central Beach Promenade, Tel Aviv

When the municipality of Tel Aviv commissioned Mayslits Kassif Architects with the refurbishment of Tel Aviv's iconic promenade, they had a clear vision in mind: improving the connectivity of the beach with the city and forming an urban "living room". The overhaul has reinvigorated the setting with the transformation of a retaining wall, once dividing the promenade from the sandy section of the beach, into a set of wooden and concrete terraces, stairs and seats that invite the public to engage with the surroundings.

"We had a vision of a new type of urban space in which the beach crowd and pedestrians interweave, forming a unique waterfront urban culture," says Ganit Mayslits, co-founder of the firm. It's proved to be an instant success, with the promenade's outdoor gyms and running trails now packed with sun-kissed citizens. — GB

mkarchitects.com

Source: The City is Your Living Room: 15 Modern Street Furniture Designs, Web Urbanist, August 2016

Source: Making Moves, Monocle Magazine, Issue 104, June 2017

TECHNOLOGY IS EVERYWHERE AND CHANGING EVERYTHING. INCLUDING OUR HOMES

The proportion of "green" buildings continues to grow and more and more of the appliances we use in our homes are energy-efficient.

However, the real boom is expected to come from new voice-activated devices that can control a range of smart and connected devices, such as thermostats, to lights, to security systems.

Electric mobility is also likely to alter our relationship with our homes as well as cars. Some companies envision a future in which our cars can act as back-up power sources for our homes, or off-peak storage for the renewable energy that our homes will collect.

GREEN HOMES (AND PRODUCTS TO MAKE THE HOME GREENER) CONTINUE TO GAIN MARKET SHARE

LEED certified buildings produce 34% less CO_2 emissions and consume 25% less energy and 11% less water.[1] LEED certification increases asset value by 5% on new builds and 4% on retrofits, and there is no significant difference (about 2%) between the average construction cost of a LEED-certified building and other new construction.[2, 6]

Since 2005, China's green building market has more than doubled every year and the country now has 7% of the LEED market.[5]

A survey of 70 countries showed that 60% of building development in these countries will be "green" by 2018.[1]

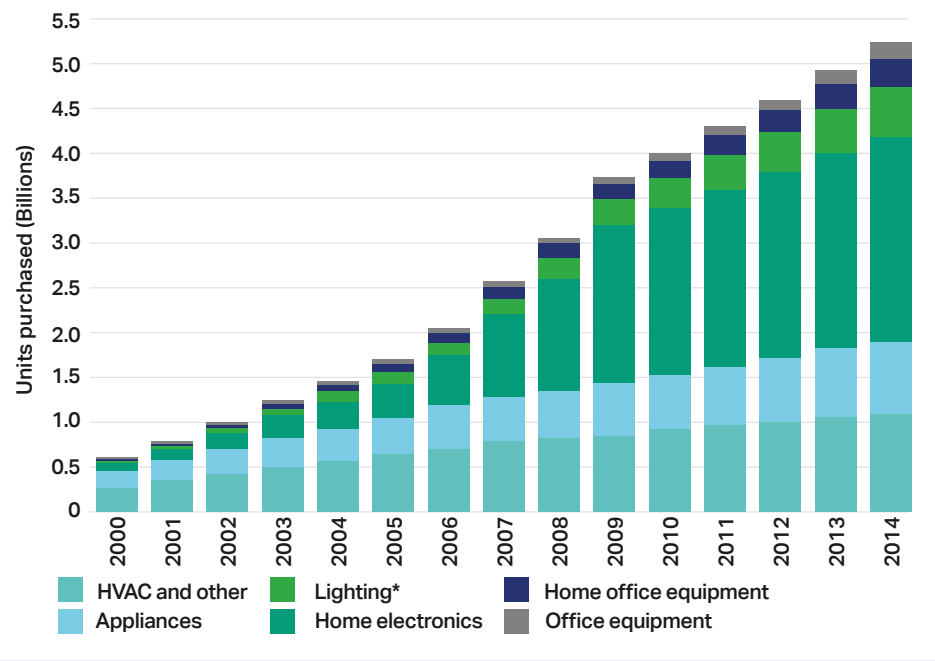
U.S. spending on green construction increased from $10b in 2005 to over $150b in 2015. Year over year growth is expected at 15% at least through 2018.[3]

Over 16% of greenhouse gases in the U.S. are emitted by home appliances, including heaters and air conditioning. Energy Star-qualified appliances use up to 70% less energy than outdated models.[4]

As of 2014, 320 million "Energy Star Certified" products are sold in the U.S. annually, saving consumers more than $31 billion annually. Unit sales are up over 80% since 2000.[4]

Products range from energy efficient versions of existing products, e.g., LED bulbs, to products that help optimize energy use within the home such as smart thermostats.

More than 52 Billion ENERGY STAR Certified Products purchased since the program began



[1] "Benefits of Green Building", U.S. Green Building Council, 2016
[2] "The Business Case for Green Building", U.S. Green Building Council, 2015
[3] "Green Building Economic Impact Study", U.S. Green Building Council, 2015
[4] "Office of Atmospheric Protections Annual Report 2014", EPA
[5] "China : The market growth for green buildings", Asia Green Buildings, 2016
[6] "Green building costs and savings", U.S Green Building Council, 2015

WE'RE STARTING TO TALK TO OUR HOMES

Voice-activated devices enable a smart, connected life away from a screen.

In 2017, 35.6 million people in the U.S. used a voice-activated device at least once a month, ~130% increase over 2016. 25 to 34-year-olds make up 25% of all users.[2]

More broadly, 60 million Americans are using virtual assistants, and usage is expected to grow 23% in 2017. Virtual assistant devices include Amazon's Alexa, Apple's Siri, Google's Now and Microsoft's Cortana. Currently, Amazon's Echo captures 71% of users.[2]

More than 25 million units voice-controlled smart home devices were sold in 2017 – more than 3 times the 6.5 million sold in 2016, and a big leap from 1.7 million in 2015.[3]

As for how these devices are used, 46.7% of people in a VoiceLabs survey said they use their Echo or Home for playing music or audiobooks; 29% to control smart home gadgets; 29% for games and entertainment, and; 26.5% to listen to news and podcasts.[3]

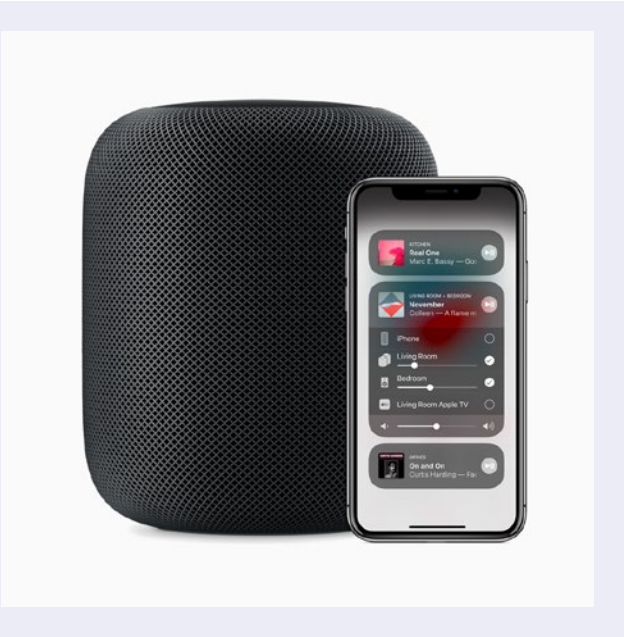
The U.S. dominates the market for smart home products, at 3 times the size of the next biggest market and over half the global market.[4]

The U.S. "smart home" market was estimated at $14.7b in 2017, with growth expected at 21% annually.[5] In a 2016 survey, 45% of U.S. home upgrades involved some aspect of "smart upgrades."[5] The European smart home is the next largest at $5b with growth projected at 37% until 2020.[6] Currently, India's smart home market is valued at $67m.[7]

Google's Nest thermostat, camera and smoke alarm are now in millions of homes globally, growing 50% year-on-year; Google announced in January 2017 that the products will be sold in four more countries in Europe – Germany, Austria, Italy and Spain.[8]

"Voice is the next frontier for search and discovery, and there are lots of opportunities to leverage voice command within the home."

Michael Levine, Photon[1]



1 "Apple takes on Amazon Echo and Google Home", LA Times, 2017
2 "Alexa, Say What?! Voice-Enabled Speaker Usage to Grow Nearly 130% This Year", eMarketer, 2017
3 "Voice powered devices will have a big 2017: 24.5 million sales predicted", Wareable, 2017
4 "Smart Home", The Statista Portal, 2017
5 "U.S. Houzz Smart Home Trends Study 2016", Houzz, 2016
6 "Smart Home – Europe", Statista Portal
7 "Smart Home – India", Statista Portal
8 "Alphabet's smart home brand Nest expands", Tech Crunch, 2017

AND WE'RE PREPARING OUR HOMES AND CITIES TO BE ABLE TO TALK TO OUR CARS

The first step to cities and homes that collaborate with vehicles to manage energy demand, storage and use, is charging infrastructure. This infrastructure must extend to people's homes.

In the U.S., electric vehicles were plugged into the 13,925 public charging stations just 4% of the time, compared with 42% of the time at home-charging units. Data indicates electric car owners prefer to plug in their vehicles at home, both for the convenience and the lower cost of residential electricity compared with what they would pay at the public charging units operated by for-profit networks.[1]

About half of the 20,000 plug-in EVs in the Los Angeles, CA area do all their charging at home, at night, on a simple 110-volt wall plug. However, this method isn't fast – taking up to 10 hours to completely recharge the battery.[2]

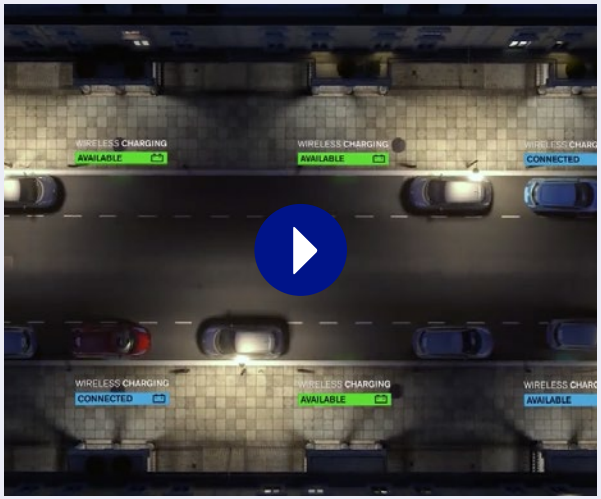
EV owners may elect to install dedicated 240-volt charging stations in their garages. These can cost from $300 to $800, plus installation costs. The benefit of these charging stations is the speed at which the car can recharge – going from empty to full in just 3-4 hours.[2]

Devices, such as Siemens's new VersiCharge Smartgrid, are emerging as Wi-Fi-enabled charging stations allow residential owners to monitor and control usage through a mobile app. Users can automatically turn charging on or off, schedule charging when rates are lowest, and view past power consumption data. Cloud-based charging stations can also interact with other utilities, receiving demand response and pricing signals so that utilities can potentially reduce peak demand on the grid.[3]

The global EV Charger (EVC) market is forecast to grow from more than 1 million units in 2014 to more than 12.7 million units in 2020, with most charging stations expected to be installed in domestic applications, such as a dedicated wall box or simply a charging cord plugged into a household power source.[4]

To get an idea of how this might work in the not too distant future, have a look at the video, a recent concept from Nissan, showing cars as the "Fuel Station of the Future".

Nissan Introduces the Fuel Station of The Future



VIDEO: Nissan reveals an exciting glimpse into the future with their ideas for renewable energy harnessed by the LEAF electric car

[1] "Public electric-car charging stations sit idle most of time", Seattle Times, 2015
[2] "How will I charge my electric vehicle? And where? And how much will it cost?", Los Angeles Times, 2016
[3] "Siemens introduces VersiCharge Smartgrid Wi-Fi-enabled charging station", Charged, 2015
[4] "Global EV Charging Stations to Skyrocket by 2020", BusinessWire, 2015

TAKEAWAYS

Challenges

The developed world's middle class hasn't recovered from the 2008 financial crisis. In its wake, the attitude of 'more more more' is giving way to a focus on balance and well-being.

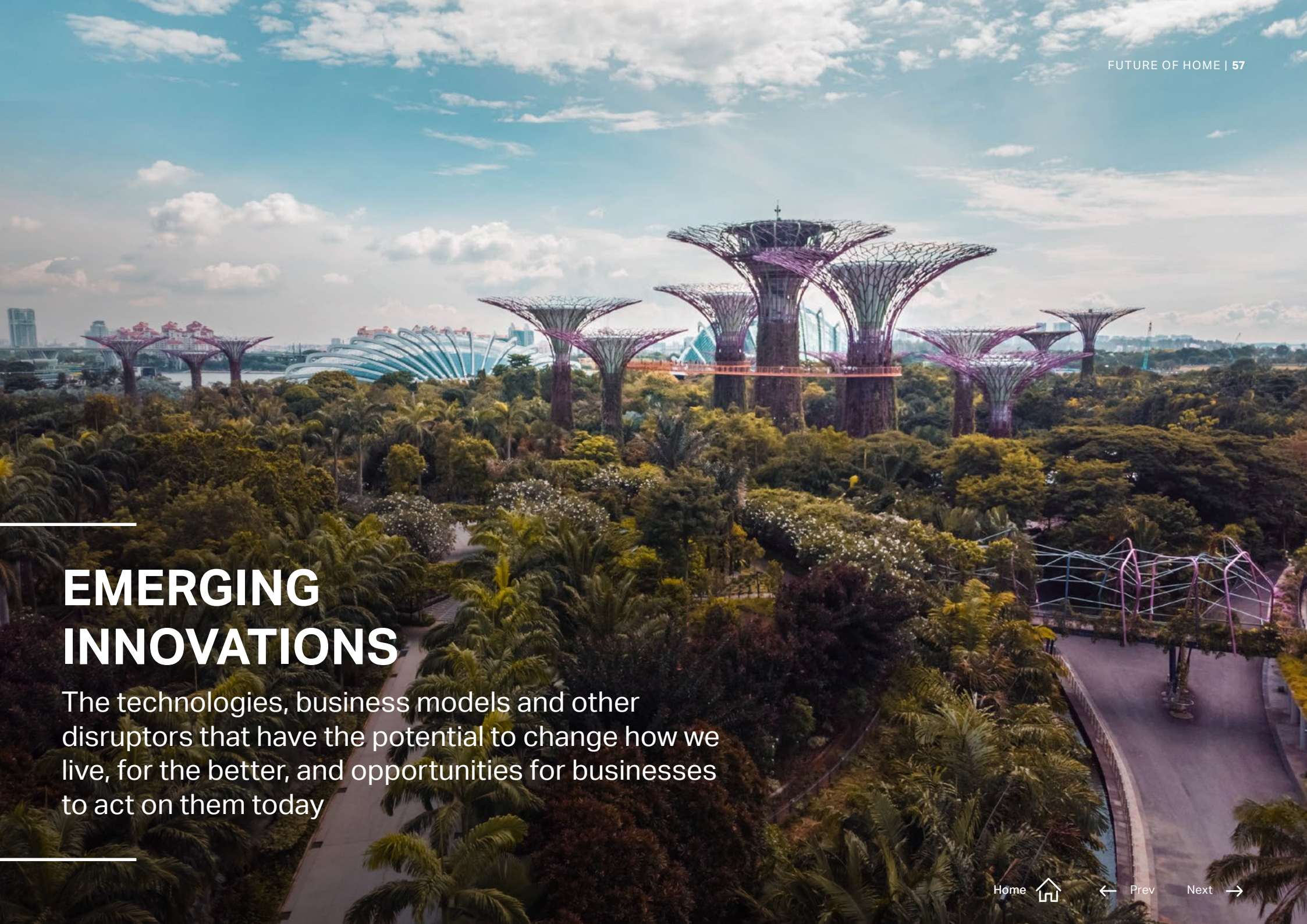
Regardless the woes of the rich world's middle classes, financial and demographic pressures everywhere are combining with the net result that people have less space than they used to. Concepts such as decluttering, minimalism, and "lagom" have taken hold.

For some, decluttering isn't the problem - finding somewhere affordable to live is. Cost, convenience and necessity are driving a renewed interest in communal living, as well as home and other asset sharing. In some markets, space is so tight (and costs so high) that people have turned to "tiny" and "micro" homes, which can offer versatile multiple-purpose spaces.

Regardless of the size of our homes, the pressures and pace of modern urban life affect nearly everyone. We need our homes to protect us from the pollution, noise and stress of the outside world. At the same time, the shortage of space and the need to unwind is driving people outdoors. The rich cultivate their roof gardens while the rest of us escape into the city, visiting parks and public spaces – services that cities now fully understand the benefit of. Some of us are even taking part in community gardens and farms. And those quirky millennials, rather than getting pets, have started a craze cultivating houseplants and creating urban "jungalows".

Opportunities to consider

- As people turn to their homes as safe havens from the stress of the rest of their lives, there are opportunities to address sustainability issues through our efforts to improve people's well-being. For instance, high quality insulation saves energy at the same time as protecting people from noise, improving sleep and reducing stress.
- Have we really reached "peak stuff"? Clearly not everywhere, but a significant number of people are re-evaluating their relationship with possessions. There is a real opportunity to offer an alternative to the current throw-away culture and instead supply higher quality, higher margin, items.
- Even better than items are services! Ride-hailing demonstrates that people are willing to move away from ownership, given a better alternative. The sharing economy offers opportunities for entirely new business models and, in this case, housing arrangements and rental agreements.
- Homes, and their inhabitants, are increasingly connected. Perhaps the most ambitious ideas are those involving the use of electric vehicle batteries to help balance energy demand in people's homes.
- Smaller houses offer multiple opportunities – for instance, new kinds of furniture and appliances. They also encourage people to spend more time outside the home, growing both the community and the economy of the city as a whole.



EMERGING INNOVATIONS

The technologies, business models and other disruptors that have the potential to change how we live, for the better, and opportunities for businesses to act on them today

CREATE HOMES THAT SUPPORT WELL-BEING AND HEALTH

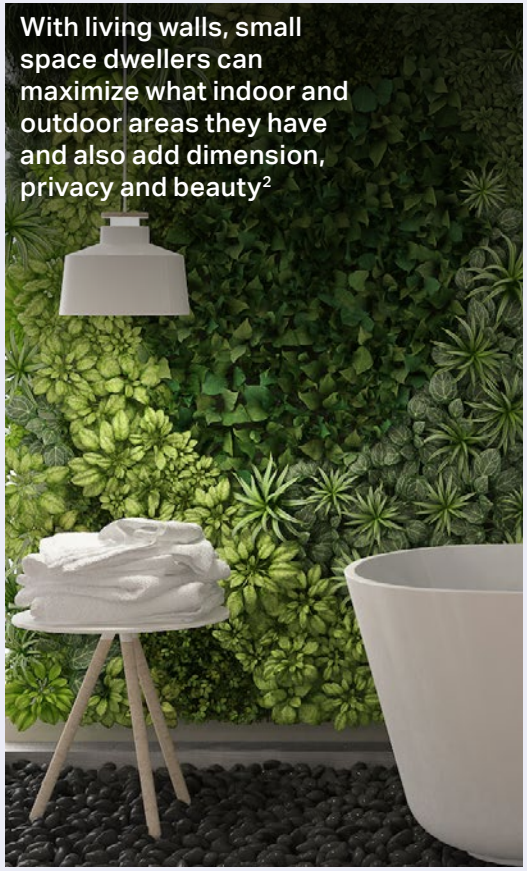
We see disruption appearing across a range of areas that will support greater well-being and health at home. These include a number of innovations that bring nature into the home, and technologies that monitor and even improve a number of different health and well-being factors, from air quality, to movement, to stress.

However, some of the most exciting developments are in how different technologies, designs and behaviors can be built directly into homes and communities to support an increase in well-being and health.

RECONNECT WITH NATURE TO IMPROVE INDOOR AIR QUALITY & WELL-BEING

The BioWall is an air filter consisting of shelves of plants built into a wall and attached to a home's HVAC system. The built-in system provides light and water to the plants. A fan behind the unit draws air into the BioWall and then through the growth media, where microbes in the plants' roots process volatile organic compounds ("VOCs"). The plants also remove carbon dioxide from the air. The cleaned air then returns to the home's HVAC unit for heating or cooling. The current prototype has been in place at the ReNEWW House since 2016.[1]

Measurements of stress hormones, respiration, heart rate, and sweating suggest that short doses of nature – or even pictures of the natural world – can positively impact human health and sharpen performance.[3]



With living walls, small space dwellers can maximize what indoor and outdoor areas they have and also add dimension, privacy and beauty[2]

Biowall @ ReNEWW

*** Note: Biowalls are also referred to as living walls, vertical gardens, green facades, and green walls covered with living vegetation**

1 "Living Biowall of Plants Could Clean Air, Lower Energy Bills", Purdue, 2017
2 "Breathe Life Into Walls", Garden Center Magazine, 2017
3 "This is your brain on nature", National Geographic, 2016

LET NEW TECHNOLOGY HELP YOU TO MANAGE YOUR AIR QUALITY

Sprimo Personal Air Monitor & Purifier

Sprimo's Personal Air Monitor & Purifier, debuted at CES2017, are small, portable, iOS compatible devices which can, in real-time, measure air quality, let you know when you are in a dirty or clean air environment, and purify your breathing zone in less than 30 seconds. Sprimo started taking orders on Kickstarter April 2017.

"A world where every home and building are comfortable and safe to breathe in"

Enerbee Smart Vent

Enerbee's Smart Vent solution, debuted at CES2017, is the first product able to both collect information on air quality at relevant places in homes and automatically adjust the indoor environment so inhabitants are always comfortable and safe, while optimizing energy at the same time.

"See what you breathe" + "Instant personalized fresh air"

YOUR HEALTH

From aging older adults, to young children to people with disabilities, there are a growing number of innovations that can help people stay healthy and safe in their own home.

Monitoring

Connected wireless devices – such as TytoCare physician exam, iHealth blood pressure cuff, Glooko wireless glucose monitor, Proteus Digital Health medication compliance monitor, Propeller asthma monitor – enable virtual doctors appointments from the home. The data syncs with mobile apps, and can be sent to doctors' offices for future consultation or immediate virtual appointment.[1]

Sensing

Smart home technology – such as Evermind, Slip & Fall and Lively – use Bluetooth sensors to track movements or (lack of movements) of elderly residents in the home. Sensors can be placed on any item, and GPS technology documents precise location information of the person, logs activity and reports it to a family member or caregiver.[2,3] SensFloor has developed a conductive textile floor that detects when people are walking or lying on it, and will alert caregivers when a senior has fallen.

Reflecting

The Wize Mirror will give users a daily health report based on a minute-long analysis of their face. The touchscreen smart mirror is equipped with 3D scanners, multispectral cameras, facial recognition software and gas sensors that perform various tests. The mirror assesses any changes since the last time the person looked in the mirror and provides a score to indicate a user's overall health, if changed, and if users are approaching unhealthy or dangerous territory.[4]

The intelligent toilet as preventative health monitor

Japanese company Toto is developing Flowsky, a new toilet that assesses health through users' urine. It measures users' mass, glucose levels, hormone levels, total urine evacuated, inflammation indicators and pregnancy testing. The new technology is expected to have significant benefits for Japan's aging population.

[1] "15 Game-Changing Wireless Devices to Improve Patient Care", MedScape, 2014

[2] "The future of aging in place", San Diego Union Tribune, 2015

[3] "Smart Home Technology: Providing Independence to the Elderly While Strengthening Family Ties", Mutual Mobil, 2015

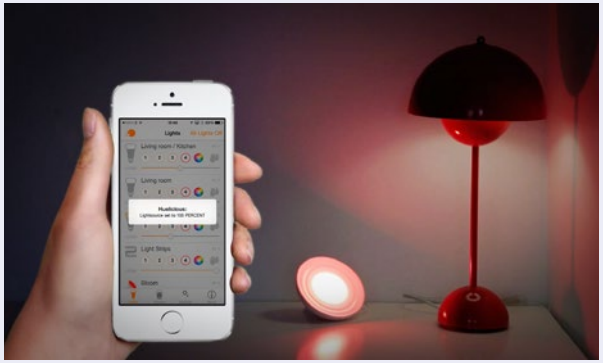
[4] "Look Into This Smart Mirror and You Get a One-Minute Medical Checkup", Smithsonian, 2015

AND EVEN YOUR STRESS LEVELS

Integrated light, sound, and scent technologies will help better manage stress and improve sleep.

Light

At night, light throws the body's biological clock – the circadian rhythm – out of whack. Sleep suffers. Worse, research shows that it may contribute to cancer, diabetes, obesity and heart disease.[4]



Phillips Hue has developed voice-controlled lighting that can automatically adjust to your mood with special circadian features to emulate natural light enhance sleep quality, energy levels, productivity, and overall home experience.[1]

Noise

In addition to sleep disturbance, urban noise can result in poor health, including cardiovascular disease, cognitive impairment, chronic stress and hearing problems.[5]

Muzo is the first acoustic device that uses anti-vibration technology for a smooth surface (e.g., wall, window) that impedes any objects from vibrating, thus minimizing any intrusive noise and generates realistic sounds, selected based on the user's mood, to drown out intrusive noises.[2]

Scent

Scents while sleeping impact both quality of sleep and mood the following day, as the sense of smell is known to be closely associated with the brain's limbic system, which governs emotion and behavior.[6]

Lumiere is the world's first IoT essential oil diffuser, where users can control the diffuser through an app based on their mood, schedule or even the volume of their rooms.[3]

[1] "A Home That Talks to You & Adjusts to Your Moods", SmartThings, 2014
[2] "Muzo – State of the Art Vibration Monitoring System", Kickstarter
[3] "Lumiere – Automated essential oil diffuser", Kickstarter
[4] "How a Light Bulb Can Help You Sleep Better", HuffPost, 2014
[5] "How Sound Impacts Your Sleep Cycle", HuffPost, 2016
[6] "Smells Influence Dreams, Study Says", National Geographic, 2008

WHERE POSSIBLE, BUILD WELL-BEING INTO BUILDINGS FROM THE GROUND UP

The Wellness Home Innovation Technology (WHIT) smart house in Orlando, Florida opened in September 2016. It is designed to activate health solutions and technologies and research their ability to measurably improve health and well-being.

"WHIT helps turn your best intentions into positive actions. With amenities like circadian lighting, air and water purifications systems, and an interactive digital cooktop, you can sleep, breathe and eat your way to healthier life.

WHIT is a built-in health coach, educator and an innovator, bringing forward-looking health technologies that empower you to be at your best. WHIT brings traditional healthcare delivery into the community and ultimately into your own home. And because we learn best when we learn together, WHIT stays connected, learning and improving to better your health and others."

Source: Wellness + Health + Innovation + Technology, 2018

All sources and references are to
WHIT: Wellness + Health + Innovation + Technology, 2018

AND DESIGN COMMUNITIES FOR HEALTHIER LIFESTYLES

Behavioral design for a new kind of affordable housing.

Some low-income housing projects are applying behavioral design and CDC's research* to to promote healthier diets and lifestyle.

The idea comes from an area of psychology, known as "nudge theory" - in this case, encouraging people to make quick decisions that are beneficial to their health.[1]

For instance, Aria Denver supports a healthy and simplified lifestyle, provides easy access to continued education from Regis University, and embraces urban gardens. Aria is a unique community that allows residents to drive less, walk more and cultivate life.[2]

"The overall concept is to link affordable housing, healthy living, health care, education, job training, connectivity and transit."

Chuck Perry, a partner at Perry Rose, the Denver office of Jonathan Rose Cos.[1]

*** Center for Active Design (CfAD), a nonprofit organization that has partnered with the Centers for Disease Control and Prevention (CDC) to make recommendations on design that will help tackle obesity**

[1] "Can Your Home Make You Healthier – If It's Designed Right", OZY, 2017
[2] Aria Apartments website

HELLO IT'S ME AGAIN, TECHNOLOGY

Yes, I'm everywhere. Embrace me to transform homes and communities (for the better)!

Connected homes will start to build virtual and augmented reality into the way that they interact with the people that live in them. For the most part, people are welcoming the potential improvements to their lives, but privacy is important and brands will have to earn people's trust in order to be invited into homes.

Another exciting area of development is in the inclusion of automation and AI into core areas of the home, for instance through adaptable or AI-augmented furniture.

Smart homes and grids continue to become more sophisticated, but the application of blockchain to community energy grids could be a gamechanger for distributed and renewable supply systems.

And while 3D printing has yet to deliver on the hype, the fact that homes are now capable of being printed gives an indication of both the ambition and the potential for this technology.

CONNECT HOMES & COMMUNITIES

Unruly surveyed 2,000 U.K. and U.S. consumers about the connected home space, connected apps, Internet of Things, and whether they'd be happy interacting with brands in their home. They found:

- **84% of U.K. consumers are open to brands** engaging with them in the connected home
- **"People are really looking for trusted voices,** and for brands that they can feel at home with… For most, the home is a sanctuary. Brands must therefore create a trusted presence to not only be invited in, but be allowed to stay."[1]

In 2017, Unruly partnered with industry experts on everything from sleep and interior design to augmented, virtual and mixed reality to show what the home of 2020 will look, sound, smell, taste and feel like.

In a 2,000 sq. ft. space in their new London HQ, Unruly showcases both actual and conceptual Internet of Things (IoT) devices and connected home technology, global consumer and tech brands and startups. The space features Click & Grow's self-watering garden, HTC Vive's VR headset, smarter's FridgeCam, iKettle's self-starting kettle, and Samsung's "Family Hub" smart fridge.

Inside Unruly's Connected Home

VIDEO: Take a look inside Unruly's 2020 Future Home experience!

[1] "Future of Home", JWT Intelligence, May 2017

BRING ROBOTS INTO HOMES (AS PART OF THE FURNITURE)

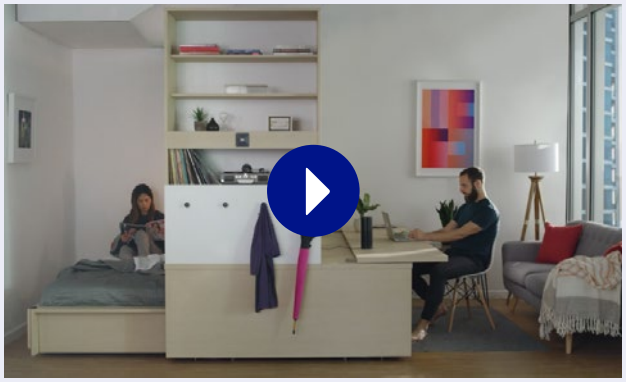
OriSystems, designed by MIT Media Lab and Fuseproject, transforms into an office space, bedroom, and living room at the press of a button or a voice command.

The "robotic system" includes a bed, a closet, drawers, a workstation, and storage. It can be powered through a standard electrical circuit and uses about a tenth of the power that a hairdryer consumes.

Ori is accepting pre-orders from large-scale development companies in New York, San Francisco, Boston, Seattle, Chicago, DC, Vancouver, Miami and Columbus.

It is retailing for $10,000.

Ori – One Room. A Hundred Ways



VIDEO: Watch how one room automatically transforms between office, bedroom, and living space at your command. This multifunctional space-defying furniture comes to life.

Note: The early iteration of Ori – "CityHome" – was tested by renting the units out on Airbnb

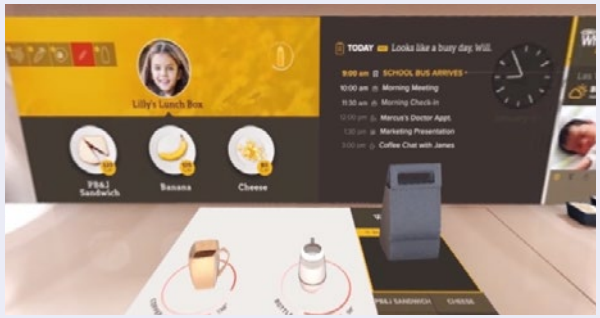
"MIT's $10K Robotic Apartment-In-A-Box Is Finally Hitting The Market", Co.Design, 2017

PUT AN EXTRA PAIR OF HANDS IN THE KITCHEN

Kitchens of the future will address everyday needs and empower people to be their healthiest selves by turning intentions into positive actions in a comfortable, collaborative, and connected environment.

Connected island

The Connected Island from GE Appliances is intended to be "the future of healthy eating and living." The Island lets you plan, schedule, shop, cook and connect all on one intelligent surface, and connects to voice-activated "assistants" such as Amazon Echo or Google Home to help simplify everyday life.[1]



Kitchen of the future

Whirpool's "sixth sense" kitchen will anticipate residents' schedules to track to-dos, suggest personalized cooking based on overall diet, favorite foods and nutrition goals, and sense and react to contents on a surface to heat or cool to the ideal temperature. Stovetops will heat up to two times faster than gas or ceramic hobs, and save up to 40% on energy bills.[2]

Concept kitchen 2025

Ideo and IKEA's kitchen facilitates mindfulness with cues throughout that guide people toward being conscious of actions such as water consumption and waste disposal, and making more sustainable decisions.[3]

[1] "Lake Nona's WHIT 'Smart Home' to Redefine the Future of Healthy Living", Lake Nona Social, 2016
[2] "Designing the Future Kitchen", Ideo, 2015
[3] "Whirlpool Smart Kitchen Concept Demos the Future of a Day of Care", Whirlpool, 2016

USE MICRO-GRIDS TO CONNECT HOMES AND COMMUNITIES IN EXCITING NEW WAYS

Smart home and city[1,2]

Honda Smart Home in Saitaima, Japan

- Honda is developing a smart-home in cooperation with Toshiba and the biggest home builder in Japan.
- Each home's energy system consists of rooftop solar panels, a gas co-generation unit, a home battery unit, a hot water tank, an electric car (Honda Fit), and an energy management system (Smart-e Mix Manager).
- Solar panels distributed on roof tops can meet 60% of residential power needs for 3 days.

Solar energy kiosks[3]

Energy Kiosks and Microgrids in Nigeria

- In March 2017, Community Energy Social Enterprises Ltd. and Renewvia Energy Corporation signed a MOU to provide solar power to 25 communities across Nigeria using local microgrids.
- Solar panels provide energy to remote villages at 40-60% of the cost of kerosene.
- At any time, the kiosk can charge 60 take-home batteries while also powering 60 homes directly wired to it.

Net zero homes[4]

Masdar's Eco-Villa in Abu Dhabi

- Eco-Villa homes are 72% more energy efficient than traditional concrete structures that still form the majority of the Emirate's housing stock.
- Energy consumption also outperforms more modern, code-compliant housing by 45%.
- Rooftop solar panels generate enough energy over the course of a 12-month cycle for these homes to run without having to draw excess energy from the grid.

1 "Honda signs project agreement with City of Saitoma", Green Car Congress, 2011
2 "Post-Fukushima, Japanese Companies Build Micro-grids", IEEE Spectrum, 2015
3 "10,000 Nigerian Homes to Get Electricity from Solar Microgrids", Cleantechnica, 2017
4 "Masdar City's new Eco-Villa: Abu Dhabi's residential future", The National, 2017

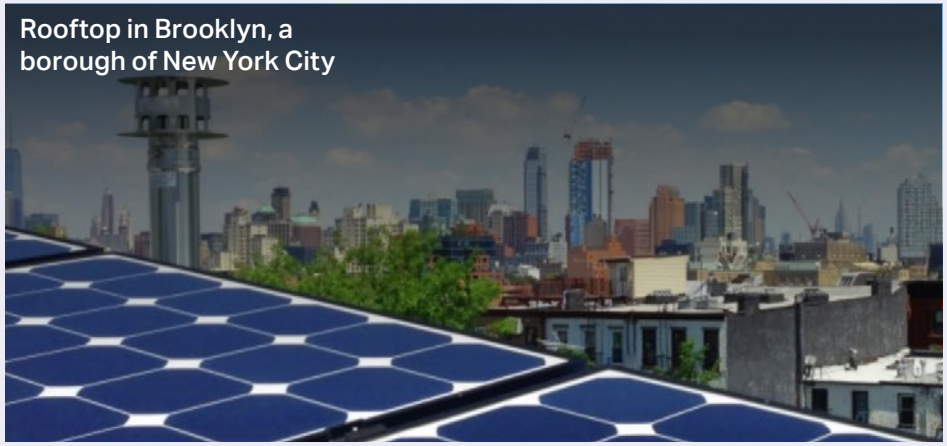
LET BLOCKCHAIN MANAGE COMMUNITY ENERGY GENERATION AND USE

Neighbors throughout Brooklyn are buying and selling solar power from each other on a blockchain platform – the first of its kind in the world and a pioneer in the movement toward a distributed energy supply system drawn from renewable sources. It will serve as a starting point for developing other joint blockchain-based microgrid projects in the U.S. and other countries.*

The first peer-to-peer transactions occurred in April 2016. By early 2017, it included 50 brownstones, apartment houses, schools, a gas station, a fire station, and factory buildings. The goal is to have 1,000 participants by 2018. This is part of the commitment made by the mayor after Hurricane Sandy, to expand microgrids to 800 MW capacity by 2030.

This pilot is a collaboration between:

- **LO3 Energy** which provided its "TransActive Grid," a blockchain platform – a technology that timestamps each transaction as a chain of secure blocks
- **Siemens Digital Grid Division** which provided microgrid-specific technical solutions
- **next47, Siemens'** startup financer, which supports potentially disruptive technologies like this, through financing, project expertise and advice.



Rooftop in Brooklyn, a borough of New York City

President Street: site of the world's first peer-to-peer energy transactions via blockchain.

Source: "A Microgrid Grows in Brooklyn," Siemens, January 2017

* Note: blockchain platforms and microgrids require a regulatory framework, in this case, by New York State's "Reforming the Energy Vision" (REV)

PRINT HOMES INSTEAD OF BUILDING THEM

The 3D printing materials market is expected to grow 22% year over year by 2021, from $530M in 2016 to $1.4B.[1]

3D printing is emerging as an alternative to traditional home building, with benefits including greater efficiency, affordability and lower environmental impact. 3D printers can create zero waste, as construction mixtures are supplied in preset doses and with precise timing.[2]

China

This 3D printed apartment used recyclable waste that provided insulation and strength, making it resistant to earthquakes. This project saved 60% on material costs and 70% of time compared to conventional construction methods.[3]

This 3D printed villa was assembled in under three hours using a mixture of cement and environmentally friendly construction waste and claims to be able to last at least 150 years and withstand a high magnitude earthquake.[4]

Netherlands

This urban cabin was fabricated using 3D printing with sustainable bio-plastic materials. It aims to showcase how 3D printing can offer solutions for disaster relief and temporary functional housing.[3]

United States

More than just a 3D printed house, this mobile home and car were manufactured to create an integrated energy system. The 3D printed hybrid vehicle can provide energy to the home at night, while the solar panels provide energy to the vehicle during the day.[3]

[1] "3D Printing Materials Market worth 1.4 bn USD by 2021", Markets and Markets, 2016
[2] "3D Printer Features", Apis Cor, 2017
[3] "30 Greatest 3D Printed Houses & Structures in the World", All 3DP, 2017
[4] "Your next home could be a click away 3D printed villas that can be 'built' in under 3 hours", DailyMail, 2015

LEVERAGE POCKETS OF PROGRESS

Progressive policy, new technologies and shifting preferences will drive growth in more sustainable homes.

The future is already here, it is just unevenly distributed. The maxim holds truer than ever when it comes to our homes. So many technologies exist that could reduce the impacts of our homes and lifestyles while maintaining and improving our quality of life, but the numbers don't yet add up.

In other areas, preferences, attitudes and aspirations are shifting ways that could be leveraged to drive a range of shifts towards more sustainable home lives – for instance the growing interest in home agriculture and composting.

Perhaps most importantly, business can help policy-makers to remove policies and regulations that lock in current impacts and lifestyles. From zoning laws, to support infrastructure upgrades, to waste management, policy-makers are working to reduce regulatory barriers to transformation.

INVEST IN A RANGE OF NOVEL MATERIALS

Low-tech and high-tech solutions to build healthier (more sustainable) homes.

Materials & systems innovations are making it easier to have a carbon-free, healthy home that will save residents money over time.

Already, a nearly carbon-free home has been designed in Chicago, U.S.A. And, in Watford, UK, architects have designed a zero-carbon home that took just 16 weeks to construct and cost $1,200 per square meter – well within the range for social housing of $1,000 to $1,200 per square meter.[2,6]

Green roof

Green or living roofs improve storm-water management, conserve energy, reduce noise and increase urban biodiversity.[1] They can also capture rainwater that can be used as greywater for garden irrigation or interior appliances, such as flushing a home's dual-tank toilets.[2]

Solar panels

The roof's reflective surface bounces additional sunlight onto the PV panels, boosting energy yield by 10%. Thermal solar panels provide for a home's hot water needs and support climate-control systems.[2]

Geothermal walls

Below-ground geothermal wells store warm water and circulate it through a closed-loop system to heat and cool a house.[2]

Mushroom-based insulation

Ecovative Design has developed a mushroom-based material that serves as an alternative to plastic foam insulation; the biodegradable substance is made of a combination of fungi roots and mixed with agricultural waste before packed into blocks.[3] MycoWorks is also working on this.

Cork flooring

Made from a rapidly renewable source – the bark of cork trees – cork flooring is anti-microbial, mold resistant and also serves as natural thermal and acoustic insulator.[4]

Ultraviolet light

Violet Defense has developed the world's most advanced chemical-free germ control unit that allows ultraviolet light to be safely used to kill germs.[5]

1 "Benefits of Green Roofs", Michigan State University, 2012
2 "The Zero Carbon House: It's Just Around the Corner", Wired, 2011
3 "Ecovative Design: wiping out polystyrene with fungus and farm waste", Wired, 2012
4 "Good reasons for cork floor", HARO, 2017
5 "Cutting-Edge Technology for Killing Germs", Violet Defense, 2017
6 "Designers create the 'impossible' zero-carbon house", BBC, 2015

STOP USING ENERGY-RICH, CLEAN DRINKING WATER FOR FLUSHING THE TOILET!

Drought-prone cities are introducing innovative ways to save water.

One strategy is to use greywater – water from bathroom sinks, showers, bathtubs, clothes washers and laundry sinks, but not from toilets or kitchens – for purposes other than drinking, such as flushing toilets.

Where are we seeing this:

- In the U.S., residential greywater is allowed in 26 states.[1] In 2016, at least nine states – California, Florida, Hawaii, Kentucky, Maryland, Massachusetts, Michigan, Oklahoma and Utah – considered greywater legislation. Bills in Florida, Kentucky, Oklahoma and Utah were enacted.[2]
- Japan relies on a blend of reclaimed water sources (e.g., greywater, rainwater, municipal wastewater) and meets 61% of all non-potable water demand with reused water.[3]

Potential downsides:

- Greywater reuse for some applications might not actually save water. Pilot studies of greywater reuse for irrigation in California have shown that it may actually lead to increased water use – especially when homeowners expand their landscaped areas.[1]
- Greywater contains bacteria and pathogens, so it must be treated for all indoor uses. Overseeing systems to ensure humans are not exposed to health risks from improperly treated greywater can create additional burdens for public health departments.[1]

[1] "A new strategy for drought-stressed cities: greywater recycling", Colorado State University, 2016
[2] Correspondence with National Conference of State Legislatures, 2017
[3] "Water Reuse – New York City and Japan Experience and Future Prospect", Alliance Environmental

ReNEWW - Retrofit Net-zero: Energy. Water. Waste.

The ReNEWW House is a 1920s craftsman home in Purdue, Indiana that has been retrofitted by Whirlpool in collaboration with Purdue University to be an in-vivo laboratory for sustainable living – and in particular, prove the feasibility and economics of net zero energy, waste and water.

24%

amount by which simply reusing greywater to flush toilets can reduce home water use.[1]

36%

amount by which using treated greywater can reduce demand for water for toilet flushing and laundry.[1]

26

number of U.S. states which, in 2014, allowed some form of greywater reuse.[1]

GROW FOOD AT HOME, YEAR-ROUND

Open Agriculture Lab at the Massachusetts Institute of Technology (MIT) suggested that as much as 40% of an urban diet could eventually be produced in a domestic context, reducing transportation costs, while providing fresher, more nutritious food.[1] And it is becoming easier for anyone to grow a garden inside their homes and have control over what goes into their food – even in tight spaces with limited resources.

Urban cultivator

Urban Cultivator is a fully automated kitchen garden.

Root

Root is the first smart, in-home aeroponic garden system that helps you effortlessly grow and maintain fresh herbs and food.

Seed2source

Seed2Source can grow enough fresh produce to feed up to 4 families and allows users to grow 30% more, 3 times faster with 98% less water.

[1] Future Food 2025

PUT FOOD WASTE TO GOOD USE

Turning today's food waste into tomorrow's fertilizer.

95-115kg

average amount per capita of food wasted by consumers in the U.S. and Europe each year compared to just 6-11kg in sub-Saharan Africa and Asia.[3]

94%

amount by which greenhouse gas emissions from landfilled food waste can be reduced through food recyclers.[1]

54%

fewer CO_2 emissions from food waste recyclers as compared to regular backyard composting.[1]

Whirlpool "zera" food recycler

This product is the first indoor recycler in the U.S. that can break down one week's worth of the average family's food waste within 24 hours by using a combination of oxygen, moisture, heat and mixing to expedite the decomposition process. Unlike traditional composting methods, families are able to use the Zera system year-round, regardless of the weather, and can remotely operate the appliance through an easy-to-use mobile app.[2]

[1] Foodcycler
[2] Zera
[3] "Which countries waste the most food", World Economic Forum, 2015

EMBRACE, SUPPORT & ENCOURAGE MORE FORWARD-LOOKING POLICIES AND INCENTIVES

Zoning & density

- Since 2007, Boston's zoning code has mandated that all new building be LEED certified.[1]
- San Antonio's infill policy established "Target Investment Areas" and provides developers with financial incentives to build in those areas.[2]
- Mumbai policymakers in recent years have proposed increases to "Floor Area Ratio" limits to promote high-density residential construction.[3]
- New York City is considering a proposal to end a limit on how small apartments can be, opening the door for more "micro-apartments", which could offer affordable options to a growing population of single people.[9]

Home upgrades & appliances

- The national-level U.S. tax credit for solar installations expired in 2016; however, many states, particularly New Jersey, New York, Vermont, Massachusetts, Rhode Island, Missouri, and Colorado, continue to offer incentives and rebates.[4] In these states, the cost of residential solar installation decreased 14-30% as a result of these rebates (compared to 6% nationally).[10]
- China has a number of policies aimed at creating an energy-efficient housing stock, including minimum standards for appliances and mandated retrofits of 400 million sq. ft. of residential and commercial property.[5]
- Since 2008, the state of Virginia has a tax credit for seniors to make their homes more accessible as they age, including adding ramps, widening doorways, and putting grab bars in bathrooms. The tax credit is 50% of the cost or up to $5,000.[6]

Other lifestyle elements

- In 2014, São Paolo decentralized its waste processing system and provided homes with free composting boxes, which is expected to reduce biodegradable waste by 33%.[7]
- The UK's Electric Vehicle Home Charging Scheme provides a subsidy up to 75% of the installation cost of private car chargers.[8]

1 "Article 37 Green Building and Climate Resiliency Guidelines", Boston Planning & Dev. Agency
2 "Fee Waivers: Target Investment Area", City of San Antonio
3 "The most important urban policy story in the world is happening in India", Vox, February 2015
4 "Residential Renewable Energy Tax Credit", U.S. Dept. of Energy
5 "Chinese policies aim to increase energy efficiency in buildings", U.S. Energy Information Administration
6 "Tax Credits for Ramps, Grab Bars to Help Seniors Stay at Home", Pew Charitable Trust, 2016
7 "Sustainable Financing and Policy Models for Municipal Composting", World Bank Group
8 "Comparison of Leading Electric Vehicle Policy and Deployment", Intert'l Council on Clean Transport
9 "New York City may see more "micro" apartments", CBS, 2015
10 "States with the best solar energy incentives", RGS, 2015

ALL AROUND THE WORLD

Chicago, Illinois

2004: Chicago required developers applying for public assistance to include sustainable features in project designs. Today, the city boasts more green roofs than any other in the U.S.A., with 7 million sq. ft. on over 500 roofs.[4]

Philadelphia, Pennsylvania

Philadelphia now requires that new residential construction include in-sink food waste disposers, in an effort to increase food waste diversion. The city is targeting 10% of its residential waste with the new requirement.[1]

Colombes, France

The Agrocité project in the suburbs of Paris is an experiment in alternative urban living that includes a micro-farm, recycling plant, and cooperative eco-housing. The project has 400 citizens co-managing 5,000 square meters of land, producing food, energy and housing, while actively reducing waste and water usage.[5]

Paris, France & New York City, U.S.A.

Paris is rolling out the first phase of a curbside organics collection program, with the goal of expanding the program citywide by 2020. Officials hope to collect 3,500 tons of material per year from 74,000 households, who will receive aerated food bins and compostable bags from the city. New York city has a similar initiative, where all residents will have curbside or nearby access to organic waste collection by 2018. Germany also separates waste by source, with an overall 87% recycling rate of all waste.[3,8,9]

Tokyo, Japan

Japan has created an optimized water reuse model that includes a mix of reuse strategies and a blend of reclaimed water sources, including municipal wastewater, greywater and rainwater. This has resulted in 61% of all non-potable water demand being met with reuse water in Tokyo.[2]

Stockholm, Sweden

Sweden burns 50% of their household waste to produce energy, and even imports waste from other countries. Bi-products are used for road paving and metal scraps. Only 1% of the original waste ends up as trash.[7]

Kuala Lumpur, Malaysia

Malaysia's National Strategic Plan for Municipal Solid Waste plans to establish 20% recycling and 100% separation at source for organic waste by 2020.[6]

1 "Philadelphia Aims at Food Waste with In-Sink Disposal Law", Waste360, 2016
2 "Water Reuse – New York City and Japan Experience and Future Prospect", Alliance Environmental
3 "Paris aims for citywide curbside organics collection by 2020", WasteDive, 2017
4 "Chicago Green: Roofs", WENDYCITY 2015
5 "Urban commons have radical potential – it's not just about community gardens", The Guardian, 2015
6 "Mitigation strategies for the reduction of GHG emissions from food waste recycling", FAO, 2012
7 "The Swedish Recycling Revolution", Official Site of Sweden, 2017
8 "NYC Organics Collection", NYC Department of Sanitation, 2017
9 "Waste Management in Germany, 87% Recycling Rate", We Future Cycle, 2015

TAKEAWAYS

Challenges

The home is so much more than walls and a roof. It is where we create our memories, nurture and tend to ourselves. We expect the homes of the future to protect us, comfort us and help bring joy to our lives.

Our homes need to get better at keeping bad things out. Bringing nature into (and even onto) our homes plays an important role in making our homes and communities healthier. Technology will increase its grip on our lifestyles: we will need to address the challenges that arise from connected or even semi-autonomous homes: avoiding isolation, protecting personal-data, privacy and home security.

Well-being can be built into the building itself, but better still would be to build it into the community. Lower-impact infrastructure, public spaces that invite physical activity, neighborhoods that integrate rather than isolate - all of these are essential to our ability to live sustainably in the future.

We can deliver this vision. Renewables are cost-efficient, water-saving technologies improve every year, and blockchain is a game-changer for community micro-grids. New methods allow us to grow food at home and more of us are willing to farm cooperatively at community gardens. And if we need to build something new, we can just print it, using recycled materials!

All this and more is to come. People are ready for it. But business needs to embrace the change, and policy-makers must be willing to "encourage forcefully" if need be.

Opportunities to consider

- The greatest opportunity lies in shifting the way that we think about our homes. Not as buildings, but as spaces where we spend time and keep our things, and places where we live, nurturing ourselves and our relationships. For instance, we can explore how we might use space more effectively, and the blurring lines between private and public spaces (inside and outside the home).
- The pressure for more sustainable, healthier lifestyles, and our seemingly endless appetite for new technologies opens up a myriad of opportunities to integrate technology into all aspects of our home lives, focusing on improving health, well-being and convenience in the home.
- Our homes won't be sustainable until "the envelope" and the infrastructure that supports us is addressed. Innovative building and infrastructure technologies exist, but we still need to work to create the "win-win-win" of increased profitability, reduced environmental impact and better (more affordable) houses.
- Government policies and incentives around cleaner homes offer opportunities for businesses to take advantage of in cities all over the world. But policies and incentives need to go further, if they are to break the urban development status quo. A more systemic approach is required to challenges such as zoning, infrastructure (energy, water, waste management, transport, eMobility) and public spaces.

FUTURE ASPIRATIONS

Good Life 2.0 aspirations that support a better future for our homes

THE GOOD LIFE 2.0

WBCSD has been exploring the emergence of a "Good Life 2.0", publishing the findings in **The Good Life 2.0 Playbook.** It presents the aspirations appearing in society that celebrate lifestyles that are better rather than bigger, but without trade-offs or settling for less. The Playbook provides a window into people's lives as they search out smarter, cleaner and healthier ways of enjoying their lives.

The purpose of the Playbook is to show companies that they can promote these emerging aspirations in their communications with their customers, helping to grow their gravity within culture and to build demand for smarter, healthier, cleaner products and services that happen to be more sustainable too.

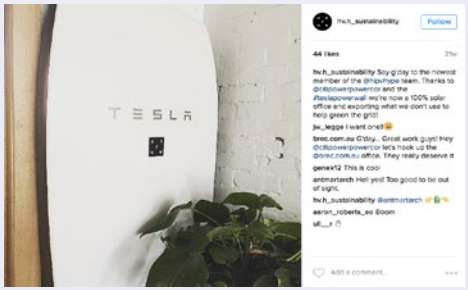
The Playbook looks at four different groups of emerging aspirations: our relationship with our "homes & families"; how we are taking "time to slow down"; the notion that "the journey matters"; and how we are keeping our "work & life in balance". Within these categories we look at 20 more specific aspirations that we suggest are emerging within culture. Several (if not most) of these were linked to our relationship with our homes.

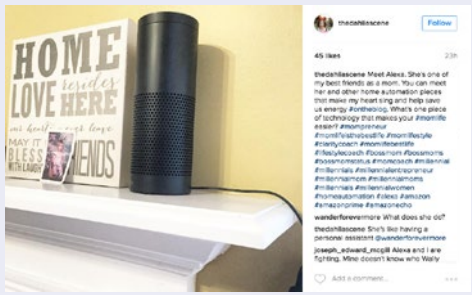
A small selection of these includes:

- **A Full House:** Togetherness has real social currency (people want to spend time with each other, with friends or family, at their homes)
- **Being Connected:** It doesn't matter whether it's our friends, our phones, our homes or our cars – our world is more and more connected. Our homes are getting to know us better. And mostly, we like it!
- **A (Smarter) Sense of Place:** We're growing more sensitive to our environment, and we're embracing simple and smart solutions that help us to live better
- **Time:** Whether it's time to hang out (the laundry), time for the simple pleasures, time to grow, to share or to save, we relish the opportunity to spend time in our homes, enjoying them and enjoying the ways that they let us spend our precious free time.
- **Work and Life in Balance:** Our homes aren't just where we sleep. For some people, their home is also an aspirational office that gives them greater control of their lives. At the same time, we're eager to get out and explore the world around us, for fun, and to make sure that we stay healthy outside our homes too. The city is our living room and we like sharing it with our friends and neighbors.

Further links can be drawn from almost all of the Good Life 2.0 aspirations we identify in the Playbook. Our lighthouse takes these aspirations as the guidelines for our future relationship with our homes and the specific ways in which we can work to improve people's homes today.

PEOPLE LIVING THE GOOD LIFE 2.0





LIGHTHOUSE

The Future of Home – To what we might aspire

PREFACE TO THE LIGHTHOUSE

Evolving wants and needs

As people move to (or near) cities, we have less space to live in.

We increasingly live fluid lives and need to be able to do almost anything from home – play, entertain, work, study, create and most importantly, get the necessary respite from the chaotic city.

What we need our homes to **BE** and what we need them to **DO** for us, or help us do ourselves, is expanding.

Frontstage

What we do and experience*

- Rest, sleep
- Relax, restore
- Grow
- Cook, eat
- Shop
- Play, entertain
- Study, work
- Create
- Learn, develop
- Care
- Connect
- Move, exercise

* in no particular order

Backstage

What we trust is working behind the scenes to make our lives better*

- Block noise
- Eliminate malodor
- Monitor and purify air & water
- Energize renewably
- Monitor and manage energy and water use
- Compost, recycle

* in no particular order

WHAT WE WANT HOME TO MEAN

WISDOM FROM ARCHITECTS & BUILDERS	What we want home to **MEAN**	
LAYERED AND TEXTURED	*"It is defined by memories, contents and people as much as it is by physical form. It is an evolving idea that continues to change as memories and inhabitants come and go. For a home to function well it needs the basics of threshold, sanctuary, space-to-be and space-to-share."*	**Shane Cotter & Kathryn Wilson,** Architectural Farm
PERSONAL AND PUBLIC	*"The personal quality of home provides a place to experience our inner being and also allows for the temporary detachment from our public character….We can look at the house as a dwelling where individual and public aspects find a concurrence."*	**Fabio Candido,** Sunday Morning
COMFORT AND PEACE	*"Home is "the idea of belonging somewhere not only in physical terms, but also the feeling of being comfortable, the moment of perceiving and enjoying the small things that inspire you and bring you peace."*	**Leonidas Trampoukis,** LoT
MATERIAL & SOCIAL IMPORTANCE	*"I recognize the material and social importance of home …and believe "that architecture carries a genotype and a phenotype."*	**Erhard Aa-He Kinzelbach,** KNOWSPACE
SIMPLICITY	*"Whether it's incessant emails, texts or social media updates, our overly packed schedules or the many hundreds of things we own, life can be overwhelming. I believe we intuitively desire simpler lives filled with high-quality experiences, relationships, and possessions."*	**Graham Hill,** resident (Dwell Magazine, Nov 2016)

"What is the Meaning of Home," Architizer, 2014

WHAT WE WANT TO FEEL

WISDOM FROM RESIDENTS	What we want to **FEEL**
HOME HAS DEEP EMOTIONAL MEANING	*"I feel safe and protected."* *"Home is my sanctuary, my refuge, my soft place to land. It's a haven from the chaos, unpredictability and noise of the outside world."* *"I breathe a sigh of relief as I walk in the door and know I can get some peace, quiet and serenity. Home is my cocoon."* *"The air smells clean, fresh and cozy, depending on my mood. But no matter what, it always smells like home."* *"Home feels full of light, life and warmth."* *"I can gather my family and friends and make magical memories. We entertain, celebrate, have fun. My home is a place of love and comfort."* *"Home is waking up to the smell of breakfast cooking and to the sound of music coming from the kitchen. The sensation of those rituals."* *"Home is that place I can relax, recharge and re-energize myself – for a night out, the next day at work, a weekend of adventure. At home, I can slow down."* *"I can be 100% myself at home. I get to have privacy for me time."* *"Anything is possible – I am able to cook, create, study, work, play. I have enough space."* *"Everything I need is available to me, and I don't necessarily have to buy it."* *"My home is life-giving. It makes a positive contribution to the lives and experience of the people who live around. It is a source of energy and abundance – not just to me but for my neighbors too. I'm not just taking; I'm giving."* *"I don't feel separate from nature; nature is a part of home."* *"Technology isn't in my way; it's in the background and makes my life easier, less stressful, healthier, organized."* *"The city is my extended home – the neighborhood coffee shop is my office, Central Park is my living room couch, the park bench around the corner is my place to relax."*

Collated from research and interviews

WHAT WE WANT TO FIX

CURRENT PAIN POINTS & FRICTIONS

A selection of pain points that have repeatedly arisen during the research, in surveys and in workshops that we have been involved in during the development of this lighthouse

What we want to FIX

- Home ownership access
- If renting, not able to make infrastructure changes
- Need for multipurpose use – work, play, create
- Eating out a lot vs. cooking
- Bad odor (e.g. composting)
- Noise overload, constantly
- Protection from unsafe neighborhoods
- Clutter, too much stuff
- Limited natural light
- Family proximity
- Intimidated by smart technology + integration
- Too much waste, not enough easy options
- Removed from nature
- Unable to monitor and manage air quality
- Indoor climate control – too hot or freezing cold

Collated from research and interviews

THE LIGHTHOUSE

LIGHTHOUSE VISION
The Meaning of (URBAN) Home

Home AS Springboard

a safe haven from which to tap into the promise of urban life

WHAT THIS MEANS
For a Person's Life

What This Means, For a Person's Life

Protect against the urban environment	**Care** for body, mind, spirit	**Recharge*** the urban ecosystem *give and take in balance	**Cultivate** one's self and one's memories with family & friends

WHAT THIS MEANS
Practically

What This Means, Practically

Whether it's a micro apartment in the urban core or a multi-generational family home just outside the city...
Home is a safe haven for healthy recovery and recharge; it is also place to nurture, grow, play, learn, love, celebrate and create lasting memories.
It is a transformable space, connected 24/7 to the endless possibilities of urban life. The home extends beyond a physical place of residence.
It exists within the urban ecosystem in super-smart, connected networks of clean energy, waste repurposing, local food, sanitation and transport.
Our homes allow us to live not just smarter, but wiser – in relationship with ourselves, others, our environments and our beloved communities.

INNOVATION SPACES

Backstage				Frontstage						
Urban planning that solves for density & offers the space and services that people need	**Building materials** that add to the working of the urban environment	**Cooling and heating** systems for home	**Protection** from noise overload, indoor air & water pollution	Design of **resource positive home infrastructure** (energy, water, waste)	Space-defying **multifunctional**, versatile design that adapts as you grow and evolve	**Health** monitoring and self-care at home	Body/ mind/spirit **relaxation, rest, refresh and recharge**	Immersion in **nature**	Frictionless replenishment and **shopping** experience	Connection to social ecosystem for **sharing and creating urban life**

WHAT MUST BE TRUE

Zero waste | Regenerative | Resilient | Safe & secure | Within planetary boundaries | Inclusive & equitable | Shared | Fair labor

ENABLERS

Policies & incentives (financial & non-financial) | Promoting new aspirational behaviors

SUMMARY

Cities offer a fabulous proving-ground for societal advances. It is in cities that we will learn how to make future sustainable living possible. And it is our homes that will give birth to sustainable lifestyles, because our homes are where all of our stories begin. We start our days in them, where they are determines how we move around, we nurture ourselves and our families in them, and they are where we rest and recharge.

The rate of change that cities, and technology, make possible is both an asset and a risk. Ideas can take hold and scale long before we fully understand the systemic social, environmental and economic consequences. Companies must take the time to investigate new ideas in order to understand how they will affect the city as a whole, and ensure people are genuinely being offered something "better". For instance, ride-hailing has given people who can afford a car, a more convenient and cost-effective way to get around the city, but at what cost to traffic, public transport and the traditional taxi industry? Airbnb gives those wealthy enough to have spare rooms a rental income, but it does this while pressuring the hospitality industry (and all employed by it) and contributing to new "mass tourism" challenges. In both cases, the average citizen has not done so well from the bargain.

We make this point because when it comes to our homes, companies can enormously influence our impacts. Yes, there are behaviors that we could change ourselves. But it is companies that work with city planners and policy-makers to determine the energy, water and waste infrastructure that is installed. Developers define the efficiency of the building envelope and the size of individual units. Consumer goods companies decide on the products and services that we should fill our homes with. The home is an area where companies can truly shape the future for the better.

This lifestyle research and Future of Home Lighthouse is an effort to help companies understand what that "better" looks like.

The Lighthouse offers a best imaginable future for our homes, based on an understanding of the homes and communities that we live in today. It provides a people-centric vision drawn from people's needs and wants from their lifestyles, and identifies the spaces in which innovation needs to occur to be able to deliver this vision.

Companies should use this research and Future of Home Lighthouse as a foundation for conversations with colleagues in R&D, innovation, insights, marketing, brand strategy and public affairs. It is designed to quickly engage colleagues and partners in a shared positive vision of the future that your company can play a role in creating. It reveals both where you can add value towards this vision today, as well as future innovation opportunity areas in support of this vision.

We hope that companies all around the world will be inspired by this vision, and use the ideas and trends that we have drawn from to accelerate the creation of, and customer engagement in, more sustainable and aspirational homes for all in the future.

Julian Hill-Landolt,
Director, Sustainable Lifestyles
WBCSD, Geneva, June 2018

ABOUT WBCSD

The World Business Council for Sustainable Development (WBCSD) is a global, CEO-led organization of over 200 leading businesses and partners working together to accelerate the transition to a sustainable world. WBCSD helps its member companies become more successful and sustainable by focusing on the maximum positive impact for shareholders, the environment and societies.

WBCSD member companies come from all business sectors and all major economies, representing combined revenues of more than US$8.5 trillion and 19 million employees. The WBCSD global network of almost 70 national business councils gives members unparalleled reach across the globe. WBCSD is uniquely positioned to work with member companies along and across value chains to deliver impactful business solutions to the most challenging sustainability issues.

Together, we are the leading voice of business for sustainability: united by our vision of a world where more than 9 billion people are all living well and within the boundaries of our planet, by 2050.

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About this Report:

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