



II. Ideas from business for business: Commercial opportunities for material efficiency

The IRP RECC model shows that material efficiency strategies bring a range of untapped climate change mitigation opportunities to the housing and mobility sectors. These strategies can also help businesses create a business model that is less dependent on resource use. Businesses are experiencing a new set of market conditions: rising consumer demand for new convenient mobility and housing, volatile and rising material prices, new opportunities of digitalization for smart design and material tracking, and emerging threats from climate change. In this context, material efficiency strategies can help shape durable business success, where more intensive use of buildings and vehicles becomes central.

In many cases, deep business model innovation will be needed to realize the potential mitigation and economic benefits of material efficiency. This chapter presents ideas from business organizations with reference to the relevant chapter of the main report.

The examples in Boxes 5 to 12 illustrate cases of notable innovation. These cases are intended to inspire rather than provide evidence or show a comprehensive picture of the implementation of all material efficiency strategies. Similarly, references to current journalistic sources or advisory reports are meant to illustrate

ideas for possible business opportunities, not provide evidence. For evidence-based results, please refer to the IRP RECC 2020 report.

A. Business opportunities for material-efficient housing

This section outlines business approaches and opportunities for material efficiency in housing. More intensive use is the priority strategy in G7 countries, which should be complemented by the additional benefit of other strategies.

1. Increase productivity of existing stock²

As populations decline while new building stock grows, G7 countries have large housing stocks with underused space. One priority is therefore to use existing buildings more efficiently in order to increase economic productivity of the existing stock and significantly reduce GHG emissions. One way to use



² Based on IRP RECC 2020, Chapters 2.3 and 3.3.3

these buildings more efficiently is by repurposing under used commercial and residential space, an effort that can combine more intensive use; recovery, remanufacturing and reuse of components; as well as product lifetime extension.

Developers, property managers and refurbishing businesses in high-demand housing markets such as New York or London can repurpose under used buildings for higher utilization, such as turning former warehouses into residential space (Savills UK News

2019). Applying the product lifetime extension strategy through repurposing old buildings in G7 countries reduces emissions only if paired with refurbishment to improve insulation and heating efficiency.

More business creativity – and policy cooperation – is needed to make a business case for increasing the utilization of under used investment properties, second homes or housing stock inefficiently reserved for short-term occupancies.

Box 5. Retrofitting for more intensive use and energy efficiency

3XN Architects – Quay Quarter Tower, Australia

The Quay Quarter Tower in Sydney, designed by 3XN Architects, Arup, and BVN, used materials from an existing structure on the site to make significant economic and environmental savings. According to 3XN reports, 65 per cent of columns, beams and slabs, as well as 95 per cent of structural walls were reused in the redesign of the building. In total, 50 per cent of the resources for the new tower were directly reused from the old one. 3XN reports that by reusing materials, they averted a total of 7,505 tonnes of CO₂ in emissions, equivalent to 2,500 one-way flights from Sydney to Copenhagen (3XN 2019).

Source: 3XN website 2019. <https://gxn.3xn.com/wp-content/uploads/sites/4/2019/01/Building-a-Circular-Future-3-3.pdf>

While the optimization of existing housing stock in high-demand cities is an intuitively appealing option, these places already have high utilization rates on average, and the potential to increase it might be limited. But declining populations in cities or rural regions in G7 countries have underutilized residential space (Der Deutschlandatlas n.d.; UK Government 2020), and in these places the intensification of use has high potential.

In a city where many young people have left to find work elsewhere, for example, many larger family houses might be occupied by only one or two people. If a family,

student group or any other group were to move into such a house, this would greatly increase utilization. Another important question is how to make it socially and economically attractive for more people to move into available homes in currently less attractive areas. These areas could attract residents by promoting the development of efficient mobility services, efficient residences and cultural and business infrastructure.

The business opportunity arises when revitalization creates new markets that can stir investor interest and promote a general increase in local buying

power (World Bank 2016). With the right policies and public infrastructure investments, regeneration with an integrated approach can create new activity for many businesses – (re)developers; refurbishment and renovation firms; new types of property management businesses; and local cultural, gastronomical and mobility services (Floride and McLean 2017).

The likely growing consumer demand for smaller, revitalized urban centres in G7 countries justifies such investments. Many urban citizens are struggling with high rents, long commutes, poor air quality and lack of community, and seem to be looking to move to smaller towns. In 2018, as many as 60 per cent of Americans living in big cities said they preferred to live in rural areas, small towns or suburbs (Ingraham 2018; Kotkin 2012). Similar trends can be seen in France (Di Pasquale 2016) and Germany (Klug and Knipperts 2018). Well-designed revitalized urban centres are likely to be attractive for this demographic, particularly if increasing home office use facilitates more flexible choice of location. Many revitalization efforts have failed in the past, and naturally the appropriate location and approaches must suit the specific context.

Integrated urban revitalization must be led by city planners and should be supported by state or national policies, but business can be an important driving force and partner in such projects, and is arguably a crucial element in their success (Floride and McLean 2017; World Bank 2016).

Shifting demographics and urbanization are likely to create high demand for intensification through revitalization, and businesses that design and provide

smarter living spaces, with better access to culture and health services, stand to benefit.

In countries with growing urbanization, such as in India or parts of China, the goal is to design smart flexible cities that provide quality of life from the outset and long-term high utilization. The IRP report, *The Weight of Cities*, provides important insights into the energy- and material-efficient design of urban living in strategic high-density nodes (IRP 2018; IRP 2020, Chapter 2.5.3).

2. Meet new demand and save costs in new construction



Increasing the productivity of the existing building stock will alleviate, but not eliminate, the demand for new buildings. Developers, builders and property managers will have opportunities to satisfy unmet demand for middle-income housing in G7 markets (Olick 2020) with space-efficient buildings in attractive structures that employ the more intensive use strategy. High-quality but smaller residences in multi-unit buildings can meet that demand more quickly and in more convenient locations than single-family homes.

While the trend to very small flats in high-demand cities must be critically discussed (Barhat 2015), building good-quality, space-efficient alternatives to inefficient large single family homes makes sense from an environmental, social and economic perspective. To strengthen their advantage, smart residences can

offer attractive and resource-efficient services beyond housing – easy access to transport, services and green spaces.

In emerging cities in countries with growing populations, the design of compact and integrated urban nodes can and must be pursued even more comprehensively. This effort is likely to require close cooperation between developers and city planners, and could constitute an entirely new business model that produces highly attractive results for consumers (IRP 2018).

New construction can save material and costs by using modular and prefabricated components and flexible design, an approach that may entail several enabling strategies: less material by design; fabrication yield improvements; enhanced end-of-life recovery and recycling of materials; and recovery, remanufacturing, and reuse of components.

Modular building with off-site prefabrication reduces construction waste, facilitates the use of recycled materials and encourages lean designs. Modular design can produce more flexible floor plans and enable efficient deconstruction at the end of building life for easier recovery and reuse of components.

By cutting construction time in half, modular and prefabricated techniques reduce costs by about 20 per cent (McKinsey & Company *et al.* 2019).

Designing for lower production waste, higher utilization over the life cycle and better recovery at end-of-life should soon become easier. New tools are emerging to benchmark the environmental impact of components over their entire life cycle or to provide a “material passport” that tracks all materials in order to enable better reuse (Heinrich and Lang 2019).

Many planners and homeowners still believe modular buildings are of poor quality and unattractive but the image of prefabricated housing is largely a hangover from the 1960s building boom (Gerrard 2018). Today’s modular buildings and the housing services they support can be highly attractive, well designed and follow sustainable principles. They need equally attractive marketing strategies supported by public information.

These strategies focused on new buildings present an even greater business case in countries with growing urbanization and the need to expand housing stock.

Box 6. Modular building

The Broad Group, China

The Broad Group, specializing in modular construction in China, has increased production and improved logistics and installation efficiencies by using modular construction techniques. The company reports building more than 30 factory-made sustainable buildings and a 57-storey building on one site in just 19 days. According to the Broad Group, their designs result in less wasted materials and to reduce total construction costs by 40 per cent compared to traditional construction methods (EMF 2018).

Source: Ellen MacArthur Foundation 2018. The Circular Economy Opportunity for Urban and Industrial Innovation in China. <https://www.ellenmacarthurfoundation.org/publications/chinareport>

Box 7. Public-private cooperation for more intensive use and recycled materials

Clarion Housing Group – Merton Regeneration Project, United Kingdom

Clarion Housing is spearheading a £1 billion housing project to provide 3,000 new homes in West London, along with 9,000 m² of retail, leisure, office, work and community space. According to the London Waste and Recycling Board, the goal of the project is to set new standards in applying circular economy principles. It is working with a start-up company, LOOP Ventures, to optimize its use of materials. It aims to repurpose or reuse fittings and materials from 1,260 local homes that are being demolished (London Waste and Recycling Board 2018).

Source: London Waste and Recycling Board website 2018.
<https://circularlondon.org/clarion-circular-housing/>.

The use of aesthetically pleasing, and sustainable materials and designs, increases the distinctiveness of buildings and their attractiveness to customers. This approach may employ material substitution (for example timber use); using less material by design; and recovery, remanufacturing, and reuse of components.

Sustainably harvested timber offers significant climate and other benefits in construction. Timber use can reduce expected building life cycle emissions in G7 countries through 2060 by about 2 per cent, by about 25 per cent in China and by about 50 per cent in India compared to current building materials such as concrete. Thanks to new technologies such as cross-laminated timber, wood can now be used in high-

rise buildings. Interest in advanced timber framing (instead of concrete or metal structures), and wood construction more generally, is gaining more traction because of its climate benefits but also potentially because of its cost savings. Modern timber techniques can enhance productivity in construction by using prefabricated wooden building components.

Planning tools like building information modelling (a virtual process that accurately models a building project in a three-dimensional environment through collaboration with architects, engineers, contractors, suppliers and other stakeholders) can further reduce material costs and waste.



Credit: GVO JTa Herout/Shutterstock.com

3. Promote and meet the demand for new living services³



All material efficiency strategies can contribute to the construction sector's ability to meet and create demand for convenient and connected living experiences while saving material and energy costs.

To provide a living experience that goes beyond just housing, innovative business models could offer clients building maintenance, energy savings, more convenience, access to green spaces, healthcare

facilities, security, shared mobility, entertainment and community services. Such service models would benefit from saving materials over the whole life cycle of buildings with the help of strategies such as extension of lifetime through insulation, renovation and repair services. Maintenance and component recovery could occur at a larger scale, at lower cost and in faster learning cycles. The possibilities of digital evaluation of utilization and maintenance needs, and possibilities for communication with residents can facilitate such models.

Such concepts can be pursued by high-end property managers as well as by more self-organized cooperative housing (Stevens-Wood 2020).



Box 8. More intensive use in housing

Vancouver cohousing complex, Canada

In this modern cohousing complex, most residents own their homes and each unit has its own kitchen, living room, washroom and bedroom or bedrooms. But residents also share large common areas and are responsible for shared duties such as cooking communal meals and handling recycling. The organization reports that the Vancouver Cohousing members have the benefits of amenities common to a traditional home while reducing the size of their private dwelling. Residents hold monthly meetings in which decisions are made by consensus (Vancouver Cohousing 2019).

Source: Vancouver Housing website 2019. <https://www.vancouvercohousing.com/>.

3- Based on IRP RECC 2020, Chapter 3.3.3

Box 9. More intensive use, recovery and reuse and a combination of services

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Taisugar Circular Village, Republic of China

The Taisugar Circular Village in Tainan is trialling a new circular economy housing model. The Taiwan Circular Economy Network reports that it reuses components from the existing housing stock for further urban development. Where possible, it reuses outputs from community utilities as well. Examples of reused utility outputs include stormwater circulation, a village heat-pump system, and shared solar power installations. Salvaged hardwood from rundown homes is used to build new houses and old rail tracks are recycled as fence posts. The project currently plans to create more than 300 high-quality environmental residential homes, according to the network (Taiwan Circular Economy Network 2017).

Source: Taiwan Circular Economy Network 2017. Publication Towards a Circular Taiwan: 66 Circular Stories.



Credit: Taiwan Sugar Corporation and Bio-Architecture Formosana

B. Business opportunities for material-efficient mobility

Effective climate action and orientation to new customer demands is a particularly urgent need in the automotive industry. Volkswagen's CEO Herbert Diess noted in January 2020 that large traditional car manufacturers may become obsolete unless they make a radical digital shift consistent with climate policy goals (Afhüppe 2020). The CEO of Bosch, the world's largest car components company, recently noted that the sector could have passed the peak of automotive production and that future success will lie in connected, electric mobility systems (Attwood 2020).

This section outlines business approaches and opportunities for material efficiency in cars. More intensive use is the priority strategy, which should be complemented by and, in many cases may facilitate, the additional benefit of other material efficiency strategies. To do so quickly enough and reap the benefits, the car mobility sector will need to reinvent concepts of ownership and value chains.

1. Meet consumer demand for more convenient, affordable, and flexible mobility⁴

Owning a car is already not cost effective for most vehicle owners in cities (The Economist 2016; Hägler and Kunkel 2019), given high maintenance costs

and low utilization rates. The typical European car is parked 92 per cent of the time and carries on average only 1.5 people per trip (EMF 2015).

Given the strong demand for convenient sharing services, potential material savings of more intensive use, and faster electrification, the business ambition for intensification can be even higher, and the commercial potential can become more apparent.

Car-sharing and ride-pooling services are growing fast (including individual hailing which does not currently lead to efficiency gains), proving its evident appeal to consumers across the world (McKinsey Centre for Future Mobility 2020). For the moment, individual car ownership remains high. Yet it is likely to become a lot less convenient and less cost-competitive relative to



⁴ Based on IRP RECC 2020, Chapters 2.4.4, 3.4.2 and 3.4.4

the alternatives over the next few decades (McKinsey & Company 2019). Parking space is becoming scarce and the complexity and costs of car maintenance are growing (McKinsey & Company 2019). Meanwhile a growing number of businesses are working to increase the convenience and cost of pooled rides and car-sharing services through better digital hailing systems and autonomous driving technology, which is expected to become a game changer (McKinsey & Company 2019).

Shared mobility services have great potential globally. The shared mobility market already exceeds USD \$60 billion in value across the three largest markets – China, Europe, and the United States – and the markets are growing (McKinsey Centre for Future Mobility 2020).

The booming demand for mobility services is not only a significant opportunity for mobility service providers, but also for those manufacturers that provide the most suitable, fuel-efficient, durable, and easy-to-maintain cars. The opportunity for businesses providing digital pooling or hailing platforms or other digital services to enhance the trip experience is large.

The rising demand for electrification in G7 countries in the European Union (Gibbs 2018) will make aiming for higher utilization models even more beneficial because higher utilization can lead to faster modernization cycles and shorten the payback period for electrification investments. Furthermore, mobility service providers can maximize the value captured per battery, a product potentially limited in availability by rare materials. They

can also optimize the management of battery life and recovery (WEF and Global Battery Alliance 2019).

In the COVID-19 context, all mobility providers have seen a downturn in demand. The long-term recovery for different modes of transport remains to be seen, but many market observers see an important role for multi-modal flexible solutions (see Box 4).

Box 10. Innovation in advanced ride pooling

Uber Pool, global

In 2014 the ride-hailing provider Uber launched Uber Pool to enable riders to save costs by sharing their trip with others heading in the same direction. As with individual ride-hailing services, customers request a ride to a destination of their choice on the app, which automatically matches the request to other people with overlapping journeys. According to Uber, the ride may take small detours and will stop a maximum of three times to pick up or drop off other riders. Business Insider reported that Uber is working on optimizing the service and guaranteeing an arrival time. According to Uber, by 2016, 20 per cent of all their rides around the world used Pool, including 30 million trips each week in China alone. While no data are available on the success of the push to improve pooling services, it shows a type of innovation that needs to be explored further (Heath 2016).

Source: Business Insider online 2016. <https://www.businessinsider.com/uberpool-ride-sharing-could-be-the-future-of-uber-2016-6?r=US&IR=T>.

Box 11. Innovation in diverse car-sharing services and automation**Canoo, USA**

The startup Canoo aims to launch a new type of vehicle in 2021 that, it claims, combines the interior space of a large SUV with the carbon footprint of a compact car. According to the company, the vehicles will be human-controlled at first but can be adapted to autonomous driving technology in the future. Canoo also plans to make a vehicle suited for delivery. Canoo vehicles will be fully electric and Canoo's services will be sold through memberships (O'Kane 2019).

Source: The Verge online 2019. <https://www.theverge.com/2019/3/25/18279906/new-ev-startup-canoo-will-only-sell-cars-on-a-subscription-basis>.



Credit: Tero Vesalainen/Shutterstock.com

2. Capture more value per vehicle⁵



One way to increase more intensive vehicle use is by expanding the concept of the vehicle.

For digital service providers, an important opportunity in ride-pooling is offering customers additional services such as entertainment, information or shopping offers through interactive panels in the vehicles or via the ride-hailing app (Glon 2020).

Utility firms may find advantages in cooperating with mobility services to use electric vehicles for energy storage (WEF and Global Battery Alliance 2019). While private vehicles could also be used this way, the centrally managed and smartly connected vehicles of mobility service providers are likely to facilitate vehicle-to-grid energy transfer.

The G7 car sector currently does not maximize the value of materials over the life cycle of cars. The 2020 IRP RECC shows that at least a 20 per cent extension of useful life is possible through better repair, with a corresponding reduction in material cycle emissions of 5-15 per cent by 2050.

Reuse or remanufacturing of components would reduce emissions by a similar amount. Improvements in end-of-life material recovery for recycling could reduce material cycle emissions by about 38-45 per cent. These improvements would require an increase from today's recovery rates of steel from 69 per cent to 95 per cent in 2050, and from 67 per cent to 82 per cent for copper.

Closed-loop recycling could increase the value of recycled materials. Using current technology, secondary steel obtained from car recycling is contaminated with copper, thereby limiting the value of the scrap and potentially limiting its use. Only about 7 per cent of the steel recovered from cars goes back into car production, with most of the recovered steel used in construction at a much lower value. Maintaining the original quality of the recovered metals allows them to be reused in cars or other high-

⁵ Based on IRP RECC 2020, Chapters 2.4.4 and 3.4.4

value applications. This closed-loop recycling largely depends on better design and processes for recovery of metals.

These strategies, in principle, would significantly reduce the material cost per kilometre driven. However, the fragmented nature of the vehicle value chain makes it difficult to implement them. The IRP RECC policy review found high recycling rates in places like Japan where producer collaboration is incentivized through extended producer responsibility policies.

Progressive organizations such as those in the Circular Cars Initiative suggest that businesses can proactively develop producer collaboration to benefit from material savings across the vehicle life cycle. Innovation can start immediately but will need clear policy support to scale up (CCI WEF 2020; Scott 2020).

Original manufacturers could keep a higher level of control over the vehicles' life cycle, for example by

connecting and collaborating with other actors in the value chain, particularly fleet managers. This approach could incentivize and facilitate the design of cars for repair and recovery, as well as employ the upskilled workforce required to execute the mechanical work along the life cycle.

The opportunity and competitive pressure for businesses to pursue cooperation to capture more value from materials seems to be on the rise with two fast-emerging trends. Businesses that offer mobility as a service have incentives to maintain and remanufacture because their large fleets have high utilization that requires streamlined maintenance at scale and their digital capabilities enable them to track vehicles to their end of life. In addition, advancements in digital technology will allow for easier tracking of materials, increasingly automated disassembly, and distributed component repair.

Box 12. Innovation in remanufacturing and recycling

Renault, France

Renault says it focuses on using secondary materials in its cars, and on producing easy-to-repair car designs. In 2017, Renault reported that it was already generating €0.5 billion revenue per year from recycling and remanufacturing operations (Renault 2017).

Source: <https://en.media.groupe.renault.com/actualites/circular-economy-partnership-deepens-between-groupe-renault-and-the-ellen-macarthur-foundation-92003-989c5.html>

3. Stay relevant by meeting societal expectations of better socioeconomic performance⁶

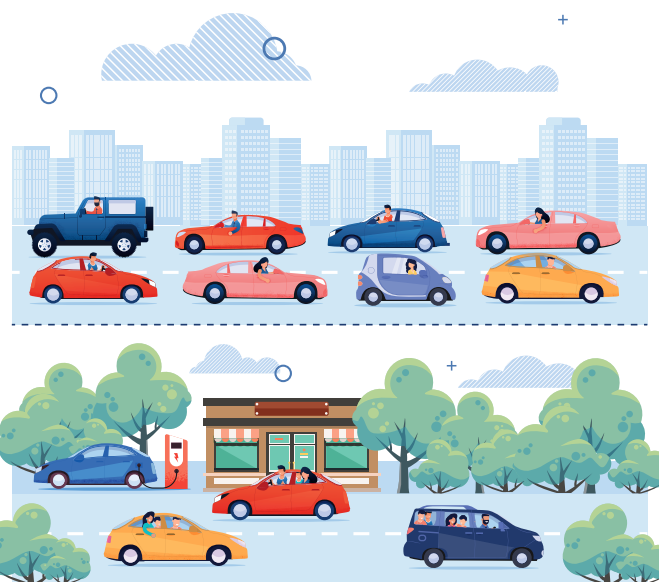
Mobility systems based on individual car use have significant downsides for urban productivity and societal health.

Currently, congestion is causing huge economic losses around the world. The city of London, for example, estimates the annual cost of congestion will be a £9.3 billion by 2030 if current trends continue (Transport for London and Mayor of London 2018). Air pollution in cities, 92 per cent per cent of which is caused by car use, is a major factor in premature deaths (Transport for London and Mayor of London 2018; WHO 2020). The way urban environments in G7 countries are currently designed to accommodate cars is dramatically space inefficient. About 50 per cent of European inner-city land is devoted to roads and parking, but, even at rush hour, cars use only 10 per cent of urban roads. In Orlando and Los Angeles, parking lots are estimated to cover at least one-third of the land area (EMF 2015). Several Indian cities feature in the top 10 list of most regular traffic congestion (Dash 2020). Exposed roads also increase the heat-island effect, which makes urban regions warmer than surrounding rural areas (Ben-Joseph 2012).

Some cities are taking action to limit urban private car use and its consequences. San Francisco, California, and Vancouver, designated street parking spaces for free-floating car-sharing programmes in effect reducing space for private car use (IRP 2020,

Chapter 3.4.2) and European cities such as Helsinki, Paris and Oslo are looking to reduce parking and road space (O'Sullivan 2020; Wijnen 2018).

Mobility providers have an important role to play in integrated multi-modal services that are particularly important to overall urban mobility performance. Ride-pooling services can cooperate with public transport to offer complementary trips and innovate to reach more peripheral areas not covered by public or shared transport services. In proactively pursuing such cooperation and offering integration, innovative businesses could have a systemic effect and create consumer awareness and demand for such integrated services – expanding not only their own role but also potentially the role of integrated models with public transport providers. This possibility does not seem unrealistic – in the case of shared bicycle and

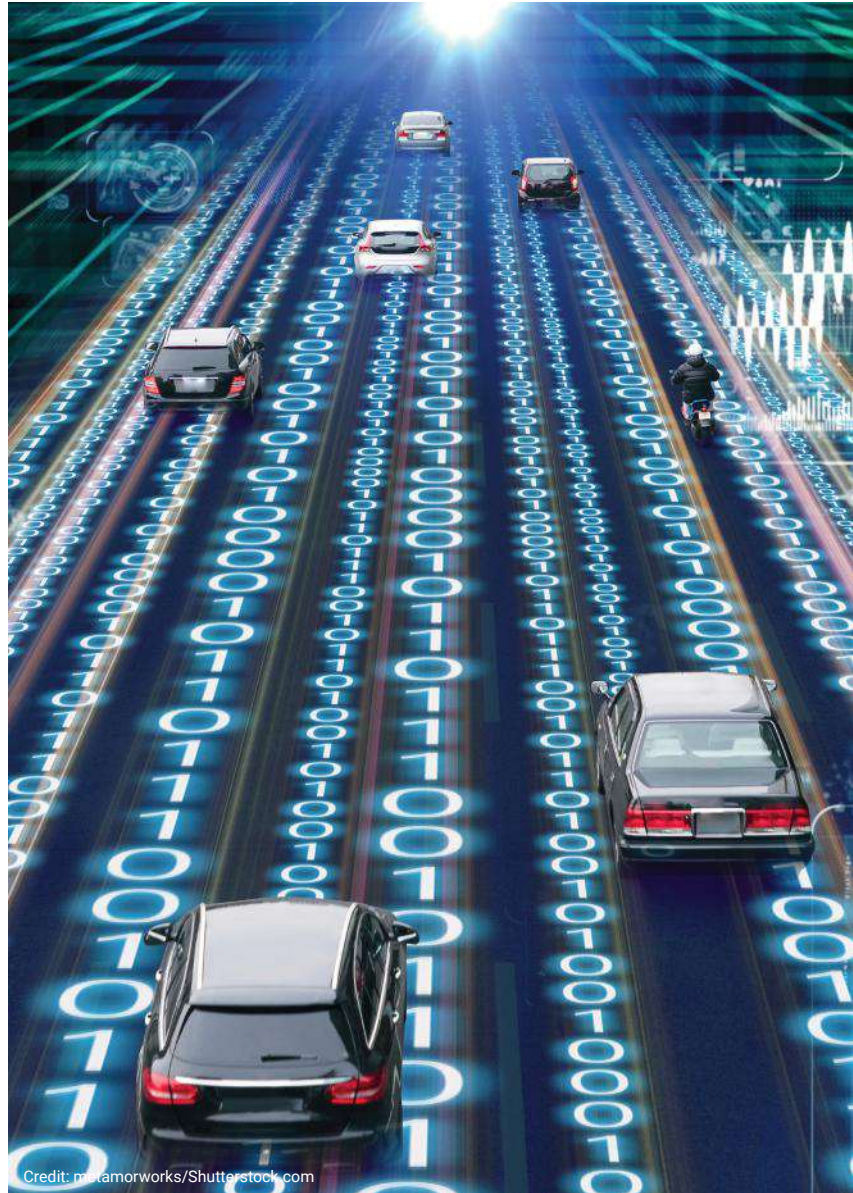


⁶ Based on IRP RECC 2020, Chapters 2.5.3 and 3.7.4

scooter services, innovative business has shaped new consumer behaviour (Ajao 2019).

Another important lever is data sharing. The collection and evaluation of trip and occupancy data in cooperation with cities or other public transportation planning bodies could improve travel options, and make public and private shared transportation more cost efficient, material-efficient and demand driven, hence more economically and socially beneficial.

The role of flexible transport services and integrated multi-modal platforms has seen new risks but also more importance in the context of the COVID-19 Pandemic. Implications for the design and operation of shared transport must naturally be further discussed by businesses, policymakers and users as the importance of flexible mobility services is likely to grow.



C. Next steps for business leaders

The following recommendations for implementing material efficiency strategies and the related business model changes are based on stakeholder inputs.

1. Anchor business vision in material efficiency and climate science



Some businesses have already begun to integrate emission reductions in their business vision and strategy. Businesses in the housing and mobility sector, and material-intensive sectors more generally, need to integrate mid- and long-term climate and resource risk assessments into their business strategies. Beyond risks, the business vision should include how a decoupled business model would look and how material efficiency strategies can play a major role.

2. Invest in innovative pilots

Material efficiency strategies are essential for modern businesses.

The trend towards business models providing functionality instead of product sales will increase resilience in a world of climate change and rising or more volatile resource prices. Of course, many of these changes require fundamentally new thinking to overcome significant complexity. This challenge should not slow business action until the perfect models are found. It should rather encourage businesses to test new approaches in pilot projects, or potentially create or join pre-competitive coalitions with other organizations or public innovation programmes, and to establish regular exchange with consumers and citizens. Digital tools, such as smart phone applications or interfaces in appliances, as well as personal communication will play a role in evaluating changing consumer experiences.



3. Demand and support policy development

The IRP report identifies a big gap in policy supporting material efficiency strategies. But only with the right policies to set fair market conditions, can businesses fully benefit from the resource savings, new service-oriented business models and new (regenerated) urban markets. Frontrunners in innovative business models and technologies can secure an important competitive advantage from better policies that take into account the real value of natural resources.

Business leaders must use their voices to advocate for material efficiency policies and offer their expertise to inform the development of new policies.

One way for business leaders to do so is to use their weight in industry associations to drive progressive positions on resource policies. Business can also join or co-create purpose-specific coalitions such as the Energy Transitions Commission or the World Economic Forum's Circular Cars Initiative (CCI WEF 2020; ETC 2020).

Business voices can provide important political space for leaders in governments to drive system-wide material efficiency policies at home and internationally, which in turn can provide a competitive advantage to innovative firms. A much-cited example of a strong business role in resource-related policymaking is the 1980s push by major chemical companies for a strict international agreement on ozone depleting substances, which arguably enabled the Montreal protocol in 1987 (Maxwell and Briscoe 1997).

Particularly in city contexts, business leaders can also pursue direct private-public partnerships, for example in the matter of city revitalization, neighbourhood development or integrated public-private mobility solutions. Data sharing is an important tool that business can provide to policymakers to design beneficial regulation and investments.



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Resource Efficiency and Climate Change:
Material Efficiency Strategies for a Low-Carbon Future
Implications for Business Leaders in Housing and Mobility

The International Resource Panel (IRP) was established to provide independent, coherent and authoritative scientific assessments on the use of natural resources and their environmental impacts over the full life cycle. The Panel aims to contribute to a better understanding of how to decouple economic growth from environmental degradation while enhancing well-being.

The Secretariat is hosted by the United Nations Environment Programme. Since 2017, the IRP has published twenty-eight assessments. These assessments demonstrate the opportunities for governments, businesses and wider society to work together to create and implement policies that ultimately lead to sustainable resource management, including through better planning, technological innovation and strategic incentives and investments.

This “Implications for Business Leaders” document accompanies a report that was developed by the IRP in response to a request by leaders of the Group of 7 nations in the context of efforts to promote resource efficiency as a core element of sustainable development. It conducts a rigorous assessment of the contribution of material efficiency to GHG abatement strategies. More concretely, it assesses the reduction potential of GHG emissions from material efficiency strategies applied in residential buildings and light duty vehicles, and reviews policies that address these strategies.

According to the Panel, GHG emissions from residential buildings in the G7 and China could be reduced by at least 80% in 2050 through more intensive use of homes, design with less materials, improved recycling of construction materials, and other strategies.

Significant reductions of GHG emissions could also be achieved in the production, use and disposal of cars. IRP modelling shows that GHG emissions from passenger cars in 2050 could be reduced by up to 70% in G7 countries and 60% in China and India through ride-sharing, car-sharing, and a shift towards trip-appropriate smaller cars, among others.

Increasing material efficiency is a key opportunity for moving towards the 1.5° C target in the Paris Agreement. Materials are vital to modern society, but their production is an important source of greenhouse gases. Emissions from material production are now comparable to those from agriculture, forestry, and land use change combined, yet they have received much less attention from the climate policy community. As shown by IRP estimates, it is time to look beyond energy efficiency to reduce global carbon footprint.

Job No:

ISBN:

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