SUSTAINABLE LIFESTYLES REPORT

CHINA

wbcsd sustainable lifestyles

A vision beyond product improvements

WBCSD's Sustainable Lifestyles cluster has a clear vision: **that the innovative power of business can enable and inspire more sustainable lifestyles.** We believe this is essential if 9 billion people are to live well and within planetary boundaries, particularly with an extra 3 billion people due to enter the middle classes by 2030. A large proportion of these will be in China.

To enable more sustainable lifestyles it will be necessary for business to go **beyond product improvements.** Lifestyle challenges need to be explored from a broader and systemic perspective. One that considers products but also infrastructure, technology, business models, policies and behaviour change.

The good news is this represents a tremendous opportunity for forward-looking business: acknowledging the limits of product improvements frees businesses to explore more transformative ways of addressing key challenges. It points companies towards understanding how people are living, identifying where the highest impacts occur, and investing in developing solutions that improve the system in which products are used – enabling more sustainable lifestyles and inspiring people to live them.

In this report: A focus on China

This report presents the findings of the WBCSD and CBCSD Sustainable Lifestyles workshop held in Beijing on the 16th-17th September 2015. This workshop was the final of four workshops held in 2015 in Brazil, India, USA and China. It was kindly hosted by PwC at its Beijing Training Center.

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China Business Council for Sustainable Development

This report summarizes the research and workshop discussions on where the highest consumption impacts are occurring in key lifestyle areas so we can begin to uncover the ways in which business can fundamentally reduce those impacts. The report serves as input towards a broader discussion between WBCSD companies on how business can inspire sustainable lifestyles, by providing a focus on the issues and opportunities present in China:

- **Section I** summarizes consumption and lifestyle hotspot research carried out by CSCP [1] for WBCSD – with a deliberate focus on Chinese middle and upper-middle class lifestyles.
- **Section II** highlights current business, product and service solutions that companies that attended are already working on to enable and inspire sustainable lifestyles.
- **Section III** reviews some of the challenges faced when promoting sustainable lifestyles in China, and suggests potential business solutions to overcome them. These solutions are drawn from the discussions that took place during the workshop between the 20 companies that attended.[1] We consider potential solutions in relation to products, behaviour, infrastructure, technology and policy. Plus the potential for collaboration between companies and with relevant stakeholders.
- **The conclusion** suggests three cross-cutting big ideas for further development, building on the workshop discussions.

Disclaimer: The contents of this report are meant to provide a synthesis of the discussions that took place during the workshop, rather than workshop minutes. All information has been subject to the interpretation of the authors and does not necessarily reflect the views of the WBCSD, the views of all WBCSD member companies, or those companies that attended the workshops.

[1] Collaborating Centre on Sustainable Consumption and Production http://www.scp-centre.org/

[2] Participating companies are listed in Appendix 1.

Executive Summary

The state of lifestyles and sustainability in China

China is currently in the middle of the largest urbanization project in history. The scale of change that has taken place in the last 30 years is phenomenal. Search out a photograph of Shanghai in the 1980s and today's world-renowned iconic skyline is nowhere to be seen. The pace of this change is sometimes hard to comprehend: between just 2011 and 2013, China used more cement than the U.S. used in the entire 20th Century. This growth is one of the factors that helped China lift an astonishing 600 million people out of poverty between 1981 and 2004, single handedly achieving Millennium Development Goal 1A. And China isn't done with its transformation: by 2030 there are expected to be 1 billion Chinese people living in cities; 221 of which will have populations of over a million.

A cultural and technological transition of such scale and speed cannot occur without consequences: China's environmental and social challenges are well documented. However, in such a fast-paced environment it is possible to rectify and resolve issues rapidly. This workshop explored where business could contribute to, and accelerate, the implementation of solutions needed to enable more sustainable living in 21st-century China.

The lifestyles of middle-class Chinese (and the impacts stemming from those lifestyles) are similar to middle-class lifestyles in other developed countries. However, China's middle class is set to grow so significantly that by 2030 it is estimated there will be approximately 850 million middle-class Chinese living in urban areas. In a world where planetary boundaries are already being breached today, a business-as-usual scenario simply isn't feasible. Nor is it desirable.

This review of current lifestyle trends and sustainability in China highlights many business opportunity spaces capable of decoupling China's urban development from its current impacts. Discussions with companies and stakeholders at this Beijing workshop pointed to already high levels of concern amongst consumers in relation to product safety (food in particular), air pollution and general health issues. Research carried out in preparation for the workshop suggested that aspirations towards healthier lifestyles and trust in corporate brands could offer a high leverage point for lifestyle product solutions that support greater wellbeing and convenience.

China: current lifestyle consumption trends & hotspots

FOOD & NUTRITION

Farming in China is both labour and resource intensive. The widespread use of fertilizers and pesticides has contributed to hazardous levels of pollution, and food safety is now both a key public concern and political priority. Income growth is also at the heart of a large, rapid change of the national diet to include more meat, as well as increased consumption of processed fats and sugars. These changes are driving supply challenges, greater overall environmental impact and significant health issues: obesity, hypertension and Type 2 diabetes are now locked into the Chinese health system for the next 15-20 years. Food waste is another matter of concern. Most consumer food waste is generated in the catering and restaurant sector, as opposed to households; however, storage issues and a decentralized agriculture system also create high post-harvest losses.

MOBILITY

Since 2010, China has been the largest single-country new-car market (having overtaken the USA). Car ownership in China continues to surge and projections for future car purchase are secondary only to those anticipated in India. Sub-standard fuel in China aggravates pollution issues. Business model innovations are occurring in the taxi sector and further adding to the volume of cars. Solutions are urgent: automobiles account for a huge proportion of the air pollution in Chinese cities (over 30% in Beijing), and China is responsible for over 20% of global road traffic deaths (road accidents are the leading cause of death for Chinese aged 15-44). Inbound and outbound leisure travel is growing, and is expected to increase further in the next decade.

THE HOME

Coal is the main source of energy supply for households. Domestic energy consumption is on the rise – driven by demand for cooking and heating (including water heating), and for the growing number of electronic devices and appliances in the modern Chinese home. Low quality construction and poor urban planning have resulted in short lifespans for buildings, which, in turn, contributes to high ongoing demand for construction materials. Access to housing in urban centers has become increasingly unaffordable in relation to average incomes. Meanwhile, continuing urbanization has increased the number of 'ghost towns' (made up of empty buildings) in smaller towns and cities. China used more cement between 2011 and 2013 than the U.S. used in the entire 20th Century.

GOODS
There is growing global concern around both the environmental as well as social sustainability of Chinese supply chains, with particular public focus on the textile and electronics industry. Chinese consumers are buying more electronics and e-waste is on the up. China is also fast becoming the largest consumer of luxury goods (imitation as well as genuine goods – despite significantly higher prices for these on the mainland) such as bags, accessories, clothing, shoes and cosmetics. The price differences for luxury goods on the mainland and abroad has resulted in a new industry of 'personal shoppers'.

Future sustainable lifestyle scenario: an aspirational target

Using a peer-reviewed methodology for calculating a sustainable level of resource use per capita (a sustainable 'lifestyle material footprint'), and working with our research partners at the CSCP, we have defined what a sustainable lifestyle will need to look like in the future. The aim of this scenario is to provide a future target to aspire to and measure progress against.

This future sustainable lifestyle scenario provides a target sustainable lifestyle material footprint of 8,000kg of material resource use per person per annum. The current lifestyle material footprint of the average Chinese person is 15,200 kg per person per annum - close to double the sustainable level. Current consumption growth trends in China are projected to grow on average to 24,100 kg per person per annum by 2020/2030. A selection of real-world example lifestyle material footprints, calculated for this workshop, showed middle-class footprints already reaching between 30,000-40,000kg/p/a.

Business intervention and product solutions are urgently needed to reverse the projected exponential growth in the impact of lifestyle consumption.

The good news – solutions exist today

Companies that participated in this workshop identified business and product solutions that could already be positioned to address many of the current consumption hotspots. These included buying healthy and organic foods through e-commerce, new business models for sharing mobility services, electric vehicles and the deployment of charging stations across Chinese cities, eco-labeled appliances and making supply chains more sustainable.

Participants agreed that business should take the lead in demonstrating sustainable solutions through innovative products and services, but that more collaboration is needed between sectors and companies. Participants also stated that while technology is an important part of the solution, a 'techno-fix' will not suffice on its own – promotion of behaviour change is also a crucial ingredient.

Three big ideas for collaborative business solutions

Smart communities: affordable, clever, sustainable housing

No single company can come up with a holistic solution that will enable sustainable lifestyles across China on its own. However, there is an opportunity to bring trusted brands together to develop affordable smart homes – conceived from the start as communities. This would have several advantages: if such communities were within easy reach of employment centers this would reduce commuter time and benefit wellbeing. It could also draw further benefits from their proximity – for example, systemically sharing industrial and residential by-products such as heat and water as efficiently as possible. As such, energy efficiency would therefore come not just from technological solutions but from locally sensitive design. In addition, expertise from different sectors could ensure that lifestyle needs (food & nutrition, mobility, community leisure spaces and activities and even aesthetic beauty) could be holistically and complimentarily incorporated into the services that the community provides for itself. Furthermore, local industry would be able to apply techniques learnt in the development of communities to improve its own processes. Such communities could be created by repurposing materials taken from the waste materials that China's current development is creating in such great quantities. Data connectivity and collection would be pre-designed into the community from the start – it would learn from itself and improve itself as it evolved. There is nowhere in the world where such an ambition could be imagined, implemented and inhabited in a matter of years. Except for China.

Mobility futures: integrated corporate new energy transport

Mobility is an undeniable challenge in China. Public transport in and between megacities such as Shanghai and Beijing is rapid and extensive. And yet these cities still face some of the worst congestion and air pollution in the world. Sheer weight of movement, and a lack of streamlined or integrated mobility options lead to this. However, technology already exists today to resolve these issues and companies can help lead the way. Forward-looking

businesses can collaborate with each other to incentivize more sustainable and efficient commuting. Companies could take advantage of government incentives for new energy vehicles. Private electric bus transport could be used to bring employees into urban centers and public transport hubs. Ride sharing commuting is already being made possible by technology solutions. So could advice to help commuters find the most efficient route – actually possible in China, as the government is implementing widespread vehicle tracking in key cities. Bike sharing schemes could be supported and offered to employees for 'last-mile' connection to corporate campuses – with those bikes recycled from the first generation of Chinese cars to reach end of life. Finally, companies can collaborate with each other to help employees live closer to work – an employee apartment-sharing network between companies in similar urban areas effectively – cutting the distances employees need to travel every day to get to work.

The tech-enabled lifestyle: healthy & sustainable choices made easy

Health is the hook. Chinese middle-class consumers are concerned about where their food comes from, what is in their cosmetics, how air pollution will affect their families. There is an unbreakable relationship between the body and its environment. Business can take advantage of an always-on society that is not (yet) overly concerned with data privacy. It can begin to explore the possibilities of an ecosystem of collaboration between companies, products, services – all connected to help individuals live healthier, happier lives. By layering up the various different aspects of individuals' lives, companies can work together to offer the choices individuals need to live healthily and sustainably. For example, a maps and mobility app could know what an individual has eaten recently, thus offering walking or cycling options as well as the public or private transport details. If linked into personal health monitors, such an integrated system could even suggest nutritional plans and menus to assist individuals with high cholesterol for instance. No-one would be forced to live as advised, but companies could collaborate to connect to each other and to their customers. They could offer lifestyle improvements, some directly linked to the use of their products and services, others that simply provide people with ideas or the time to explore them. Imagine a recipe put together from what an app knows is already in someone's fridge. Missing ingredients are collected by a driverless vehicle from the nearest place stocking them, avoiding wasted kilometers and wasted food. The recipe is a bit calorie heavy – but you can play a game of ping with Mr Li who lives in your building and likes playing. And he can lend you that blender that you'll need tonight, too.

I: Chinese Consumption Hotspots and Lifestyle Material Footprint

This section summarizes the research carried out by CSCP [3] into current consumption-related hotspots in China. These hotspots help identify the current baseline of lifestyle-related consumption, and where resources may be at risk due to lifestyle habits and trends. They also offer an indication of where to prioritize solutions, and provide a benchmark that can be used to measure how effectively business solutions are addressing the challenges in the future.

What is a consumption hotspot?

A consumption hotspot is a lifestyle or consumption trend that's on the rise, and that poses the biggest risk to the environment and social wellbeing. As such, hotspots reflect consumption trends with the largest potential for change, and therefore indicate where intervention could have a significant impact. Lifestyle hotspots are calculated based on:

- Country-level environmental footprints (analyses of facts and trends about rapidly depleting and scarce resources in a country)
- Average household consumption expenditure (what people are spending more money on, and what goods and resources they are consuming the most)
- Growth trends (any evidence of social/societal innovation that has the potential to shift social norms if applied at scale – in a negative or positive way).

Chinese consumption hotspots

The research investigated current Chinese consumption hotspots in four areas where impacts tend to be highest: food and nutrition, mobility, the home (including building materials, energy and water inputs and waste) and household goods (cleaning products, personal care, appliances and clothes).

A sustainable lifestyle target for China

As you can see from [Diagram 1] below, CSCP's research also investigated a 'Future Sustainable Lifestyle Scenario' to provide a goal that solutions should work towards.

To determine this future target, the research quantified the average lifestyle material footprint based on national consumption averages (see Diagram 3 and its accompanying explanation below for more information on how lifestyle material footprints are calculated). It then quantified what a sustainable lifestyle material footprint would need to look like in the future, based on global resource availability, planetary boundaries [4] and divided per capita assuming a 2050 global population of 9 billion. [5]

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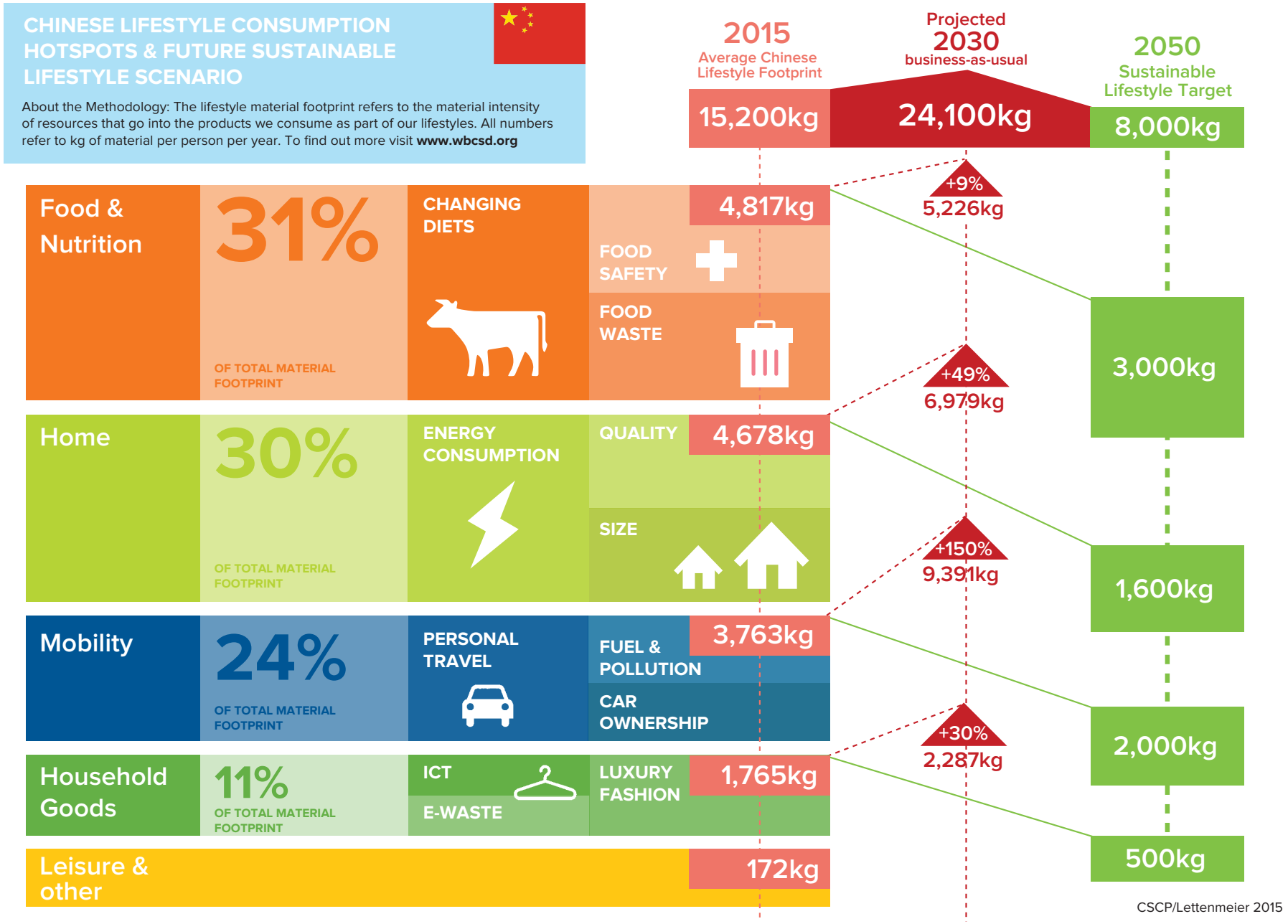
[3] The Collaborating Centre on Sustainable Consumption and Production (CSCP), http://www.scp-centre.org/, has been the WBCSD Sustainable Lifestyles research partner for the 2015 work in Brazil, India and China.

[4] The 2015 updated Planetary Boundaries research can be accessed from the Stockholm Resilience Centre's website: http://www.stockholmresilience.org/21/research/research-news/1-15-2015-planetary-boundaries-2.0---new-and-improved.html

[5] For humanity to live within planetary boundaries global resource consumption should be halved by 2050 and an equal per capita use of resources should be achieved - SCHMIDT-BLEEK, F. (2009). The Earth: Natural Resources and Human Intervention, 1st ed. Haus Publishing: London, UK.

Diagram 1: Chinese Lifestyle Consumption Hotspots & Future Sustainable Lifestyle Scenario
iii. A sustainable lifestyle target for India



A starting point

These hotspots, footprints and sustainable lifestyle targets are a springboard for deeper understanding – providing business with the information it needs to identify opportunity spaces where it can enable and inspire Chinese people towards continuous improvement of well-being, while minimizing negative environmental impacts and social challenges. This research was provided in advance to all participants of the workshop in China, as a starting point for discussions.

Diagram 2: example of the current lifestyle material footprint of a middle-income Chinese person

Tian

Manager in Beijing

- Food & nutrition
- The home
- Household goods
- Mobility
- Leisure
- Others

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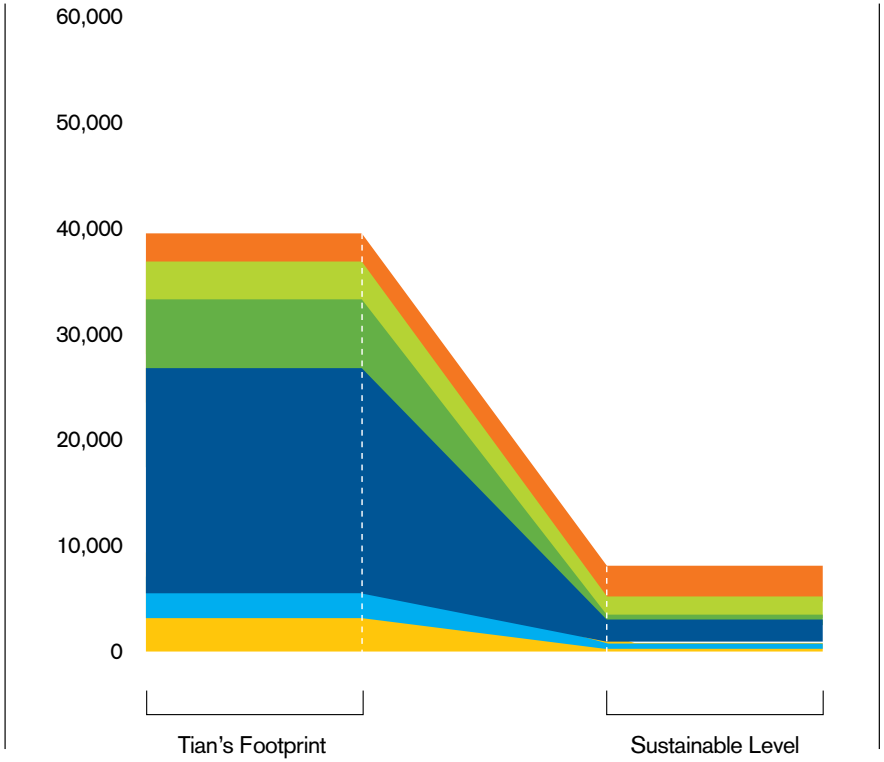


Tian's footprint is 2.5 times the size of the average Chinese footprint

Tian is very conscious of where his food comes from for safety reasons. He aspires to have a healthier diet and do more exercise .

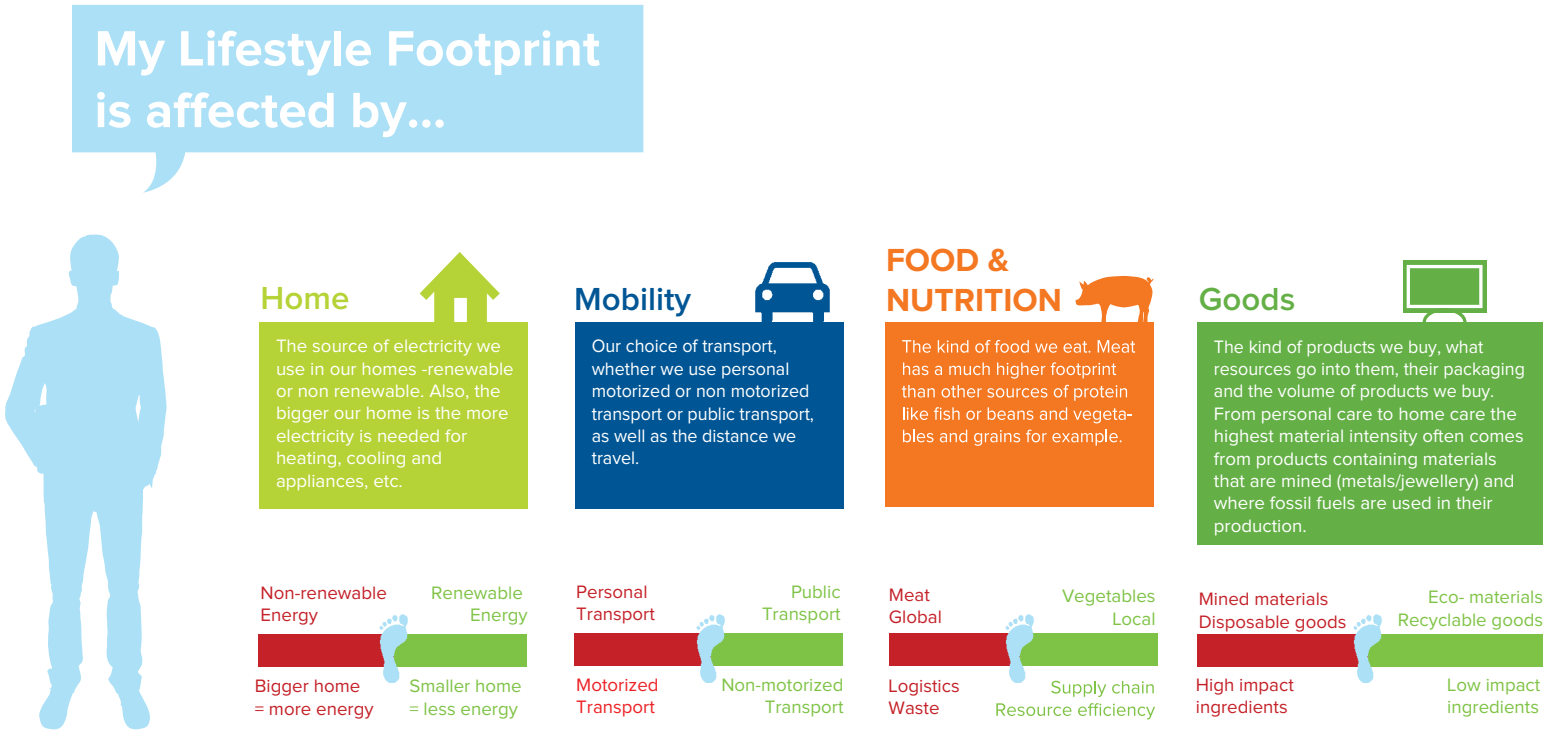
Tian lives in a 120 m2 flat with 2 other family members. He has several electronics and 4 air conditioners.

Tian usually buys several personal and household items every year.

He commutes around 30 km/day by car and travels 4 times a year by plane to enjoy his holidays.

He spends his free time playing badminton

Diagram 3: Calculating a lifestyle footprint



Lifestyle footprint calculations convert all elements of a lifestyle into a material (kg) level of consumption of all goods and services in terms of natural resources and the material intensity required in production. The calculation includes consumption-based indicators of resource use; lifecycle-wide material resource use of all products and services used by households; sum of abiotic and biotic resource consumption plus agricultural and forestry-related erosion, and CO_2 emissions (embedded in the resource use). [6]

Using 2000 data as a baseline, and estimating a world population of 9 billion people by 2050, a per capita future material consumption target has been developed [7], calculated at approximately 10,000kg per capita per annum (where abiotic resources account for 6,000 kg/cap/a and biotic resources account for 4,000 kg/cap/a). Of these 10,000kg, 8,000 kg/cap/a comes from personal lifestyle consumption and 2,000kg comes from public services. This methodology is peer reviewed and was used in a 2012 EU-funded research project that established pathways towards sustainable lifestyles in Europe through to 2050.[8]

CSCP has used this same methodology in WBCSD's 2015 investigations into Brazil, India and China to calculate country level average lifestyle material footprints as well as example individual footprints from a small sample[9] of, in this case, Chinese, representing diverse socio-economic situations and income-levels. Individual current lifestyle material footprints from different countries provide an interesting snapshot of consumer footprints and impact areas and appear to be similar from country to country within relative income brackets.

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[6] Lettenmeier, Michael et al. Eight Tons of Material Footprint—Suggestion for a Resource Cap for Household Consumption in Finland . Resources 2014, 3, 488-515.

[7] Bringezu, S., Kazmierczak R. ed, (February 2015) Possible Target Corridor for Sustainable Use of Global Material Resources, Wuppertal Institute, Wuppertal Germany.

[8] Sustainable Lifestyles 2050 http://www.sustainable-lifestyles.eu

[9] These Lifestyle Footprints are illustrative only, calculated from a one-off household surveys and self-reported data.

II: The Good News Story: Current Solutions from Companies

Our workshop discussions revealed that a significant level of technological expertise already exists in China. However, workshop participants were consistent in their belief that behaviour change will be equally important in the shift towards sustainable lifestyles. Furthermore, it was noted that the role of government is critical in China.

Participants believe the private sector should take the lead in demonstrating the potential of sustainable solutions, with a complementary role for policy to support these efforts. All participants agreed that solutions would require partnerships between companies – no one business can come up with a holistic solution that will enable a sustainable lifestyle. However, there are countless opportunities for collaboration between companies up and down the supply chain to work together in new ways to accelerate and scale existing solutions.

Food & Nutrition

- Companies are already proving their commitment to creating more environmentally and socially sustainable supply chains – from extraction and production through to distribution and consumption.
- Given the concern around food safety in China, certain companies and respected brands are playing a key role in ensuring higher quality in food production.
- Companies that have recognized the value of reducing their waste are producing more goods that can be recycled, and are using more recycled materials in development.
- Certain companies are also playing a critical role in advocating higher standards, certification schemes and the labeling of products in the Chinese marketplace.

Mobility

- The sharing economy is experiencing rapid growth in China, particularly in the mobility sector. This is happening through foreign innovations such as Uber (for instance Uber's recently launched commuting service in Chengdu [10]), as well as via home-grown sharing platforms such as Didi.
- The deployment of electric vehicles and the development of charging stations is well underway, particularly in urban centers. Companies are partnering with each other to roll this out, and, importantly, are being supported by the government (for instance, new energy vehicle data is being shared with both OEMs and the government in order to help improve their implementation).
- Important investments are also being made in rapid transit and rail systems, within and between cities.

The Home (Buildings and energy use)

- Companies have helped deliver eco-labels that communicate the energy efficiency of certain appliances in the Chinese marketplace.
- Many of the companies attending have a range of energy efficiency and building management solutions that are available for implementation. Companies are also beginning to explore management systems that are tuned for use by the individual.
- Decentralized waste management systems are also active in China, promoting the segregation of waste and recuperation of recyclables.

Household goods

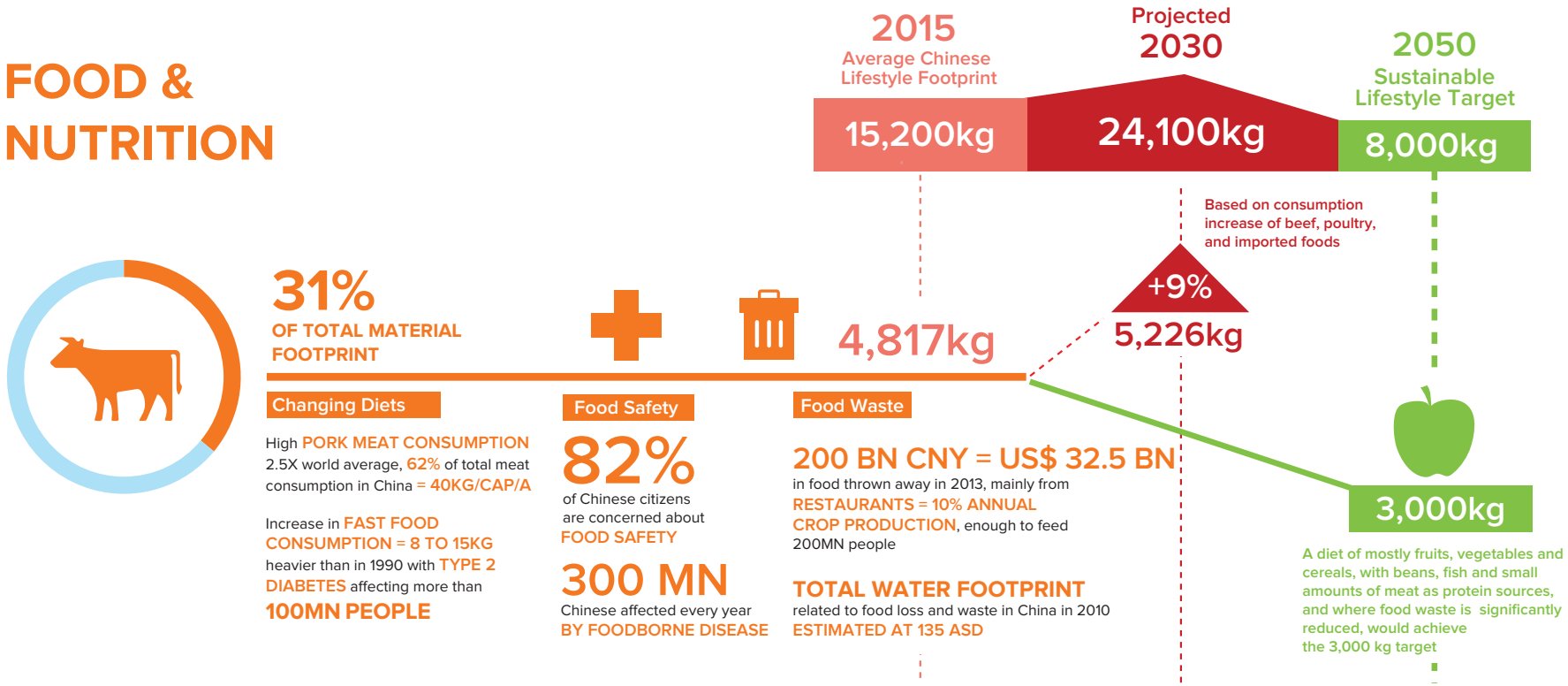
- The increasing use of e-commerce, particularly among the middle classes, is leading to 'greener' shopping decisions among Chinese consumers.
- Companies are helping to make biodegradable and eco-friendly products more readily available in Chinese retail outlets.
- Innovative solutions for water management are underway, including the recycling of grey water for washing machines.
- 'Green' hotels are open for business in China, and are rising in popularity.

[10] Techcrunch (2015), "Uber Is Testing UberCommute, A New Carpooling Service, In China", http://techcrunch.com/2015/09/22/uber-is-testing-ubercommute-a-new-carpooling-service-in-china/

III: Future Business Opportunities – by Lifestyle Category

Food & Nutrition

Figure: Current average lifestyle material footprint of food and nutrition as a % of the total individual lifestyle footprint (average Chinese) including the hotspots driving the footprint today and projected to 2020-30. A future sustainable lifestyle target level of material intensity for food consumption is also suggested.



Issues and challenges

Much of the discussion in China focused on food and nutrition challenges. A key topic was the growing concern around food safety issues, particularly amongst the upper-middle classes, along with increased awareness of healthy eating. Online shopping has skyrocketed because of the attraction of 'trusted' foreign brands – for instance, Chinese shoppers are willing to purchase milk and eggs that they believe come from Europe in order to avoid products coming from China.

Food labeling is not normal in China and third-party or government certification schemes would not necessarily be trusted. However, workshop participants pointed out that many major global brands currently manufacture their products in China. This creates an opportunity for them to take the lead in guiding consumers towards local food choices and labeling schemes that focus on 'sustainability' attributes.

Health awareness is on the rise coupled with changes in traditional diets. Workshop participants highlighted the growing popularity of sweet potatoes as a good example of this – what was once an undesirable vegetable is now a symbol of healthy eating. However, the rapid urbanization of the past 25 years has led to many being unable to afford fresh or healthy food in China.

Food waste is an issue across the supply chain, including a tendency towards the over-packaging of food items. However, the most serious area of food waste is in the restaurant industry: edible food thrown out by the industry equates to 10% of China's annual food production, or enough to feed 200 million people. This figure is particularly perverse given that 128 million Chinese live below the poverty line.

Key challenges to be overcome (as identified by workshop participants)

- Food safety is currently a major concern amongst Chinese consumers, following various food scares.
- Foreign brands are coveted by the middle classes, due to perceived higher safety standards, and boosted through e-commerce.
- Access to healthy food is growing in importance, but remains unaffordable to many.
- Food labeling is not prevalent in China, beyond standard product information and expiration dates.
- Food waste exists across the supply chain, including waste generated from excessive packaging.
- Yet food packaging also contributes to food safety and reductions in food waste, through preservation.

Sustainable lifestyle scenario: key requirements

The group identified three key areas around food and nutrition, on which business could work, and that support a future more sustainable lifestyle scenario:

- A traditional diet of mostly fruits, vegetables, cereals and fish in moderation as meat protein.
- Improved food quality and safety – voluntary standards and greater transparency of ingredients to improve trust in more local produce.
- Reduction in food waste through technology solutions that also support efforts to follow healthier diets.

Furthermore, China is struggling to manage both the demand for water in its cities, as well as pollution from agricultural and industrial run off (five of China's lakes have substantial dead zones caused by fertilizer run off). In 2010, the water footprint of China's lost and wasted food was 135m3, equivalent to the water footprint of Canada.

Business solutions and opportunity spaces

Key solutions identified by workshop participants	
Hotspot	**Solution**
Intensive Agriculture & Health risks from change in traditional diets	• Product solution: introduce labeling/certification for more sustainable food items through collaboration between companies and with third-party certifiers. • Technology solution: introduce traceable food ID that allows consumers to understand the full lifecycle of products and related impacts. • Product, behavior and business-model solution: promote healthier food consumption, focusing on health benefits, to wider population and simplify supply chains to increase transparency and make more sustainable foods more affordable.
Food safety	• Business solution: improve market for higher quality food by increasing transparency and certification. • Behaviour solution: actively promote 'smart buying' and awareness campaigns.
Food waste	• Product solution: make packaging more efficient and integrate recyclable materials into product development. • Policy and business model solution: promote food recycling in the service sector by exploring partnerships around food-waste reuse with the restaurant industry. • Technology and product solution: create smart 'food waste reduction' systems through smart applications and innovative appliances in the home.

Making sustainable, healthy food more desirable and accessible through certification

Product solution spaces: Workshop participants felt that consumer trust would be increased if the private sector were to take the lead in developing sustainability-focused food certification and labeling schemes. However, participants also highlighted the potential challenge of deciding what should be included on these kinds of labels. This concern is based on the current (and ongoing) struggle to create a sustainability meta-label [11] which covers everything from food safety and carbon emissions to fair trade and production processes (i.e. organic). Product labels could also confuse and mislead consumers, create protectionist strategies or give unfair advantages to big business because of the costs of certification.[12]

One solution could be to draw on best practice from around the world. However, the Ecolabel Index currently lists over 459 product-labeling schemes (including but not limited to food products) – a good indication of the difficulty consumers might face in evaluating a 'sea of labels' in a retail environment [13] Workshop participants concluded that certain trade-offs might be required in order to help consumers in the Chinese market start using labeling schemes as a way to make informed decisions.

Participants stressed the fundamental importance of collaboration: companies must work together towards a successful certification and labeling scheme. This collaboration could also possibly include a third-party

[11] Dendler, L. (2012). Sustainable meta-labeling: an effective measure to facilitate more sustainable consumption and production?" Global Research Forum on Sustainable Consumption and Production Workshop, Rio de Janeiro, Brazil.

[12] Boström, M. and M. Klintman (2008).Eco-standards, product labelling and green consumerism. London, New York, Palgrave Macmillan.

[13] Sahakian, M. D. (2009). Towards a Deeper Understanding of Consumption: the example of eco-labels. 37th LCA Discussion Forum, Lausanne.

organization and – in the long-term – engagement with the public sector to create a policy-supported initiative. Companies should take the lead because the public sector can more easily support an existing and effective initiative. Furthermore, foreign brands currently command a superior level of trust to Chinese brands: this can be used to engage consumers and demonstrate leadership.

Technology solution space: Given the complexity of food-labeling schemes, companies could also make use of smart technologies to provide consumers with additional information on food products. Workshop participants suggested that traceable identification (ID) codes might be made available for food items through RFID technology. This would allow consumers to access information across the supply chain, as well as understand the full lifecycle impacts of products.

Behaviour and policy solution spaces: Unhealthy food consumption in China is becoming a major challenge. There is a significant opportunity to promote healthier food choices, in part by reconnecting with traditional Chinese diets. While healthy foods are appealing to the growing middle classes, companies could play a key role in making healthy food more accessible to a greater portion of the population. This could include reducing intermediaries in the food provisioning system and raising awareness around healthy foods in stores, the workplace and in classrooms.

Behaviour and policy solution space: Given the rise in obesity levels in China, workshop participants felt it could become a national issue and theme in policy discourse, with a clearer link made between healthy food consumption and healthy lifestyles. One way of increasing awareness could be through school campaigns, focusing classroom discussions around healthy food, and making healthy food options available in the cafeteria. Some workshop participants suggested taxing unhealthy foods to create a price disadvantage for processed and fast food items.

Increasing food safety

Product solution space: given the consumer awareness around food safety issues in China, workshop participants felt that overall food quality (fresh and processed) could and should be improved. One way to improve overall quality could be by increasing transparency around food production processes and supply chain impacts between companies (for example, producers and retailers) and towards consumers. The food certification and labeling schemes, together with the food ID proposals detailed above, would help improve food safety and consumer trust in food supply chains. As also mentioned above, non-Chinese brands command a greater level of trust. This position could be used to demonstrate the safety of production processes within China, helping to reduce concerns, where transparency and information are available to back these up.

Behaviour solution space: Technological solutions are rarely sufficient in and of themselves. While labeling schemes and food IDs would give consumers more information, workshop participants felt that 'smart buying' should still be actively promoted among consumers. The private sector could play a role in communicating and marketing smart buying, including the promotion of labels or ID codes, while also offering more green choices on retail shelves. Previous studies in a European context have found that people would accept a certain amount of 'choice editing' prior to making products available at retail. Further research could be conducted in China to determine whether consumers would welcome the private sector playing a more active role in choice editing [14] towards green and sustainable food choices.

Improving food waste management

Product solution space: While packaging can increase food safety and longevity, workshop participants felt that excessive packaging is also contributing to plastic and cardboard waste. Companies could re-evaluate product packaging during transportation and storage, reducing it when possible, and integrating recyclable materials when feasible.

Policy and behaviour solution space: Workshop participants identified opportunities for the re-use of leftover foods or the promotion of food recycling. More work could be done in the food service sector in particular, but action would most likely require supporting policy. Multinationals will have little influence on the catering sector. Nonetheless, changes are required to the way that food is served and ordered. By linking with other potential efforts around health and food quality, companies might be able to promote the taking-away of food leftovers. A more likely area of collaboration between the catering sector and business might be the repurposing of catering waste in industrial processes, such as piggeries, or even office energy supply.[15]

Technology and product solution space: Workshop participants identified innovative technological solutions for managing household food stock and therefore reducing food waste. For example, a smartphone application could send alerts when food items are approaching their expiration dates, or smart packaging could change colour as an item nears its expiration. Another technological solution could be for such a smartphone app to suggest meal plans or recipes for existing produce, thus optimizing the use of household food stock.

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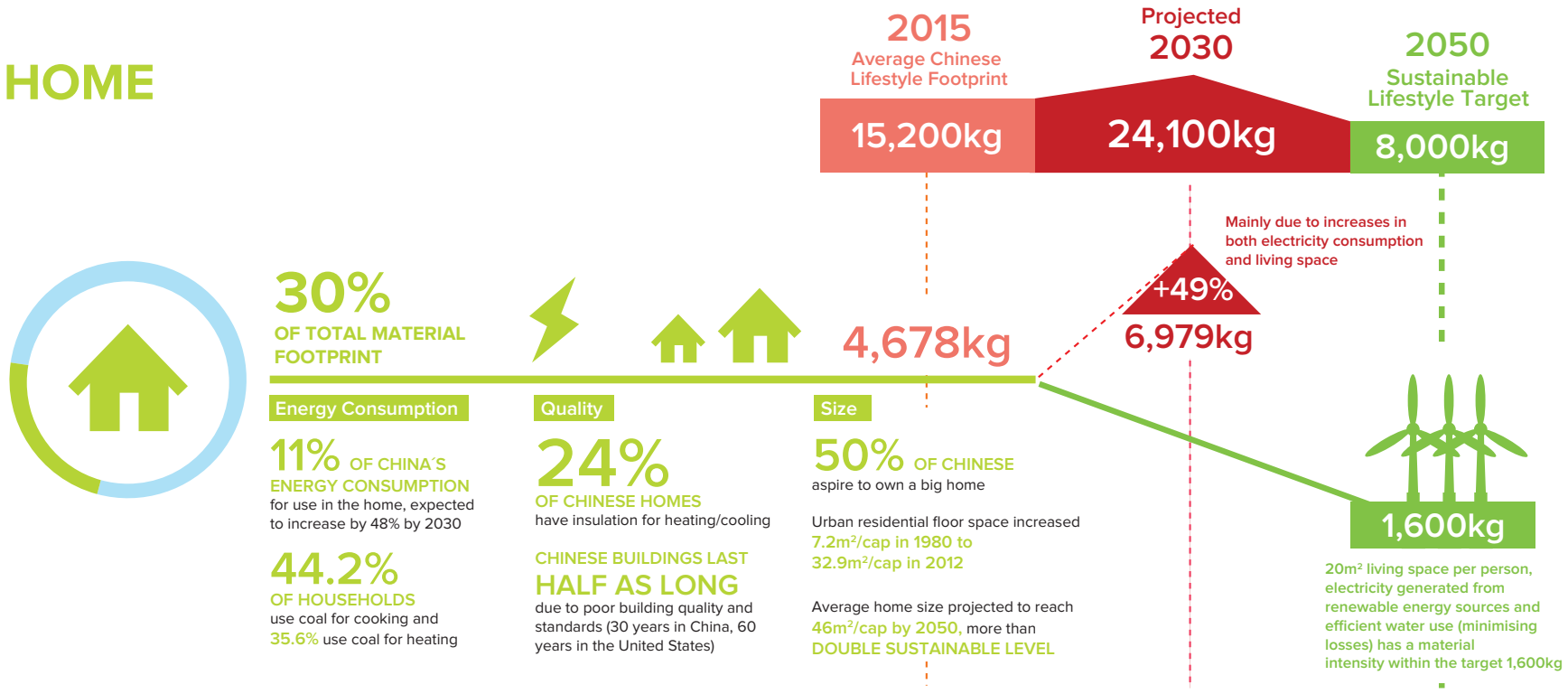
[14] SDC (2006). I Will If You Will: Towards Sustainable Consumption. Sustainable Development Commission UK (SDC).

[15] PwC, our host in China, powers approximately 25% of its London HQ on used oil from local restaurants: London-SE1 (2011): http://www.london-se1.co.uk/news/view/5186

Home

Figure: Current average lifestyle material footprint of the home as a % of the total individual lifestyle footprint (average Chinese) –with hotspots driving the footprint today and projected to 2020-30 –and a future sustainable lifestyle target for the home.



Issues And Challenges

One main challenge facing the future of more sustainable homes is the vast urban-rural divide in China. Consumption patterns in the home vary greatly between these differing contexts. Urban centers are experiencing skyrocketing prices, which is pushing certain populations to semi-urban and suburban peripheries, and therefore increasing commuting distances and traffic. Commuting distances, even in and around major urban centers such as Beijing, can be considerable – with queues, just to get onto public transport, lasting up to an hour.[16]

The workshop participants identified several issues in terms of resource consumption in the home, including poor tap water quality and water efficiency options, ineffective household waste management and inefficient heating and cooling devices.

While smart homes are being developed, the overall building stock in China remains not just inefficient [17] but short-lived too.[18] Impacts resulting from this poor building envelope are compounded by household energy consumption coming mainly from coal. Air purifiers and conditioners are in demand, as are larger homes and secondary housing.

Key challenges to be overcome (as identified by workshop participants)

- Rising cost of housing in urban centres.
- Poor drinking water quality and lack of water efficiency or recycling options.
- Ineffective household waste management systems.
- Increased demand for air-conditioners and air purifiers.
- Stock of electronic appliances currently on the market largely energy ineffiecient.
- Demand for larger and secondary homes is on the rise.

Sustainable lifestyle scenario: key requirements

The group identified three key areas around the home 'system' on which business could work, and that support a future more sustainable lifestyle scenario:

- Widespread implementation of efficient building practices for low and medium-cost housing developments – combining smart technology and passive measures for maximum effect.
- Bringing 'smart' building technology expertise into daily lives through connected and efficient appliances in the home.
- Exploring industrial symbiosis opportunities at the community level through more systemic solutions to energy, water and waste, potentially linking with industrial needs.

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16 International New York Times (2015), "As Beijing Becomes a Supercity, the Rapid Growth Brings Pains", http://www.nytimes.com/2015/07/20/world/asia/in-china-a-supercity-rises-around-beijing.html?_r=0

17 95% of existing buildings fail to meet energy standards: Hong, Lixuan, et al. (2014), 'Modeling China's Building Floor-Area Growth and the Implications for Building Materials and Energy Demand'.

18 Chinese buildings have an average lifetime of 30-40 years in urban areas and 15 years or less in rural areas (compared with 60 years in the US) largely due to building quality and urban planning.

BUSINESS SOLUTIONS AND OPPORTUNITY SPACES

Key solutions identified by workshop participants	
Hotspot	**Solutions**
Poor building quality and design & Home ownership size and growth	• Policy and infrastructure solution: improve building design through stricter regulation of building efficiency and disaster resilience and celebrating certification. • Product solution: increase use of both high- and low-tech solutions for more sustainable buildings. • Social and product solution: improve training of construction industry in order to improve building quality, health and safety. • Product and technology solution: promote 3D printing of buildings using construction waste materials. • Behaviour solution: raise corporate and consumer awareness of benefits stemming from efficient buildings with reduced environmental footprint. • Collaborative solution: bring architects, city planners, energy, water, and waste experts together to shift focus from green buildings to smart communities and cities and align with sustainable lifestyle principles.
Energy consumption	• Infrastructure and technology solution: explore ways to transfer industrial waste heat to residential or municipal use (industrial symbiosis). • Technology solution: explore more universal availability of alternative technologies such as geothermal heating and cooling. • Policy solution: reduce indoor air pollution in rural areas with access to electricity through grid expansion or application of microgrid technologies. • Technology and behaviour solution: Bring appliance manufacturers together to improve interconnectivity of smart home appliances.
Water consumption	• Infrastructure and technology solution: explore potential for greater water recycling between industry and households, as well as heat recapture. • Policy and behaviour solution: increase public awareness of importance of water and power conservation through public utility campaigns.
Household solid waste	• sa

Improving public transport systems

Infrastructure, technology and behaviour solution spaces: Workshop participants recognized a need for better public transport infrastructure and facilities across India. Opportunities include branded carriages and best-in-class facilities, as well as lounges and waiting areas that offer branded products and brand experiences. Participants also underlined the importance of hygienic bathrooms in public spaces – sanitation, far more than safety, was a key barrier to use of the public transport.

Companies indicated that they could work internally to promote corporate shuttles from condominium developments to the workplace. In order to enhance their appeal, companies could ensure that corporate shuttles provide premium-level working conditions, such as electrical sockets and wifi Internet connections. To further develop this idea, our research shows that mobility is connected to different aspects of consumer lifestyles. Improved mobility services, such as a corporate shuttle, could therefore take into consideration other stops along the way, beyond the work-home transit, such as day-care and school drop off and pick up, as well as stops at food retail centres and markets.

Another potential opportunity would be for companies to incentivize ride sharing between their own employees, and encourage it through technological solutions – such as ride-matching.

Infrastructure and behaviour solution space: Workshop participants felt that non-motorized transport could be further promoted, such as walking and cycling. However, the group also agreed that this promotion would have to develop hand-in-hand with proper walking and cycling infrastructure, as well as more attention paid to air pollution in urban centers. While cycling has had a long history in India, traffic and congestion have made it both dangerous and unhealthy to cycle (and walk) in urban areas. Some trailblazers are leading the way in promoting city cycling as a hip and environmentally-sound way to get around, with group cycle rides and cycle clubs popping up regularly in various cities in India. Business can play a role in supporting cycling communities, starting with their communities and campuses. Another way to encourage non-motorized transport is to tax private vehicles, a solution suggested by workshop participants in light of similar efforts in Singapore.

Safer, cleaner and more fluid transit

Technology and behaviour solution space: Workshop attendees discussed how tech-enabled car and ride sharing schemes are a tremendous area of opportunity in India, particularly through vehicle-to-vehicle communication technologies. One possible collaborative opportunity is working across the mobility sector to further develop car sharing offers, while also promoting sharing internally within companies.

Policy and infrastructure space: The group agreed that business could work more closely with the public sector to improve urban mobility solutions, including motorized and non-motorized transit, and the promotion of low-carbon mobility. They also raised the need for efficient rapid rail systems. The workshop also discussed how mobility could be tied into other aspects of sustainable lifestyles - for example, by linking leisure activities, work, school and home. There is also an opportunity to promote non-motorized transport by ‘piggy-backing’ on the health and fitness trend.

Sustainable housing development

Policy and infrastructure solution space: Workshop participants agreed that existing building stock and new buildings should achieve higher standards in terms of energy efficiency as well as disaster resilience. The first Chinese building to be awarded a gold rating by the international rating system LEED (Leadership in Energy and Environmental Design) was in 2005. Since 2006 China has had its own '3-star' Green Building Label.[19] China has become a leader in developing LEED certified buildings in the past decade, and is now the second largest market for LEED buildings in the world.[20] However, the majority of the building stock remains inefficient. Creating incentives for building developers to adopt such certification schemes on a voluntary basis would be a first step, but stricter regulations around building efficiency and disaster resilience are also necessary. Participants also indicated that building waste remains a key issue: given the level of redevelopment and construction in China, building recyclability is an important component of more sustainable building development.

Product solution space: While participants agreed that China has both the expertise and the materials for developing green buildings, there is an opportunity to further connect the dots between suppliers of more sustainable building products and solutions, and building developers. Businesses could work together to gather this knowledge and help further promote more sustainable building alternatives, working with both high-tech solutions such as inverter technologies for cooling and thermal water heating, and low-tech alternatives such as light tubes, passive ventilation and shading. It is important that China moves towards an approach of making developments energy efficient, rather than choosing between a 'green' or 'traditional' construction approach. Design, rather than technology, can account for as much as 50% of a building's energy efficiency.[21]

Product and technology solution space: The 3D printing of buildings is already underway in China, using printers that use 'ink' made from a combination of glass fiber, steel, cement and hardening agents, as well as recycled construction waste. Large sections of buildings are 'printed' through these machines then assembled on location – much like prefabricated housing. Workshop participants felt that there is an opportunity for the 3D printing of buildings to become both more widespread and more sustainable. This could be done by creating a blueprint for building styles that are aligned with climatic conditions, and by using materials that are primarily based on recycled buildings, reducing the environmental impact of buildings in the construction phase.

Behaviour and policy solution space: According to workshop participants, workers in the building sector would need additional training to be able to build a more sustainable building stock. In addition to learning about sustainable design and building efficiency, there is a need to address overall worker safety and training among construction workers. At the moment these workers lack a fair wage system and insurance, and are often working informally and have no system in place for grievances. Workplace safety is a therefore key issue for construction workers – one that the business sector could take the lead in promoting.

Behaviour solution space: As Chinese middle-income consumers aspire to larger homes and second homes, there is an opportunity for companies to help raise awareness around the benefits of green buildings, including both the environmental and financial footprint of housing.

Collaborative business solution spaces: Companies could provide more information and greater transparency regarding their own building developments. By walking the talk, the private sector could then help assemble and promote a supervising committee for the further development of green building policies in China, in partnership with the public sector. As has been seen elsewhere in the world, the most likely adopters of green building standards in China are multinational companies, large Chinese companies, and an increasing number of hotels and resorts. As central government policies around China's overall energy use become more ambitious, there is an opportunity for forward-looking business to benefit from transferring expertise from the commercial to the residential sector.

In example of such a future collaborative opportunity is the move from the development of smart homes to the creation of smart cities. The Chinese government has made the development of smart city technologies

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19 Institute for Green Building Efficiency (2013), "Green Building Rating Systems: CHINA", http://www.institutebe.com/InstituteBE/media/Library/Resources/Green%20Buildings/Fact-Sheet_Green-Building-Ratings_China.pdf

20 US Green Building Council (2014), Leed in Motion: Greater China, http://ch.usgbc.org/resources/leed-motion-greater-china

21 Hartmann, P. (2012). "The Green Delusion." Retrieved September 23, 2015, fromhttp://www.architectural-review.com/buildings/the-green-delusion/8634782.article

and projects a key national policy, with associated funding for deployment and buy-in from private sector partners.[22] Collaborations are also underway, for instance between the Chinese Ministry of Industry and Information Technology (MIIT) and the European Union Commission, to share best practices and commit to more green smart city developments in the future.[23] There is an opportunity to align smart city developments with sustainable lifestyle principles, broadening focus away from material, energy and water efficiency, to more carefully consider how people will exist within these new population centers.

Sustainable energy consumption

Infrastructure and technology solution space: Companies have indicated that concepts from industrial ecology (specifically industrial symbiosis) could help create heating solutions – such as the transfer of heat from industry to households. While industrial symbiosis has traditionally focused on maximizing flows within industrial parks, the possibility of linking to the household sector is an innovation that merits further exploration – also in relation to water consumption and re-use, as detailed further below.

Infrastructure and technology solution space: While the use of geothermal energy for heating has existed in China for several decades, workshop participants felt that more investments could be made in geothermal cooling and heating in urban and rural areas. Using thermal energy in housing developments could be facilitated through the involvement of industry giants, such as Vanke. These technologies must be made available to the mass market, instead of solely to building developments that act as a showcase for energy efficiency and remain unattainable to future homeowners.[24]

Technology and behaviour solution space: Building on the idea behind the Apple home kit device, workshop participants felt that smart homes in the future would involve technological innovations that would allow household appliances to communicate with each other and with human users. For example, refrigerators could indicate what food is soon to expire, while sensors in the home could adapt lighting and cooling/heating to hourly needs.

Policy and behaviour solution space: Indoor air pollution is particularly acute in rural areas because coal and biomass are used as a source of fuel for heating and cooking. This contributes to major health and safety issues. Companies involved in the workshop felt that additional measures should be taken to reduce the use of these fuels, which will require the continued electrification of rural China, as well as changing consumer behaviours.

Sustainable water consumption

Infrastructure and technology solution space: Workshop participants raised the need for more efficient and better quality water systems. The group discussed the opportunities to apply industrial ecology ideas to greater integration of industrial and urban water demands, specifically to maximizing water flows between households and industry. For instance, household waste water could be reused by industry (domestic grey water from washing machines and sinks) and heat content in both industrial and domestic waste water could be captured and reused. The group suggested that better water management would also require improved water piping to improve the overall quality of water.

Policy and behaviour solution space: Participants felt that more work could be done on raising public awareness around water and power conservation. Companies could engage in public utility campaigns, for example, reminding people to save energy and water, or work with schools across China to deliver the message in classrooms.

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22 'The 12th Five-Year Plan, which guides broad economic policy through 2015, specifically calls out smart city technology as a sector to be strengthened and encouraged, and ministries are jostling to sponsor programs and industry alliances.'Johnson, D. (2014). "Smart City Development in China." Retrieved September 23, 2015, from http://www.chinabusinessreview.com/smart-city-development-in-china/.

23 Yanrong, K., et al. (2014). Comparative Study of Smart Cities in Europe and China. EU-China Policy Dialogues Support Facility II (PDSF), Ministry of Industry and Information Technology of China (MIIT), DG Communications Networks, Content & Technology (CNECT): 35.

24 Hartmann, P. (2012). "The Green Delusion." Retrieved September 23, 2015, fromhttp://www.architectural-review.com/buildings/the-green-delusion/8634782.article.

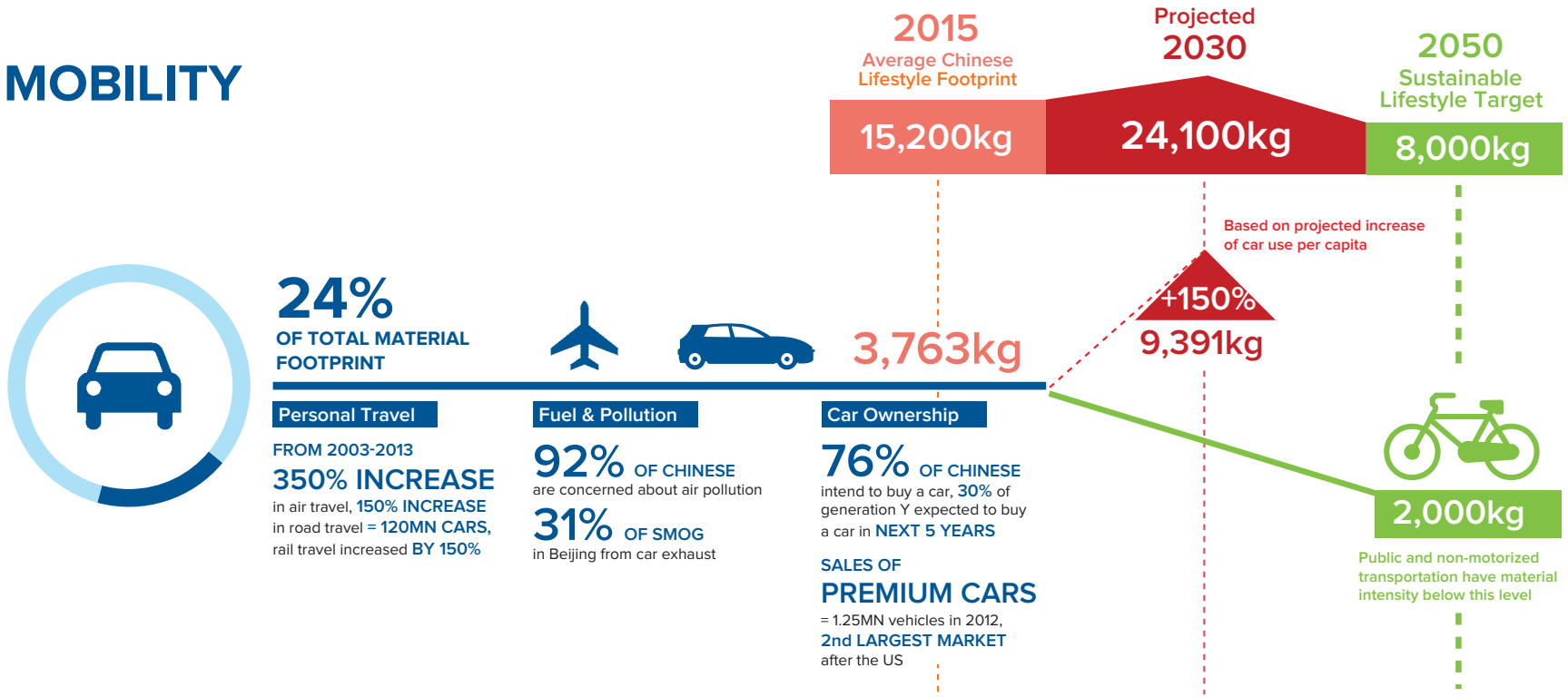
Effective waste management

Policy and behaviour solution space: Efforts to better manage waste around the world have typically focused on the waste hierarchy model – the 3Rs (reduce, reuse and recycle). Workshop participants felt further work was required to engage households, companies and the service sector in waste segregation at source.

Policy and infrastructure solution space: Workshop participants felt that waste management could be diversified. China is investing heavily in incinerators that generate energy from waste: it is close to achieving its goal of incinerating 35% of urban household waste in 2015. However, incinerators must be carefully maintained and thus require vast quantities of waste to be cost effective. This is manageable in supercities such as Shanghai where 22,000 tonnes of household waste are generated every day. However, a better long term option may be to support municipal collection and incineration schemes with community collection schemes of certain waste streams, particularly organic. Waste could be treated in anaerobic digesters producing biogas at a community level, for uses such as cooking and public transport. More formalized segregation of solid waste could provide work as well as recoup valuable materials from city waste streams.

Mobility

Figure: Current average lifestyle material footprint of mobility as a % of the total individual lifestyle footprint (average Chinese) –with hotspots driving the footprint today and projected to 2020-30 –and a future sustainable lifestyle target for mobility.



Issues And Challenges

Car transport in China is on the rise [25] and, coupled with poor fuel quality and inefficient fleets, contributes to both local and national pollution. Annual average concentrations of coarse particulate matter nationwide exceed the World Health Organization ambient air quality standard by a factor of five. In order to reduce private vehicle usage, major cities enforce strict laws around issuing new license plates – which can involve as much as a four-year wait in some cases. However, existing car owners have no incentive to choose public and non-motorized transport, which are currently not perceived as a valid alternative to private car ownership. While electric bikes are prevalent (China is the largest eBike market in the world with approximately 120 million in use in 2010), the aspiration amongst the middle class remains to own a car. There is an urgent need to improve the energy efficiency of cars, as well as increase access to renewable energy sources for mobility.

Ride sharing is on the rise in urban centers through new taxi service business models such as Didi and Uber that are now expanding their offerings. This trend represents an important opportunity to reduce congestion and smog. Rapid transit and subway systems continue to be developed in and between cities, but the growing middle classes prefer cars and buses for commuting into urban centers. Congestion is however the result of sheer weight of traffic. Ultimately Chinese population centers may well disperse – for instance, government functions will begin to move out of Beijing.[26] Such actions could offer reduced distances between workplace and living spaces – China already has developments that remain empty as a result of their distance from current economic centers.

Key challenges to be overcome (as identified by workshop participants)

- Significant and continuing increases in use of car transportation – resulting in both congestion and air pollution.
- Public and non-motorized transport is currently not appealing for middle class.
- Cars are generally inefficient and often use inferior quality fuels.
- Subsidized energy creates a disincentive for the development of more renewable energy sources to be used in trasportation.
- Despite public transport developments, private car usage is preferred mobility option.
- Distances between workplace and home contribute to long commutes and city traffic.

Sustainable lifestyle scenario: key requirements

The group identified three key mobility challenges, on which business could work, and that support a future more sustainable lifestyle scenario:

- Collaborative approaches to commuting to reduce pressure on urban mobility infrastructure (also consider solutions that take into account where people live in order to reduce distances travelled).
- Improve efficiency of mobility through technology solutions that improve routing.
- Support cleaner fuels, alternative fuels and more sustainable powertrains.

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[25] China's transportation-sector CO2 emissions more than doubled from 2000 to 2010 and are projected to increase by another 54 percent by 2020 from 2010 levels. ICCT (2015) http://www.theicct.org/china

[26] Xinhua News (2015), "Beijing to shift city admin to ease "urban ills "", http://news.xinhuanet.com/english/2015-07/13/c_134408425.htm

Business solutions and opportunity spaces

Key solutions identified by workshop participants	
Hotspot	**Solutions**
Increasing mobility demands & Increasing car sales and preference for bigger, luxury cars	• Product and technology solution: increase appeal and functionality of car sharing solutions. • Behaviour solution: explore sharing economy solution that includes apartment sharing to help people live closer to their place of work reducing required commuting distances. • Infrastructure and product solution: consider integration of private company commuting services into public transport hubs. • Policy and business solution: explore new ways of encouraging the use of urban bike sharing services. • Policy solution: taxation of most fuel inefficient personal vehicles to further incentivize alternative fuel vehicles and more sustainable powertrains.
Fuel and pollution	• Behaviour and social solution: continue to raise awareness around links between inefficient fuel and vehicles and pollution-related health risks. • Policy solution: lobby for policy support for commercial use of alternative powertrains and removal of government fuel subsidies. Pre-empt legislation with support and enforcement of emissions standards throughout companies. • Product and policy solution: promote more efficient vehicles and charging stations, particularly e-vehicles. • Technology solution: recycle and value vehicle waste, including the recycling of vehicle components from cars now reaching ‘end of life’ in China.

Sustainable mobility options

Product, technology and behaviour solution space: Workshop participants noted a growth in mobility sharing services, particularly for Uber and local competitor Didi. In addition to providing a fleet of vehicles and drivers, Uber has launched a car-pooling platform in China, further contributing to the possibility of shared mobility services.[27] Encouraging car sharing could be an important step towards reducing the appeal of private car ownership – these types of shifts appear to be beginning to happen in other urban markets, for instance Delhi, India.[28] In addition to car sharing, workshop participants mentioned that apartment sharing in urban centers could help reduce commuting times, given the high cost of urban living. Within urban centers, technology could offer improved routing assistance, helping individuals to choose the most time and distance efficient journeys.

Infrastructure solution space: If public transport is to become more popular than private vehicle transport, workshop participants felt that urban planning should pay closer attention to mobility options and transit points. For example, public bus and rapid transit rail stations could be located closer to community centers. Participants also underlined the need for tram and rail systems to provide improved connectivity between cities (already underway), as well as better public transport options within cities. Companies could play a role by providing branded and corporate bus services for employees to travel between work and home, or between work and transit hubs.

Infrastructure solution: According to workshop participants, cycling is a key area that would merit further development. Even though China is home to approximately half of all bike sharing schemes, including the largest in the world (90,000 bikes in the city of Wuhan), these schemes are struggling to engage users successfully.[29] In some cities the cost of an access card to such schemes exceeds the cost of a cheap bicycle. New technologies – such as Lock8, a keyless and GPS tracked bike sharing system – could encourage everyday people to share their own bikes in public spaces. Bike sharing typically requires public subsidy (justified as it provides part of the overall public transport mix), but business can support such initiatives too – particularly as they benefit through the increasing wellbeing of employees. Given the experience of bike sharing schemes in China to date, there is an opportunity for business to collaborate with city planners to explore how they could be made more successful in major urban centers such as Shanghai and Beijing.

Energy efficiency and reduced pollution

Behaviour and social solution space: The appeal of private transport (and the aspiration to vehicles such as SUVs) could be countered by taking advantage of the growing awareness that air quality issues are a direct consequence of traffic and vehicle-generated pollution. Workshop participants agreed that it would be possible to work collaboratively on public awareness measures to help promote greener forms of mobility, perhaps through highlighting corporate social responsibility initiatives aimed at reducing emissions and pollution from transport.

Product and policy solution space: One clear barrier to the development of cleaner and renewable energy sources for mobility is the current government subsidizing of fuel. This leads to a lower cost of fuel in comparison to the cost of renewables. Workshop participants suggested that business should work with government to encourage a decoupling of renewable energy development from fuel prices, focusing on incentives for moving corporate mobility requirements to cleaner energy sources and powertrains.

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[27] Kokalitcheva, K. (2015). “Uber’s new carpooling service launches in China.” Fortune, Retrieved September 23, 2015, from http://fortune.com/2015/09/23/uber-china-ubercommute/.

[28] The Economic Times (2015), “Changing trends: Here’s why it may make sense to sell your car and hire a cab from Uber or Ola” retrieved from http://economictimes.indiatimes.com/small-biz/startups/changing-trends-heres-why-it-may-make-sense-to-sell-your-car-and-hire-a-cab-from-uber-or-ola/articleshow/48289590.cms

[29] Financial Times (2014), “Wheels come off China’s bike-share schemes”, http://www.ft.com/cms/s/0/815c5378-33e2-11e4-85f1-00144feabdc0.html#axzz3oYDfPh1Y.

Product, technology and policy solution space: Workshop participants felt that promoting more efficient vehicles is a critical step towards more sustainable mobility in China. This includes solar-powered [30] and electric vehicles, as well as those powered by liquefied natural gas (LNG). The deployment of such vehicles could be supported through government repurchasing schemes, subsidies or tax reductions around more sustainably-powered, cleaner cars. New technologies around exhaust purifiers and filters and fuel itself would contribute to cleaner running vehicles. While China has taken steps to adopt more stringent emissions standards (Beijing has led the way with 22 specific measures designed to reduce emissions and pollution [31]) workshop participants agreed more needed to be done to adopt better car emission standards throughout the country. Electric vehicles (EVs) are being manufactured by local companies and Sino-foreign partnerships, with exponential increases in sales in China over the past few years. Low speed EVs in particular seem to be popular with consumers in urban centers, with vehicle sales expected to reach the 3million mark by 2020.[32] In an effort to increase EVs' range and appeal, in 2014 the government announced that it would spend as much as 100 billion Yuan (16 billion USD) to build charging facilities and therefore spur demand for new-energy vehicles.[33] Workshop participants felt that further government support would be necessary in order to make electric charging stations readily available across major cities and the country as a whole.

Technology solution space: Given the growing demand for private vehicles in China, workshop participants agreed that closer attention could be paid to valuing vehicle-related waste and promoting the recycling of vehicle components. China is only now arriving at a point where cars are reaching 'end of life': before they were rare and valuable enough to be continuously repaired.

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30 China's Hanergy is developing solar powered cars, Wall Street Journal China (2015), "Despite Stumbles, Hanergy Sees Bright Future for Solar-Powered Cars", http://blogs.wsj.com/chinarealtime/2015/06/22/despite-stumbles-hanergy-sees-bright-future-for-solar-powered-cars/

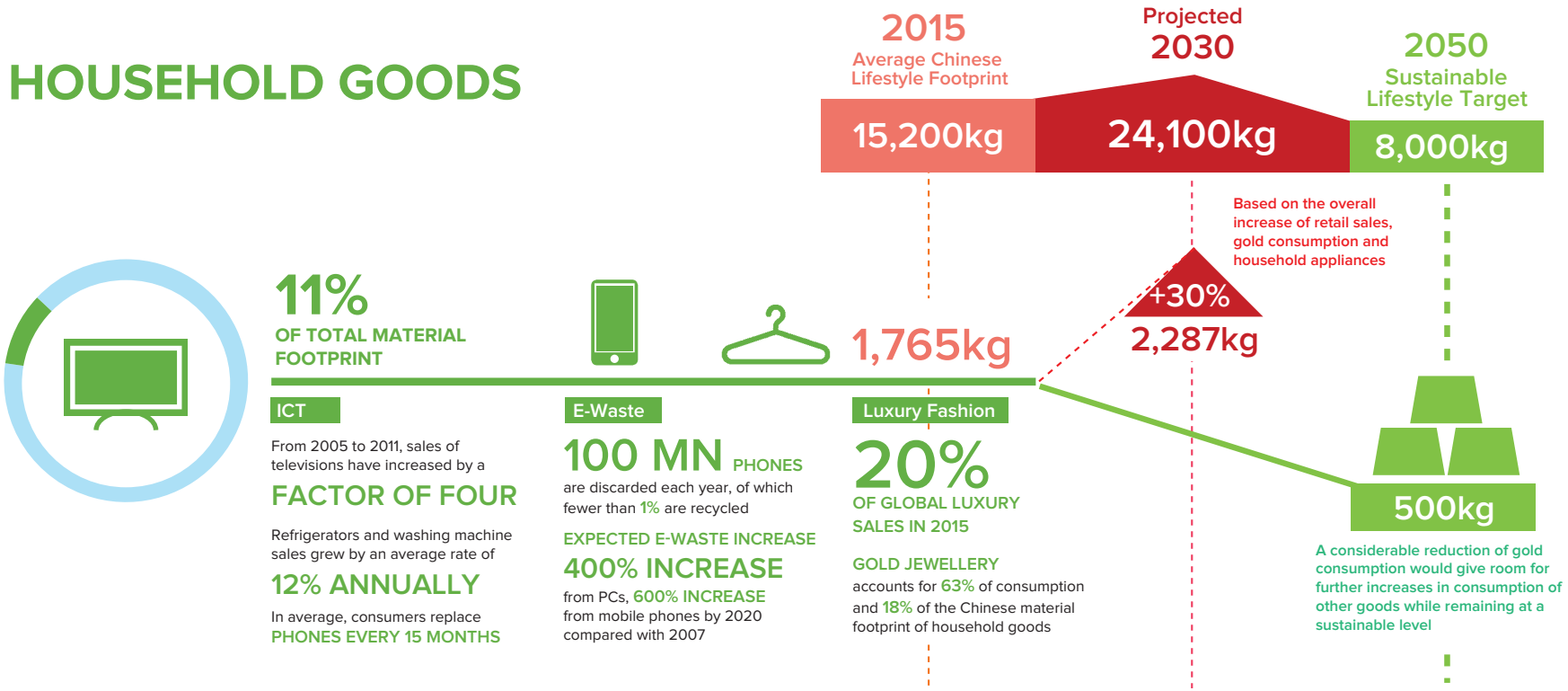
31 These include a lottery system to restrict the monthly sales of new vehicles in the city, a schedule to bring new vehicles in line with emissions standards globally, mandated annual checks of all vehicles on the road, restricted the types of vehicles allowed to be used in the heart of the city during the workday, new fuel standards and the scrapping of older vehicles.

32 Perkowski, J. (2015). "China's Other Electric Vehicle Industry." Retrieved September 22, 2015, from http://www.forbes.com/sites/jackperkowski/2015/04/08/chinas-other-electric-vehicle-industry/.

33 Ying, T. and S. Yang. (2014). "China Said to Consider $16 Billion EV-Charging Fund." Bloomberg Business Retrieved September 22, 2015, from http://www.bloomberg.com/news/articles/2014-08-26/china-said-to-consider-16-billion-ev-charging-funding.

Household Goods

Figure: Current average lifestyle material footprint of personal goods as a % of the total individual lifestyle footprint (average Chinese) – with hotspots driving the footprint today and projected to 2020-30 –and a future sustainable lifestyle target for personal goods.



Issues and challenges

During the workshop, participants emphasized the power of brands in China, particularly foreign brands. Consumers have a high level of trust in products and private companies, and there is increasing desire for luxury products – whether genuine or imitations.

There are several sustainability challenges associated with consumer goods, including the short lifecycles of products, which are increasingly encouraging a 'throwaway society'. It's usually cheaper to buy a new product than fix the old one. E-waste from PCs is expected to increase by 400% and mobile phones by 600% by 2020 compared with 2007. Mobile phones are replaced, on average, every 15 months, and 100 million phones are discarded every year (by 2014, 1 billion units had been thrown away) of which fewer than 1% are recycled. Chinese consumers discarded over 26 million tonnes of clothes in 2011 – less than 10% were recycled.

Busier lifestyles have also propelled Chinese consumers to search out convenience. As a result, e-commerce is booming in China and workshop participants felt this could well be contributing to over-consumption. Because of the trend towards larger and second homes in China, workshop participants also felt that the over-consumption of interior design items was on the rise, including paints and fabrics.

Finally, China is expected to account for about 20% of global luxury sales in 2015 – primarily in cosmetics, followed by leather goods, watches and jewellery. Sales of these categories to Chinese overseas personal shoppers had grown to an estimated market value of RMB 55-75 billion in 2014. In some ways linked to the explosion in luxury, China has become the third largest market in the world for plastic surgery, at the same time as personal care and beauty items have become an increasingly important market.

Key challenges to be overcome (as identified by workshop participants) Challenges:

- Short product lifecycles / obsolescence.
- Over consumption through e-commerce.
- Increases in e-waste.

Sustainable lifestyle scenario: key requirements

The group identified three overarching actions around consumer goods that would be needed to enable a future sustainable lifestyle scenario:

- Nudging towards more sustainable lifestyles and solutions by using e-commerce data as an opportunity to understand individual lifestyle consumption trends.
- Increasing product safety and sustainability awareness through greater transparency, labeling and education.
- Reducing household waste through greater focus on (eco) product design.

Business solutions and opportunity spaces

Key solutions identified by workshop participants	
Hotspot	**Solutions**
Energy efficiency Reponsibly-made products, luxury goods, personal care products quality and safety use of electronic products and eWaste	• Product and policy solution: provide green rating systems and greater product transparency in partnership with third-party certifiers. • Product and technology solution: make green products more accessible through lower price points or through clearer communication of functional or financial benefits. • Product solution: place greater focus on full lifecycle eco-design products for 100% recycling. • Product and technology solution: explore ways of extending • Product life through sharing economy solutions, particularly around electronics, household appliances and luxury goods. • Behaviour solution: increase awareness around sustainable lifestyles in communities, classrooms and the workplace.
Private ownership	• Behaviour and service solution: Explore involvement of lower income workers in the management of a commercially viable sharing economy of high quality goods.

Developing the market & supply chain for sustainable household goods

Product and policy solution space: Workshop participants felt more could be done to label more sustainable products in China. Deploying an e-commerce green label would make it easier for online shoppers to identify and select more environmentally-friendly products. Participants also suggested that dedicated eco-friendly e-commerce sites could be developed.

The private sector could take the lead in establishing a rating system, working in partnership with an international organization for third-party validation. This alliance could then invite the public sector to further promote this approach. Because consumers would need points of comparison in relation to their shopping decisions, it would make sense for companies to collaborate to make such a label visible across different brands and products.

Product and technology solution space: While eco-friendly products are already desirable to a niche market in China, workshop participants felt that such products should be made more widely available, for example through lower prices.

Product solution space: Rather than contribute to a throwaway society, workshop participants felt that products should be designed with their full lifecycle in mind, with a focus on upcycling rather than downcycling.[34] The process of creating goods would therefore start with the final use in mind. This is in line with thinking in other markets although circular products remain niche.

Product and technology solution spaces: Workshop participants underlined the tremendous opportunity represented by the sharing economy – a future in which ownership is steadily replaced by the sharing or renting of products and services. There are opportunities for companies to come together to work towards new business models that promote the sharing economy and collaborative consumption, following tested business models such as eBay, but adapting them to be both culturally and commercially appropriate in China. Given the explosion in electronics and luxury goods consumption, companies have the opportunity to develop business models that generate value from their products after their first purchase, at the same time as contributing to impact reductions from product life elongation. In time this could also give rise to greater available of service-based solutions (rather than product purchase and ownership).

Behaviour solution space: Participating companies agreed that general awareness campaigns would be necessary to promote more sustainable lifestyles – at government, company, community and individual level. The classroom was identified as an opportune space for social learning towards greater sustainability. The workplace is also a unique setting through which more sustainable lifestyles could be promoted.

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[34] McDonough, W. and M. Braungart (2002). Cradle to Cradle: Remaking the Way We Make Things. New York City, North Point Press.

Conclusion

The ultimate goal of the workshop was for companies to explore new opportunities to collaborate across businesses and industries, linking existing product and service solutions for bigger positive impact against key current and future lifestyle hotspots.

From those discussions we have selected the three areas that participants got most excited about – ideas that might have the potential to lead to transformative action that could enable and inspire more sustainable lifestyles.

Each of these areas would involve the co-creation of new collaborative solutions – extending beyond business leaders to include civil society, the public sector, media partners and other key stakeholders.

Three Big Ideas: Companies collaborating to transform sustainable lifestyles

Smart communities: affordable, clever, sustainable housing

No single company can come up with a holistic solution that will enable sustainable lifestyles across China on its own. However, there is an opportunity to bring trusted brands together to develop affordable smart homes – conceived from the start as communities. This would have several advantages: if such communities were within easy reach of employment centers this would reduce commuter time and benefit wellbeing. It could also draw further benefits from their proximity – for example, systemically sharing industrial and residential by-products such as heat and water as efficiently as possible. As such, energy efficiency would therefore come not just from technological solutions but from locally sensitive design. In addition, expertise from different sectors could ensure that lifestyle needs (food & nutrition, mobility, community leisure spaces and activities and even aesthetic beauty) could be holistically and complimentarily incorporated into the services that the community provides for itself. Furthermore, local industry would be able to apply techniques learnt in the development of communities to improve its own processes. Such communities could be created by repurposing materials taken from the waste materials that China's current development is creating in such great quantities. Data connectivity and collection would be pre-designed into the community from the start – it would learn from itself and improve itself as it evolved. There is nowhere in the world where such an ambition could be imagined, implemented and inhabited in a matter of years. Except for China.

Mobility futures: integrated corporate new energy transport

Mobility is an undeniable challenge in China. Public transport in and between megacities such as Shanghai and Beijing is rapid and extensive. And yet these cities still face some of the worst congestion and air pollution in the world. Sheer weight of movement, and a lack of streamlined or integrated mobility options lead to this. However, technology already exists today to resolve these issues and companies can help lead the way. Forward-looking businesses can collaborate with each other to incentivize more sustainable and efficient commuting. Companies could take advantage of government incentives for new energy vehicles. Private electric bus transport could be used to bring employees into urban centers and public transport hubs. Ride sharing commuting is already being made possible by technology solutions. So could advice to help commuters find the most efficient route – actually possible in China, as the government is implementing widespread vehicle tracking in key cities. Bike sharing schemes could be supported and offered to employees for 'last-mile' connection to corporate campuses – with those bikes recycled from the first generation of Chinese cars to reach end of life. Finally, companies can collaborate with each other to help employees live closer to work – an employee apartment-sharing network between companies in similar urban areas effectively – cutting the distances employees need to travel every day to get to work.

The tech-enabled lifestyle: healthy & sustainable choices made easy

Health is the hook. Chinese middle-class consumers are concerned about where their food comes from, what is in their cosmetics, how air pollution will affect their families. There is an unbreakable relationship between the body and its environment. Business can take advantage of an always-on society that is not (yet) overly concerned with data privacy. It can begin to explore the possibilities of an ecosystem of collaboration between companies, products, services – all connected to help individuals live healthier, happier lives. By layering up the various different aspects of individuals' lives, companies can work together to offer the choices individuals need to live healthily and sustainably. For example, a maps and mobility app could know what an individual has eaten recently, thus offering walking or cycling options as well as the public or private transport details. If linked into personal health monitors, such an integrated system could even suggest nutritional plans and menus to assist individuals with high cholesterol for instance. No-one would be forced to live as advised, but companies could collaborate to connect to each other and to their customers. They could offer lifestyle improvements, some directly linked to the use of their products and services, others that simply provide people with ideas or the time to explore them. Imagine a recipe put together from what an app knows is already in someone's fridge. Missing ingredients are collected by a driverless vehicle from the nearest place stocking them, avoiding wasted kilometers and wasted food. The recipe is a bit calorie heavy – but you can play a game of ping with Mr Li who lives in your building and likes playing. And he can lend you that blender that you'll need tonight, too.

Appendix I

Beijing Attendees & links to 2015 workshop reports

3M

Alcoa China

All-China Environment Federation

Apple

BMW

BT

CBCSD

China Environment Certification Center

China-Asean Environment Cooperation Centre

CRFPDC

DeTao Investment and Development Group

Mengniu Dairy

Novozymes

PepsiCo

PwC

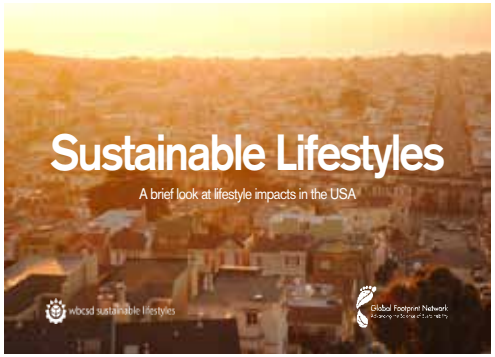
Schneider Electric

SINOPEC

TSC

UNEP

Veolia China



Appendix II

The Product Perspective

The “product perspective” considers the social and environmental hotspots across the entire value chain, from raw material production or extraction through manufacturing and distribution to use and end-of-life. This approach often identifies diverse impacts across various stages of the value chain. Some relate to processes under the direct control of retailers and brand manufacturers but typically the bigger impacts are “upstream” in the early stages of the value chain or “downstream” in product use and end-of-life. This makes it challenging for any one organization to tackle these alone. And yet, experience shows that through partnerships and novel business models, there are major opportunities to tackle these sustainability hotspots and unlock business value.

The Sustainability Consortium (TSC) has identified the hotspots and improvement opportunities across 120 different food and consumer product categories, representing approximately 60-80% of the sustainability impacts of the entire consumer goods value chain.

TSC has contributed this knowledge to the WBCSD Sustainable Lifestyles Project. The aim of doing so is to allow WBCSD to re-use this pre-existing work and to put the focus on finding innovative partnerships and business models to drive change.

The Results

Brazil, India and China are diverse markets each with their own characteristics. Nonetheless, there are many common themes, and common impacts, across the three: some of these generic aspects include:

- Inefficient production methods are a major source of waste, including unnecessary raw material consumption, water use and pollution and greenhouse gas emissions. And worker rights and worker health & safety are important considerations in agriculture, raw material extraction and manufacturing in some product value chains.
-
- Consumption and consumer decisions are often the major driver of the impacts. In some cases, these impacts are directly with the consumer, such as buying food that is then wasted. This causes extra greenhouse gases from food decomposition in landfill. But these can also have knock-on impacts upstream in the supply chain. In the food waste example, additional food needs to be purchased to substitute for the food that was wasted. This leads to additional upstream impacts because the additional food needs to be produced, with all the same associated social and environmental impacts in the supply chain.
- Infrastructure plays a foundational role in determining daily impacts. Good public transport, for example, can mitigate local air pollution and overall greenhouse gas emissions by offering citizens an alternative to a car-based daily commute (as well as often improving quality of life too). In most emerging markets, major infrastructure is still being built. Retro-fitting sustainability into existing infrastructure is typically much more challenging than including it from the outset. In all three countries, there’s a significant opportunity to build-in sustainability in the design from the outset. The flip-side to this is that, if the opportunity is missed, it locks in unsustainable patterns of use potentially for generations.

THE SUSTAINABILITY CONSORTIUM™

China

The major impacts can be organized into three categories, with product-related impacts playing a varying role, as follows:

Product Supply Chain

The biggest sustainability impacts occur in the following product categories:

- Food & Nutrition: Meat, especially Pork; Dairy, Eggs and Fish; Fruit; Sugar.
- Household Goods: Electronics & Energy-Using Products; Luxury Clothes & Cosmetics

Good energy efficiency and resource efficiency improvements already exist that have decent financial pay-backs as well as others that have more complex business cases.

Farming operations and final processing can consume significant amounts of electricity and energy, leading to greenhouse gas emissions. Fertilizers and manure also emit greenhouse gases. Manufacturers and farmers can measure and track energy use, perform preventative maintenance on equipment, or replace inefficient equipment to improve energy efficiency and reduce emissions. Additionally, chicken farmers can implement a nutrient management plan, use precision agriculture or low energy irrigation, or optimize feed yield, feeding of chickens, or the size or efficiency of farm vehicles to minimize impacts associated with feed production.

Worker rights and animal welfare are also important considerations in all relevant supply chains.

Behaviour

Consumers have an important role in many aspects of product choice and product use and disposal. Similar to India, two important consumer trends are leading to growing sustainability impacts, both associated with increased wealth and a growing Chinese middle class. These are:

- Food/Diet, in particular the increasing “westernization” of diet, including rising consumption of all meats and in particular pork.
- Spending on luxury goods, white goods and consumer electronics, driven in large part by the high status that these products confer their owners.

Because these impacts are driven by growing wealth and status, it will be particularly challenging to reverse the prevailing trend but progress here is essential to tackling the sustainability issues that arise from these choices. But focus must also be given to the underlying infrastructure that supports improvements, for example the infrastructure required to support an increase in reuse and recycling of white goods and electronics at the end of life.

Infrastructure

Indirectly linked to product impacts is the underlying infrastructure that influences how people live their lives and the production systems that support them. Housing, transport, recycling and utility/energy infrastructure have significant room for improvement with large societal benefits as well as the opportunity to “lock in” sustainability over coming decades.

Appendix III

The Social Perspective

Background

Managing social issues is complex.
The concept of a 'social licence to operate' is gaining traction as a key element of reputational risk management, corporate value protection and access to capital. However, the application of social impact assessment at a product- or consumption-level is not yet well understood nor systematically considered as part of product design. By contrast, approaches to analysing the environmental impacts of a product are well-established and no longer seen as an emerging science or innovation.

Stakeholder expectations are changing.
Provocative images in traditional and social media - a clothing factory collapse in Bangladesh [(1)] - a child picking tobacco in the US [(2)] - controversial resettlement of indigenous people in Ethiopia [(3)] - drive customers to demand greater transparency on where and how products are made. The risks and opportunities presented by social issues are a focal point on the agenda of leading investors and forward-thinking C-suite executives. Such changing attitudes encourage companies to develop more transparent and ambitious social performance programs.

Step-change legislation on human rights is changing the benchmark. The California Transparency in Supply Chains Act 2010 and the UK Modern Slavery Act 2015 have been developed in response to the astounding finding that nearly 21 million people live in forced labour conditions [(4)], in addition to numerous other well-known existing and ongoing human rights issues. Furthermore, Denmark, the Netherlands and the UK are developing national action plans to implement the UN Guiding Principles on Business and Human Rights, which will help to establish a new benchmark. WBCSD's Social Impact group has developed a brief that is helping companies operationalise these guiding principles [(5)].

Social benefits can present significant opportunities. Much of the attention on social issues surrounds risk management and supply chain initiatives, as this is where some of the most significant known issues sit. However, better management of supply chain and operational risks, together with an improved ability to address social challenges or deliver social benefits through product and service design, offer huge market potential to forward-thinking companies. For instance, SCA has recognized this opportunity and it is working in China to improve the lifestyle and health of senior citizens through more accessible incontinence products.

Workshop Inputs

Over the last year, the Sustainable Lifestyles working group has explored which products and services are associated with the highest lifestyle impacts, and where business should focus its efforts to enable more sustainable lifestyles. ERM provided China-specific social hotspot information for the Beijing workshop to encourage participants to reflect on and to discuss social performance challenges and opportunities across each product category's value chain. The key social hotspot themes for Chinese value chains are summarized in the table below.

ERM

(1) http://www.theguardian.com/world/rana-plaza

(2) https://www.hrw.org/report/2014/05/13/tobaccos-hidden-children/hazardous-child-labor-united-states-tobacco-farming

(3) http://www.theguardian.com/environment/2015/sep/03/eu-diplomats-reveal-devastating-impact-of-ethiopia-dam-project-on-remote-tribes

(4) http://www.ilo.org/global/topics/forced-labour/lang--en/index.htm

(5) http://www.wbcsd.org/Pages/EDocument/EDocumentDetails.aspx?ID=16382&NoSearchContextKey=true

	Mobility	Food	Home	Household goods
Upstream supply chain	Business ethics	Farm workers are at risk of forced labour, gender inequality and H&S issues; lack of fair wages; large migrant workforce (often denied access to social security rights in host cities); availability of workers; investment in training and upskilling needed	Business ethics and human rights	Supply chain and production are directly linked in this sector as many procured materials are also produced in China (see row below for impacts)
Corporate operational boundaries	Attracting and retaining talented staff in lower-tiered cities in Central and Western China where factories are located	Food health quality (eg fat, salt, % meat content etc); safety (eg contamination, traceability of source)	Lack of fair wages and formal employment; large reliance on migrant workforce often denied access to social security rights in host cities); H&S training insufficient, many workers must provide own safety equipment, lack of insurance; limited opportunity for workers to increase skills; no grievance systems	High tech manufacturing creating more well-paid and skilled jobs; labour issues, fair wages and compensation, gender inequality and H&S are significant problems in the industry (often in low-skilled positions); Low-skilled jobs moving to Indonesia, Philippines, Myanmar etc
Downstream consumer activities	Health impacts from air pollution; road safety; access for low income earners via car sharing, hiring and pooling; ownership can increase consumer happiness, confidence and well-being; low capacity to formally dismantle end-of-life vehicles	Quantity and quality are main issues; increased availability provides healthier options, but not affordable to all; concerns about quality control/ safety and authenticity (eg tainted milk, expired meat); obesity from changing consumption	Skyrocketing housing prices in urban areas; opportunity for social housing in 2nd and 3rd tier cities with oversupply; cost of maintenance/utilities; indoor air pollution from cooking in rural China; short housing life likely to cause future problems	Goods can increase consumer happiness, confidence and wellbeing; issues with youth over-use of internet and online gaming; moving towards a more “throw-away” and wasteful lifestyle; consumer knowledge on proper disposal; worker rights and safety in waste/disposal industry (often unskilled and informal employment)

Workshop Analysis

China's rapid development has lifted hundreds of millions out of poverty, but it remains a developing country, albeit one that also has a middle class growing at an astonishing rate. High inequality, a large internal migrant workforce and aging demographics are major social challenges for the country. Availability of skilled workers in the right location presents both an opportunity and challenge for companies and workers. Access to healthy and safe/quality foods and homes is emerging as the top priority issue for middle class Chinese. Business ethics and the government's role in policies and priorities have an integral role in all categories.

Many companies in China have advanced and forward-thinking social compliance and organizational/community investment programs. However, social impacts in the context of sustainable lifestyles or consumption is a relatively new concept. Emerging themes on how this space could be progressed are summarized below.

- **A business case is needed to identify social performance opportunities.** Management of a product's social issues may entail costs without an immediate or direct return. Techniques to analyse the broader social return on investment (e.g. reduced long term public service health costs if a healthy diet is maintained or pollution is reduced) can build an attractive case.

- **Companies** – even large ones – cannot act alone. Industry partnerships and involvement in policy-making is required to advocate positive change and can provide early-mover advantages in the marketplace.

- **A systematic approach is needed** to assess, prioritise and manage social performance in supply chains, company operations and consumer activities. As companies innovate and diversify products and business models to enable more sustainable lifestyles, social issues will need to be tracked against a baseline to mitigate risk, enhance reputation and build on benefits that are differentiators.

This year's work program has provided insight into what social hotspots are relevant for mobility, food, home and household goods product categories in China. When considering the three ideas for collaborative business solutions presented earlier in this report, the top-level social issues that could be used as a starting point to springboard the inclusion and integration of social issues into sustainable lifestyle discussions are summarized below.

Collaborative business solutions for China	Social issues to consider as the ideas are progressed
Smart communities: affordable, clever, sustainable housing	Supply chain ethics and human rights in upstream activities, fair wages and management of migrant workers, H&S conditions related to building, training, well-being and access/affordability
Mobility futures: integrated corporate new energy transport	Employment and staff attraction/retention, road safety, health impacts from air pollution, quality of life and access to the solution itself
The tech-enabled lifestyle: healthy & sustainable choices made easy	Job creation, skills and knowledge, well-being, health, rebound effects of too much time online and poor e-waste management

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