



The World of Energy Post-COVID

↳ How changing attitudes and behaviours will shape the way we power our future



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Introduction: a world in transition

There's no doubt about it: everything changed in 2020. The ramifications of what our environment, our institutions and our societies have experienced reverberated around the globe and the long-term impacts are still largely unknown. But what is certain is that there will be no returning to the way our world operated before.

Needless to say, consumer habits were changing and environmental consciousness growing long before the pandemic. But the global shutdown forced many of us to reflect on our behaviours, social values and environmental footprint with a heightened level of awareness.

This hiatus has put both consumer demand for greener lifestyle choices – and the clean energy transition – into overdrive.

This paper is a call to action for governments and industry. It aims to unpack consumer lifestyle choices and green expectations as we rebuild our economies. Success depends on our ability to harness these shifts, which could prove to be the difference between achieving the Paris Agreement goal of net zero by 2050, or not.

Habits and attitudes are fueling the transition

Some enduring changes are expected to be a reduction in physical travel, meaning fewer journeys on public transport, far fewer flights and less time spent in offices and physical retail stores. However, this also means more time spent online, an increase in domestic energy consumption and more suburban freight on our roads.

Meanwhile, the COVID-catalysed acceleration in environmental awareness could see greener businesses growing more quickly and a newly agile skilled workforce moving to more sustainable lifestyle locations. Companies and places that do not keep pace could potentially find themselves disadvantaged and investors are looking towards both sustainability and resilience.

Believing in the possible

Key to progression is market confidence. As our research shows, consumer confidence that governments, businesses and even broader society are doing enough to meet our climate goals remains relatively low. If we are to make a successful shift to net zero, we must ensure the current green momentum is not merely a hype curve moment.

Percentage confidence that governments, businesses and the wider public are meeting their responsibilities to achieve net zero by 2050

	Australia	Canada	New Zealand	Singapore	UK	USA
Governments	45%	47%	55%	58%	45%	42%
Businesses	41%	38%	42%	41%	40%	42%
Society	46%	41%	44%	40%	41%	43%

It is crucial that the public and private sectors work together with consumers to shape a joint vision for how our world will need to operate. Confidence is a catalyst in its own right. The more we commit to the transition and are seen to be investing in greener technologies and lifestyles, the greater the impact.

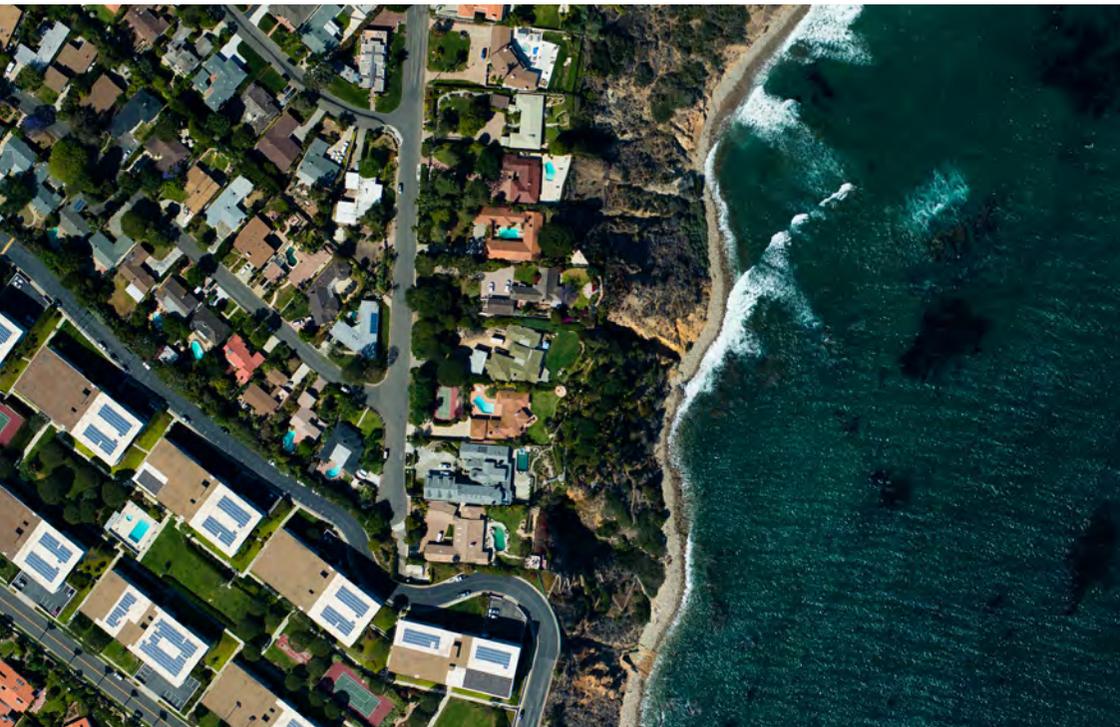
Despite the dreadful consequences of the pandemic, we can use the opportunity it has provided to build a greener world. It will not be easy, but I believe we will be able to look back and be proud of the way we responded in the aftermath of the COVID crisis to protect our world together.

Dr. Tej Gidda

GHD Global Leader – Future Energy

Executive summary

- Consumers aren't pinning their hopes on governments alone to pave the way to a greener future — businesses and society will have to play their part, too.
- Our daily habits have already changed dramatically. Physical travel and online shopping, in particular, are set to be very different to what they were just over a year ago.
- We are entering the era of the electric vehicle. However, perceived barriers such as a lack of charging infrastructure remain a handbrake on consumer uptake.
- Our work and home lives will never be the same, and many would consider moving house for a more environmentally-friendly lifestyle.
- Cost will continue to be a hot button for households. However, we increasingly value sustainable products and are seeing growing demand for domestic green energy solutions.



Our call to action:

1

New partnerships and radical collaboration across the value chain must happen now to inform future net zero carbon strategies.

2

As consumer demand for new technologies grows, their implementation must benefit the whole of society – not only those who can afford them in the first instance.

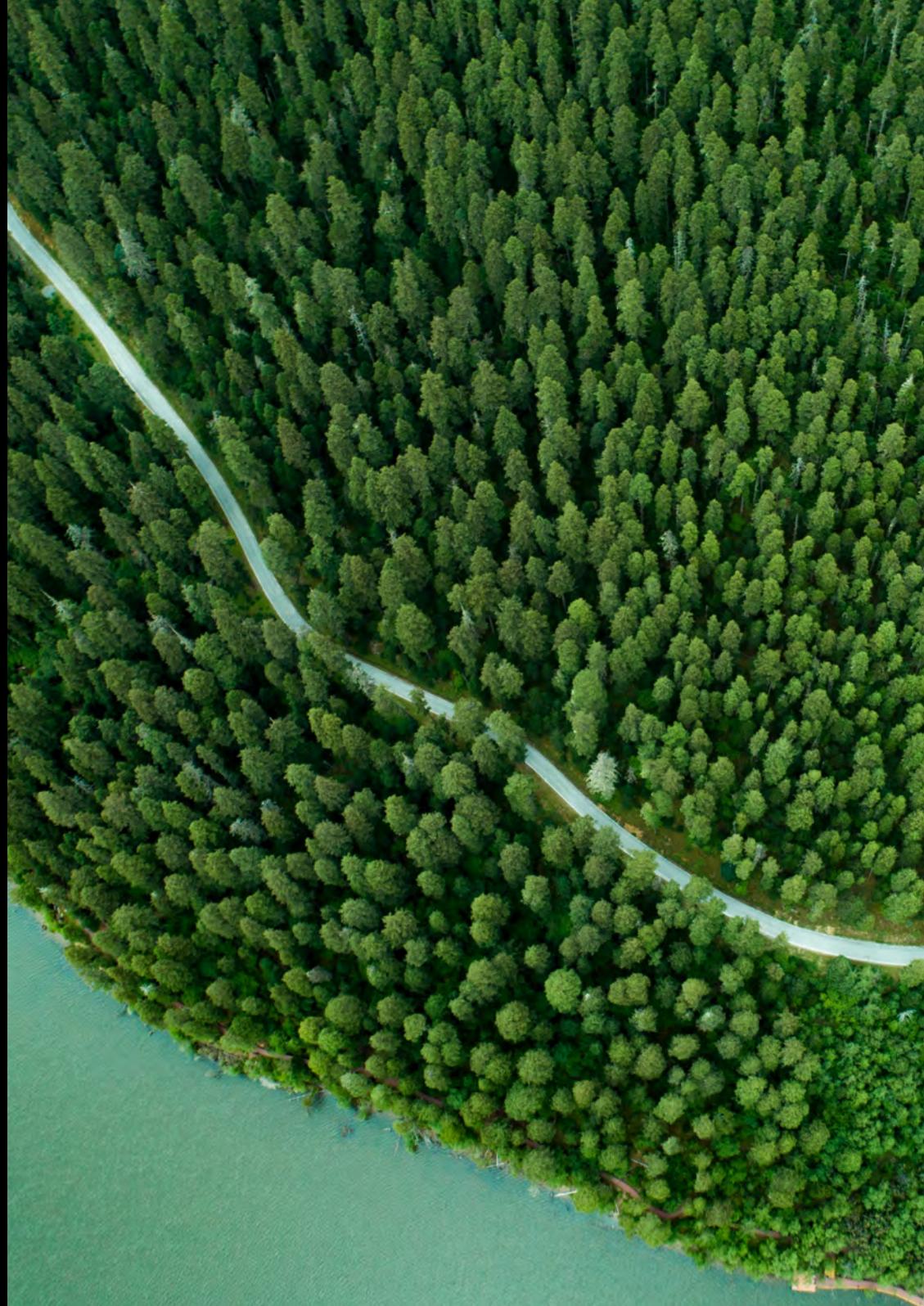
3

To meet the drive for greener products, businesses must reimagine their offerings and look to circular approaches to safeguard the environment and appeal to changing consumer tastes.

The countdown to 2050

The pandemic has catalysed changes that will need to be harnessed if we are to reach the much-heralded mid-century net zero emissions target.

Here are our predictions for how we see these societal shifts – and the transition more broadly – developing.



Our predictions for a successful transition

1. By 2050, our world will be unrecognisable

The legacy of the pandemic will see people live differently. Daily habits are likely to shift substantially. We are also much more environmentally conscious than ever before. We now have an opportunity to think differently about the future of our infrastructure and rapidly evolve our energy-intensive industries.

Harnessing this change is going to be the difference between achieving net zero by 2050 or not.

2. Fossil fuels are here to stay... for the time being

While a huge global effort is going into clean energy generation, there will remain a significant requirement for fossil fuels for some time yet. Net-zero emissions doesn't mean 100% renewable energy. The global economy is reliant on a degree of fossil fuel use, with the likes of steel production, aerospace and other industries likely to require non-renewable energy sources for a long time to come.

Managing these resources effectively and implementing genuine offsetting measures is not only possible but highly desirable, and can play an important role in its own right. Energy transition is not a sudden step change but a progression that drives a profound shift over time.

3. Hydrogen will power our lives

From mass transit systems to the way we heat our homes, the decarbonisation of our economy will be hugely dependent on green hydrogen being successful. Hydrogen burns clean and is a potential gamechanger in reducing reliance on fossil fuels.

Repurposing gas networks to hydrogen is a very real possibility. Groundbreaking trials are underway building a compelling case for hydrogen to help deliver on our goal to net zero. Fuel cell transportations running on hydrogen are already here and will gain in prominence.

4. Sustainability will equal growth

Many publicly listed companies are required to publish sustainability reports each year. However, these seldom leave the pages of the weighty annual report. As more corporates publish carbon pledges, full transparency and accountability will become the norm. During the market turmoil of 2020, returns on many funds committed to strong Environmental, Social and Governance (ESG) outcomes performed better than those on comparable non-ESG funds. This trend is likely to continue.

Transitioning to circular economic models represents new opportunities for prosperity. Though there is still a hurdle for businesses to unleash new value and link it to revenue, it is inevitable that we shift. Consumers and investors will demand it, and already are. Those that wait too long are at risk of becoming obsolete in tomorrow's economy.

5. Carbon capture will move us into sub-zero territory

The crowning achievement of carbon removal and storage will be extracting it from the atmosphere and parking it elsewhere. Reforestation, renewables and electric cars simply won't be enough. Humans will have to engineer ways to draw carbon out of the air or ocean at scale to halt climate change in its tracks. This is the principle of net negative.

Scientists, technologists and engineers are already pioneering commercial-scale, emission-busting technologies, and the opportunities are immense. The world depends on it.

Tesla CEO Elon Musk has pledged to donate \$100m to whoever invents the best carbon capture technology.



Our world needs to...

Phase out coal

5x faster than current rates

Ramp up renewable energy

6x faster

Transition to electric vehicles

22x faster¹

[1] John Kerry, Special Presidential Envoy for Climate. (2021, January 27). Mobilizing action on Climate Change. Retrieved from U.S. Department of State: <https://www.state.gov/remarks-at-world-economic-forum-davos-2021/>

Changing habits will transform the energy landscape forever

As the world moves from a COVID response phase and into recovery, lockdown strategies brought in right across the world will have a profound, long-lasting impact on our societies. One of the most significant side effects of this will be how we consume energy.



The proportion of people who expect their daily habits to change due to the impact of the pandemic

86% Singapore

Australia	Canada	New Zealand	UK	USA
70%	82%	68%	76%	78%



» More than a quarter of people believe their habits will change to a 'great extent'

Homes and commercial spaces



One of the most striking images of the pandemic was that of empty spaces at iconic landmarks across the globe. As our societies gradually learn to live with COVID, we will understand better what this means for our towns and cities.

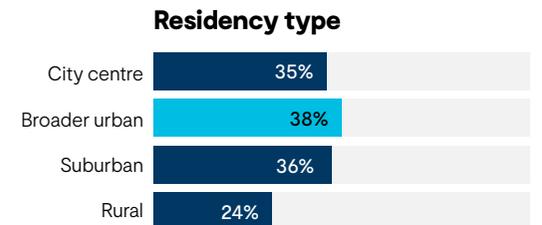
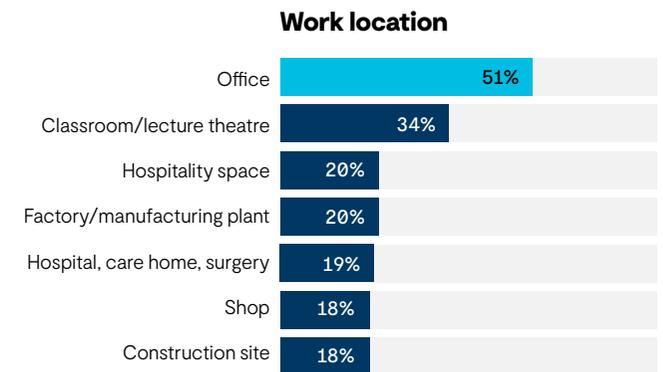
Commercial centres

With the number of commuters expected to drop and many businesses looking to reduce their floorspace, we need to make bold changes to the way cities function. This will mean looking to address broader societal needs, such as providing affordable housing by retrofitting disused shops and office buildings.

We could also expect to see a more radical approach where under-utilised commercial spaces are transformed into vertical farms, reducing 'food miles' and improving local food security.

All of this will significantly impact how energy is consumed and distributed over a 24-hour period. In response, advances in storage and distribution of alternative energy sources such as hydrogen, PV and batteries – both at a commercial and domestic level – will drive a decentralised energy grid and sponsor a new model for energy utilities.

Proportion of workforce who anticipate an increase in home working, following the pandemic



Residential property

More remote working means growing requirements for lighting and consuming significantly more data at home. This will place new and unpredictable pressure on peak electricity demand for domestic heating and cooling systems.

In more temperate climates, heating often poorly insulated homes every day throughout the colder months will require a sizeable uplift in natural gas. Homes that produce power through renewables will incorporate storage to maintain grid stability, and the likes of electric cars will be able to act as energy storage units in their own right.

To ensure this is both environmentally and economically sustainable, investment is needed in self-supply systems and push-pull networks that allow consumers to generate, store and consume their own power. Domestic batteries can both help stabilise peak consumption and lessen demand for non-renewables.

Furthermore, with anticipated jumps in demand for natural gas in some areas, there has never been a better time to accelerate the roll out of hydrogen-powered heating systems and ground source heat pumps.

To reset our towns and cities, we must disrupt the traditional norms of consumption and generation, fast forwarding the transition to a model that meets the new needs of consumers and our environment.

Proportion of total workforce who anticipate more home working

44% Singapore

Australia	Canada	New Zealand	UK	USA
32%	36%	27%	34%	37%

The world's first domestic hydrogen energy storage system

GHD is providing product development engineering support for the world's first household hydrogen energy storage system, known as LAVO. It uses innovative, patented metal hydride technology to store the equivalent of up to 60kWh electricity, enough to power an average household for three days.

The system is being developed by Providence Asset Group, with the Hydrogen Energy Research Centre at the University of NSW, Australia. GHD has recently formalised an agreement to become a cornerstone investor in LAVO.



Transport habits

COVID-sparked transformation in our relationship with physical travel could be one of the most visible legacies of the pandemic, with big consequences for the provision and use of energy in the transport sector.

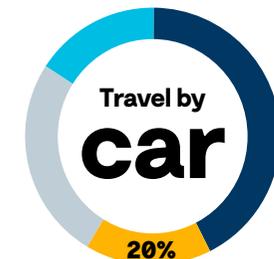
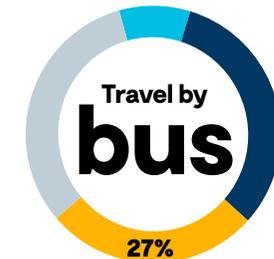
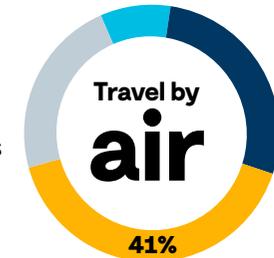
Mass transit

Reliable and affordable public transport is essential to address climate change. However, with commuting five days and regular air travel looking increasingly less likely for many, networks must adapt as new habits form. Coordinated planning between modes is increasingly essential.

The shift from designing transport systems for predictable patterns and permanence to designing for uncertainty, flexibility and resilience will be a step forward in responding to the sustainability challenge. This shift continues even as the nature of fleets changes towards electric and fuel cell vehicles.

Most airline and rail operators are focused on business continuity. However, future technologies will have the biggest impact when it comes to decarbonisation. Long-term investment decisions will need to be made if green technology like hydrogen and other future fuels are still not yet available.

There is no easy solution to this. However, by capturing asset information, monitoring movement patterns and reinventing services to keep emissions as low as possible with what is currently available should be the current focus.



How often people believe they will travel post-COVID

- Less than before the pandemic
- More than before the pandemic
- The same amount as before the pandemic
- Not applicable



Powering the drive towards electric vehicles

To meet future demand for electric vehicles, the development and roll-out of charging requires planning and partnering. Take Charge is an innovation project that aims to make rapid EV charging at motorway service areas easier for service station operators and customers.

GHD is leading the project on behalf of UK network operator, Western Power Distribution. The new standardised one-size-fits-all solution will provide up to 20MVA of capacity, ensuring that service station customers can simultaneously charge their vehicles at peak times. Future rapid charging hubs, such as the one being developed for Take Charge, will become more commonplace as the uptake of EVs increase significantly over the coming years.



Electric vehicles

The start of 2021 saw Jaguar Land Rover, Volvo and Ford announce commitments to producing only electric vehicles (EV) in some markets by the end of the decade. General Motors has also made similar commitments. Meanwhile, Singapore has committed to end registration of diesel cars by 2025, and internal combustion engines by 2040.

This is a significant step forward but is only half the picture. At the same time fuel cell vehicles, which rely on hydrogen, are coming into the market, providing longer range and compatibility with heavier-duty vehicles.

As with any new technology, it is highly likely that early adopters will be those with the financial means to do so. Without incentivising EV uptake, the transport sector may be limited in its ability to curb emissions. However, with economic recovery fragile, any measures must ensure that costs do not disproportionately impact those who are not going to benefit.

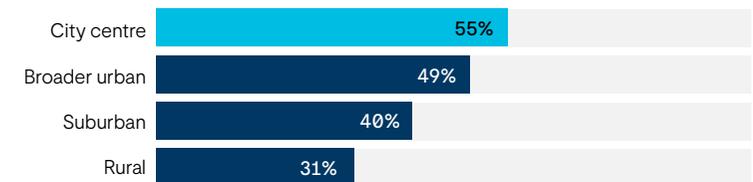
Also critical is the provision of charging infrastructure. Batteries and point-of-use technology are becoming more accessible, and we will see a rapid uptake in the coming five years. The adoption of these new approaches in the developing world may leapfrog the rest of the world, as incumbent infrastructure and the associated constraints do not necessarily exist.

State governments will need to provide guidance around land use, planning and consent for others to build what is required. Here, people movement data – such as that provided by GHD’s Movement Strategies – can play a major role, as understanding how people’s daily habits are shifting is crucial to locating this infrastructure to best effect.

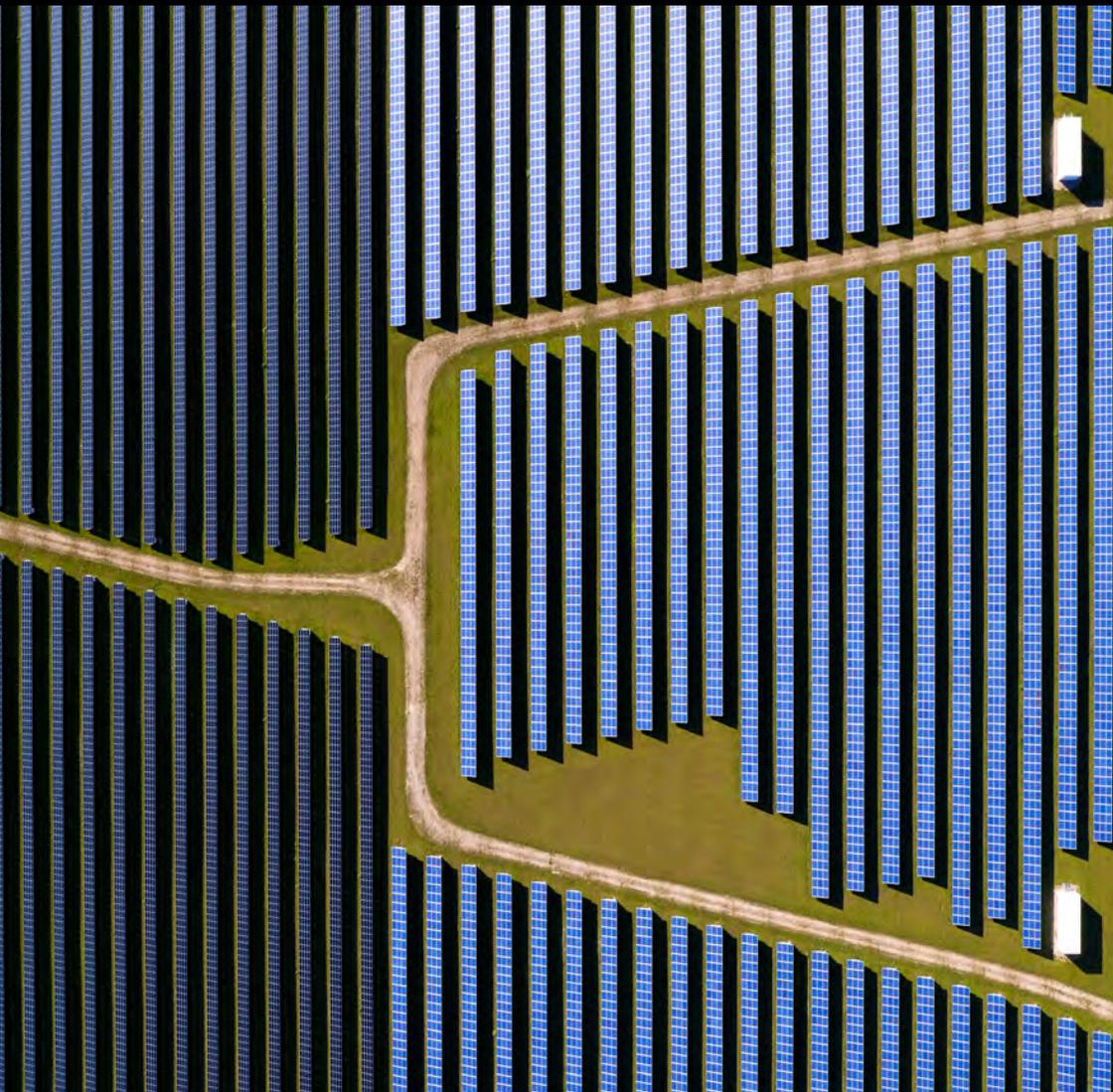
Proportion of respondents who would consider an electric vehicle within the next five years



Likelihood of wanting to own an EV within the next five years by residency type



Power generation and distribution



When it comes to energy consumption, behavioral changes raise a number of unique challenges. The amount of energy used in the home is at its highest thanks to a greater concentration of people using electricity over a wider area than before. This is causing a re-think about baseline stability and how grids operate.

While the cost of new, low-carbon energy options is rapidly approaching parity with conventional sources, consumer sensitivity to power prices remains a key consideration. Keeping costs in check will require an overhaul in demand response programmes to help people better manage when and how they use power and flatten the peaks of consumption throughout the day.

When it comes to renewables, the trickle towards solar will likely become a tide. A more decentralised grid means people have greater autonomy over their energy and expectations around greener sources are growing.

Community-based funding mechanisms to expedite renewables, build resilience through self-sufficiency and battery uptake will reduce demand on the grid. This, in turn, will reduce the need for network upgrades. To make this happen, we need to prioritise energy storage technology – a key part of the virtual decentralised solution.

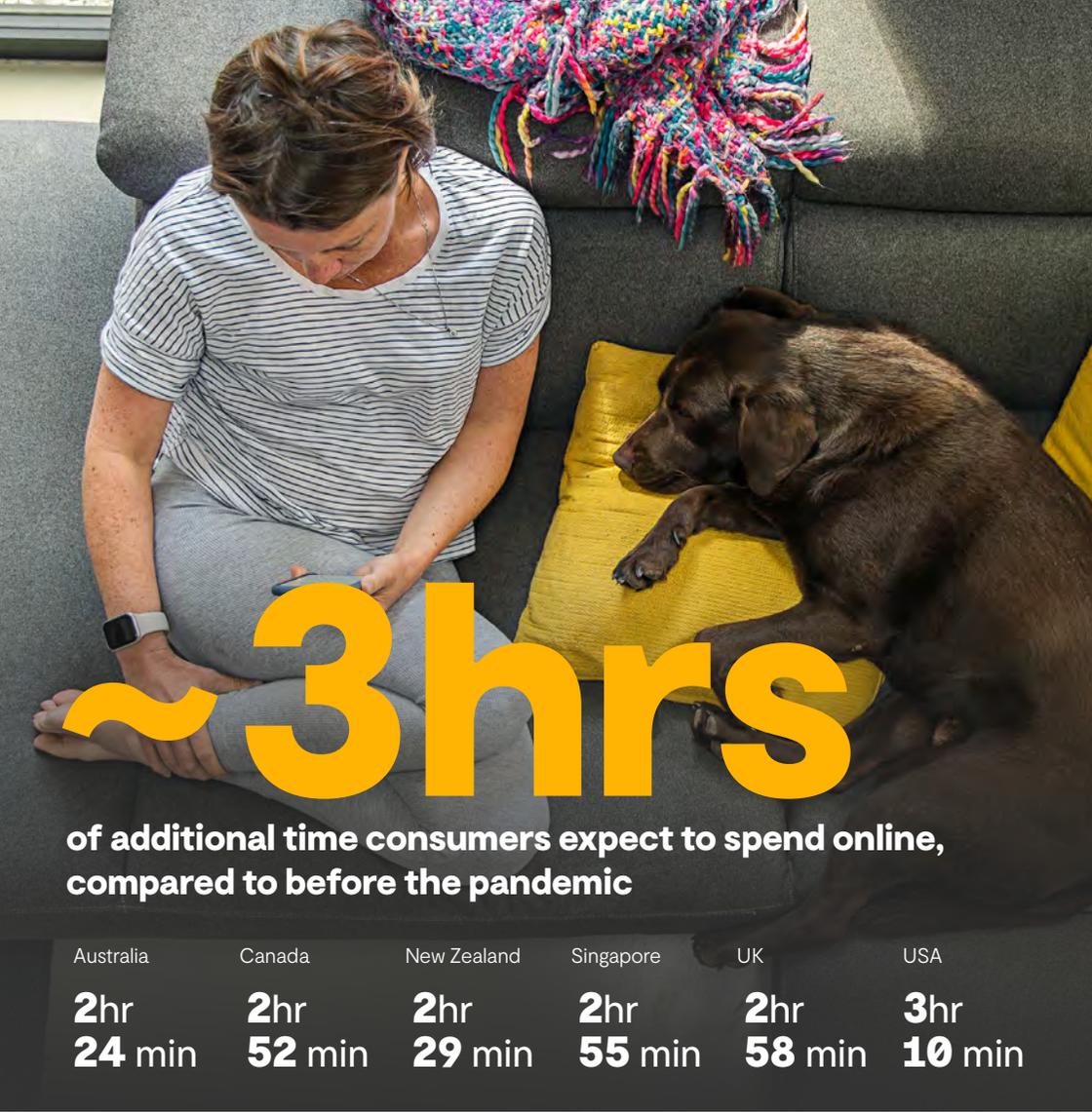
When it comes to renewables, the trickle towards solar will likely become a tide.

Batteries have opened new opportunities in green energy storage

GHD played a critical role in the connection and installation of Australia's first grid-scale lithium-ion battery, including obtaining the signed connection agreement.

The 100 MW/129 MWh battery installation known as the Hornsdale Power Reserve is a pioneer in storage technology, providing essential grid support. These projects became the centre of world-leading innovation in renewable energy as Neoen partnered with Tesla to get the battery system installed in 100 days.

We continued our role as owners engineer to expand the battery facilities by 50 MW, building on the success of the initial installation and providing additional savings to energy consumers. Completed in 2020, the expansion provides additional system security for the South Australian electricity network.



~3 hrs
of additional time consumers expect to spend online, compared to before the pandemic

Australia	Canada	New Zealand	Singapore	UK	USA
2hr 24 min	2hr 52 min	2hr 29 min	2hr 55 min	2hr 58 min	3hr 10 min

Expected daily increase in time spent online by age



The impact on our cities and communities

Town, cities, states and regions will need new strategies to attract investment, skills and talent to boost economic growth.



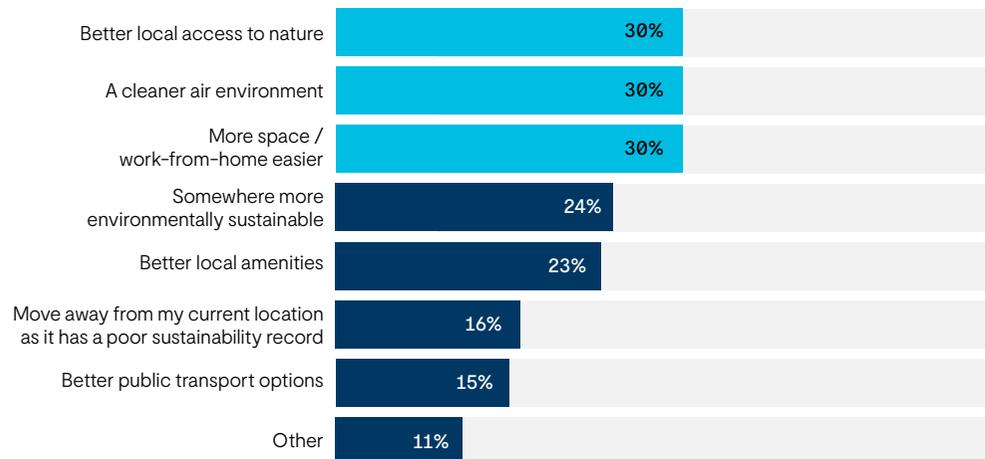
Greener pastures

With the list of large corporates with ambitious net zero carbon and ESG targets growing, city leaders must ensure their regions have a long-term vision for living sustainably if they are to remain competitive. Looking outside sectors such as power and exploring opportunities to decarbonise the use of gaseous and liquid fuels will be key. This includes the development of renewable natural gas, hydrogen and biofuels, leveraging existing infrastructure and talent to repurpose systems for lower-carbon energy vectors.

At the beginning of 2021, some large cities experienced dips in population, demonstrating the extent to which changing work practices are making location increasingly a choice for some.

Towns and cities that boast sustainable infrastructure, green technologies and ambitious ESG strategies may well come out on top when it comes to attracting the skilled workforce of the future.

Main reasons for considering moving homes following the pandemic (top three selected)



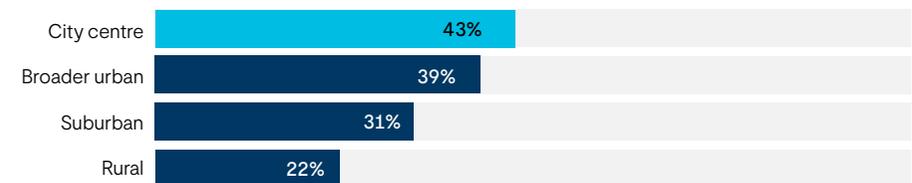
» A third responded that the pandemic has made them consider relocating their residence

34%

Say the pandemic has made them consider relocating



Current location of people considering moving



Closed-loop waste management

The City of Toronto has one of the biggest food waste and organics diversion programmes in North America. In parallel to the anaerobic digester facility expansion at the Dufferin SWMS site, the City of Toronto and Enbridge Gas Inc. have constructed a facility to convert biogas from food waste into renewable natural gas.

The RNG is then injected into the natural gas distribution grid which powers the city's facilities. This supports the City of Toronto's closed-loop approach to create a low-carbon fuel that is produced and refined on site and used locally.

GHD is providing technical owner's engineer services to expand the anaerobic digestion facility and is the design engineer for the RNG project.



We will soon understand the impact of 'new normal' lifestyles on consumption

The new localism

Early signs suggest that peri-urban areas are growing in popularity, as some turn their back on living in densely populated city centres in favour of local living.

More people operating around where they live rather than their place of work will profoundly change energy demand. So, fuel for transport, buildings, energy, heating and cooling systems must be produced in a more regenerative way.

Furthermore, the drive to more sustainable products and services combined with regional security of supply could mean increasing demand for locally produced goods to avoid shipping at high carbon intensity. This dimension, of course, will further change as the carbon intensity of the transportation networks decreases over time.

Local authorities must do everything they can to support these ambitions by continuing to invest in telecommunications infrastructure. By ensuring people have access to reliable 5G networks to communicate effectively, less onus will need to be placed on more carbon intensive means of interacting. Getting those fundamentals right will prove critical to success.

Clicks versus bricks

Online shopping is expected to increase by at least half compared to before the pandemic.

Estimated proportion of shopping done online

	Australia	Canada	New Zealand	Singapore	UK	USA
Pre-pandemic	23%	22%	22%	29%	30%	30%
	Australia	Canada	New Zealand	Singapore	UK	USA
Going forwards	34%	37%	33%	45%	46%	45%

Reducing the carbon footprint of the goods we buy

The emissions generated in manufacturing goods is a significant contributor to our carbon footprint.

GHD is supporting a ground-breaking hydrogen project led by HyNet consortium in the North West of England. It aims to develop the UK's first low-carbon hydrogen cluster including production, distribution and end-use of hydrogen in the manufacturing industry. GHD is working with the project coordinator, Progressive Energy, and one of the host industrial sites to design the new plant.

Through this, it is hoped that we will be able to demonstrate that hydrogen can be a substitute fuel for natural gas in industrial processes, lowering the carbon footprint of goods.



New technologies

Growing demand for sustainable living will likely continue to increase as environmental awareness builds. Having access to charging infrastructure for electric vehicles, hydrogen gas to power greener appliances, and domestic clean energy batteries will move from being a nice-to-have to an essential factor of modern living.

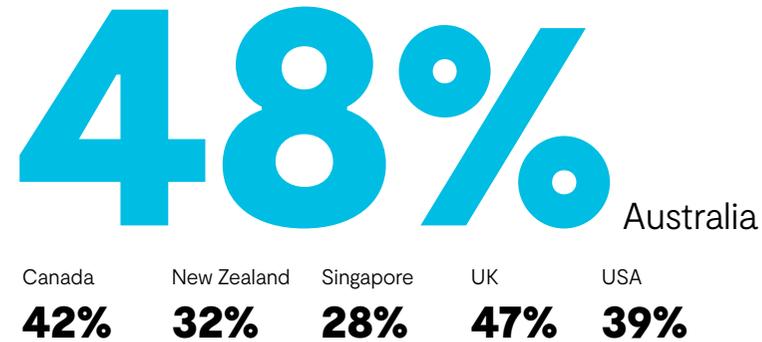
Furthermore, rising demand for more local lifestyles will see growth in digital infrastructure, data centres, fibre cabling and electric vehicle technology that contribute to making places smart and more livable.

Local authorities will play a key role in developing the strategies to meet these demands and lessen their impact on the environment. A key technological advancement will be in the space of removing carbon dioxide from the atmosphere, with a view towards a net-negative future.

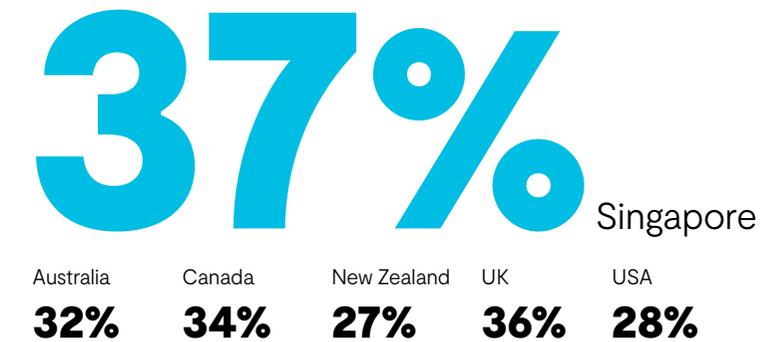
Barriers to electric vehicle uptake

Proportion of those who would consider an EV but are unconvinced by:

The ability to charge one locally



The ability to install a charging device at home



» Embracing green technology

Proportion of those who would consider each technology:

Technology	Australia	Canada	New Zealand	Singapore	UK	USA
Ground source heat pump	50%	56%	59%	56%	56%	55%
Hydrogen boiler	46%	44%	45%	55%	57%	51%
Hydrogen battery	52%	48%	49%	57%	53%	51%

Growing social consciousness

Social movements in recent years have shed light on a variety of socioeconomic inequalities. Throughout the pandemic, these issues have heightened. Now, more needs to be done to alleviate imbalances and give people equal access to the tools they need to improve their quality of life.

Local authorities can take a step in the right direction by prioritising those trapped in fuel poverty. One means of making a positive contribution is by enabling those on lower incomes to generate their own renewable electricity.

It is highly likely that rooftop solar panels will increasingly become the norm, but it is of critical importance that those with the greatest need have early access to the necessary technology. Enabling this requires comprehensive investment in distribution network upgrades and battery technology — something that local authorities should prioritise as a matter of urgency.

Generating energy at home

Proportion of those who say they often or always struggle with the costs of domestic energy, and would consider solar panels

75% USA and Singapore

Australia	Canada	New Zealand	UK
65%	71%	71%	67%



Immediate priorities for municipalities on the road to net zero

- Attracting funding for sustainability growth – identifying what win-win looks like between corporates and local authorities
- Implementing circular innovation for economic reset – investing in the right areas to deliver the required value
- Space planning for EV infrastructure – how and where to provide charging infrastructure to anticipate growth
- Accommodating the rapid technological change – considering the impact of future energy intensive technologies on the grid

**“
Solar will be the
king of renewables
over the next
decade”**

— International Energy Agency (IEA)



**Creating a more circular
economy could create**

700K

net additional new jobs by 2040

\$200B

of savings generated

Spotlight on Australia



Australia's future energy ecosystem is in a state of flux. A desire to decarbonise is certainly driving policy change and investment in renewables and enabling infrastructure.

However, Australia's reliance on coal-fired power (for domestic use and export dollars) and reluctance to set a national net zero carbon target continues to be controversial, particularly given every Australian state and territory has made a commitment to net zero.

Consumer sentiment confidence in society – rather than the public or private sectors – as a driver for positive change is strongest in Australia (45%) compared to other parts of the world.

Australia's Federal Government is increasingly acknowledging this, recently saying for example that Australian businesses will be encouraged to invest in plug-in hybrid and electric car fleets. Such moves appear necessary according to our survey, with

respondents living in Australia indicating they were least likely to consider an electric vehicle compared to respondents in other countries.

Of course encouraging electric vehicle take-up is only part of the challenge: in our survey, Australian consumers expressed the least confidence in having access to enough reliable charging infrastructure.

In more positive moves, studies for green hydrogen projects and major blue hydrogen projects are rapidly advancing. The green energy export market looms large, with significant projects in the works to ship hydrogen or directly transmit renewable energy to Southeast Asia.

Advancements in future fuels like hydrogen will continue to drive private sector investment to reduce emissions in the transport sector. Energy storage project announcements have also been made across the country in the last 12 months, potentially smoothing energy reliability issues. In the meantime, the focus on gas-fired generation (to replace retiring coal) is gathering momentum. Even challenging-to-abate sectors, such as mining, are looking at renewable energy solutions and carbon capture and storage to help decarbonise their operations.

46%

of Australian respondents are confident society – rather than the public or private sectors – will be a driver for positive change

37%

of Australian consumers would consider an electric vehicle within the next five years

40%

of Australian consumers that express an interest in driving an electric vehicle are not confident they'd have access to charging infrastructure

Spotlight on Canada



The global shutdown has forced us to reflect on our social values and heightened our awareness of the environment.

A year into the COVID-19 pandemic, Canada's ability to adapt has sparked hope the country will continue to build on this momentum to combat climate change.

Much like their global counterparts, Canadians have little confidence governments, businesses and broader society are doing enough to achieve net zero emissions by 2050. Less than half believe the government is meeting its responsibilities, and just under 40% believe businesses and society are doing enough.

As part of a new climate commitment made on Earth Day in April 2021, the Government of Canada committed to reducing its 2005 emission levels by 40 to 45 % by 2030, a move to strengthen plans already in place to achieve net zero emissions by 2050.

Our attitudes are changing

As outlined in the survey, Canadians are among the world's most enthusiastic about the prospect of electric

vehicles (EVs) in their lives, with nearly half (46%) who are definitely or seriously considering purchasing an EV in the next five years. In the past year, government and auto manufacturers have announced billions of dollars of stimulus investments to transition internal combustion to electric, evolve EV charging infrastructure and provide alternative fuel options. Continued collaboration of industry stakeholders is crucial.

The future of work

This historic shift has motivated employers to embrace work-from-home (WFH) options beyond the pandemic. Not surprisingly, the survey found nearly 40% of Canadians anticipate a substantial increase in the amount of time they will continue to WFH. But there are implications – the reduction of workspaces in cities could exacerbate labour force inequalities and trigger changes in economic productivity and housing.

Also, as many as 30% of Canadians admit the pandemic has persuaded them to consider relocating from where they currently live, primarily for better access to nature, cleaner air, and more space.

Recovery will be complex, requiring collective efforts to change practices for the better for all.

40%

of Canadians believe businesses and society are doing enough to achieve net zero

46%

of Canadians are definitely or seriously considering purchasing an EV in the next five years

Spotlight on New Zealand



Given the resources available, New Zealand is well-positioned for a low-carbon shift in the energy sector, with 82% of the country's electricity already generated from renewables.

However, as more industries look to decarbonise their operations, including the electrification of the transport sector and a shift from fossil fuel reliance for process heat, the country will need to generate significantly more renewable electricity to meet growing demand. Overall, electricity demand as a proportion of total energy is expected to increase from 25% to 61%.

The New Zealand Government has recognised this, setting a target of 100% renewable electricity by 2030. Supported by the NZ Battery Project¹, achieving this goal will be a major step in meeting the carbon neutral commitment. Yet the expected growth in the demand will be challenging. Options such as green hydrogen

need to be part of the solution, with the potential to take New Zealand beyond its 100% renewable energy target and presenting an economic opportunity to export energy in the future.

Society also has a part to play in this shift. With increasing social momentum towards a greener future, now is the time for the government to act.

Our research indicated that confidence in the government's ability to deliver the 2050 carbon-neutral goal is 55%. Higher than in the UK, Australia, USA and Canada. Yet personal commitment to switching to more renewable sources is less enthusiastic. This is likely driven by price, with more than 70% of respondents indicating they struggle with the cost of domestic energy.

A recently released report² by the NZ Climate Commission indicates that NZ can achieve a lot, with relatively little pain. Now, together, the government and society need to consider the right mix of renewable energy generation to get there.

55%

of New Zealanders believe the government will meet the carbon neutral goal

51%

of New Zealanders would consider renewable sources to power their homes

[1] NZ Battery Project, Ministry of Business, Innovation & Employment. Retrieved from NZ Battery Project | Ministry of Business, Innovation & Employment (mbie.govt.nz)

[2] He Pou a Rangī, Climate Change Commission. (2021, January 31), Retrieved from He Pou a Rangī » Climate Change Commission (climatecommission.govt.nz)

Spotlight on Singapore



Singapore is the first Southeast Asian countries to introduce a carbon tax as a measure for companies to improve their carbon efficiency. Steps to limit peak carbon emissions to <65 million tonnes (MMt) of carbon dioxide equivalent by 2030 and then halved to 33 MMt by 2050¹ will help achieve their net zero ambition.

Policy initiatives under the Singapore Green Plan aims to gradually adopt cleaner energy vehicles, developing low carbon infrastructure supported through green financing and green bonds and advance large-scale use of renewable energy sources like solar.

The Singaporean Government's commitment and policies are favourable with citizens. The survey results show that Singaporeans (58%) displayed the highest level of confidence in their government to achieve its

net zero target when compared to other countries. They (41%) are also more confident that businesses will play a large part in meeting that goal in contrast to the other countries.

The trend of private sector participation is set to continue. Major retail estate developers have pledged to reduce their impact. Petroleum companies are already beginning to convert their petrol stations to support electric vehicles (EVs) fast charging across the city-state.

The continued support of businesses is key to spurring the adoption of EVs by removing key barriers. Of those surveyed, 49% indicated they would consider purchasing an EV within the next five years, but of those, 28% felt they lack access to local charging infrastructure, and 37% expressed there are challenges to installing a charger at home.

Increased work-from-home arrangements have also driven consumer demand for solar energy as 75% prefer to have their homes powered by renewables. Singaporeans agree that everyone has a responsibility to change their habits to help the planet become more sustainable.

49%

of Singaporeans indicated they would consider an EV within the next five years

75%

of Singaporeans prefer to have their homes powered by renewable energy

[1] IHS Markit, No timeline set for net zero, but Singapore on track to achieve goal, (2021, February 09). Retrieved from [No timeline set for net zero, but Singapore on track to achieve goal: government official | IHS Markit](#)

Spotlight on the United Kingdom



Electricity network innovation is the priority as British consumers shift to green technology.

In the UK, we are seeing a generational shift towards a greater “green conscience” and an apparent desire to make changes to the way we live to effect environmental change.

Green technologies all too often dominate the conversation with too little said about the infrastructure that enables it to function. With consumers considering electric vehicles (46%) and heat pumps (56%) in future, the extra pressure on the electricity network will demand a much more flexible grid.

Our evolving energy mix presents all sorts of issues for a network that was built for generating electricity from fossil fuels. Not only because renewable sources are more unpredictable, but renewable generation interacts differently with the grid itself. When it comes to demand, distributors need more control and the ability to flatten out peak demand.

+1/2

of British consumers are considering using green technology to power or heat their homes

If this isn't prioritised, we risk failing to deliver on the UK Government's Ten Point Plan to lead the 'Green Industrial Revolution'.

To meet our future energy needs, generators must be updated and storage solutions such as batteries need to be considered together with longer-term solutions, such as hydrogen energy systems.

Distribution network operators could see the most pressure to transform. Here, behavioural modelling to understand future demand patterns will be essential to making the right investment decisions.

Funding and ensuring cost is borne fairly in society demands serious consideration. Already over half of consumers sometimes struggle to meet the financial cost of energy. Given this will be the biggest transformation the network's seen in its lifetime, private sector investment may well be needed to make it possible.

If we take a long-term view of our network innovation, not only will mean we can meet our green ambitions, but it will support energy innovation and wider economic prosperity in the long term.

46%

of British consumers are likely to want to own an electric vehicle in the next five years

Spotlight on the United States



Climate change is a top priority - it's not a request. It's an expectation. Within hours of Biden's inauguration ceremony, he signed the U.S. back into the Paris Agreement and committed to his recent Leaders' Summit on Climate - making it clear, climate change is a top priority.

An issue this far reaching requires more than federal support – for this to truly work, we need all levels of government, business and society to cooperate to instill the changes necessary to transform our economies and reform key industries such as transportation and the power-generating sector.

While the long-term impacts of this year remain unknown, the consumer survey results made it very clear: we're not returning to life as it was pre-pandemic. Amid the changes, one thing is clear, Americans have increased their expectations towards a greener future.

Are we doing enough?

American confidence is relatively low that the government (42%), businesses (42%) and society

in general (43%) are doing their part to achieve net zero carbon emissions by 2050. Despite this, 86% of American respondents agree we all have a responsibility to change our habits – with 59% admitting to becoming more environmentally aware since the pandemic began.

Consumers are demanding action. It's required for public companies to publish sustainability reporting and metrics each year. More and more corporations are starting to see the benefits of actively striving to contribute positively to the environment as pressure builds to provide transparency about Environmental, Social and Governance plans. If companies do not start to address these ambitions now, the risk of becoming irrelevant in the new, greener economy is very real.

The shift is inevitable

Consumers' expectations of environmental and sustainability habits are likely to continue to drive change. To keep up, businesses will need forward-looking, innovative approaches to decarbonise and sustain their product lines and industries.

With the Paris Agreement to reach net zero by 2050 in force, governments, industries and communities will need to work together and evolve to meet demands for cleaner energy and greener lifestyle choices.

86%

of American respondents agree we all have a responsibility to change our habits to become more sustainable

43%

of American respondents believe society in general are doing its part to achieve net zero by 2050

Methodology, disclaimer and acknowledgements

Authorship and acknowledgements

GHD is grateful to the people who have made this report possible, particularly the stakeholders around the world who participated in our surveys. We would also like to express our appreciation to the global GHD Future Energy team for their time, insight and encouragement to commence this report and for their unwavering commitment to making the energy transition possible.

The data included within this report was commissioned by GHD and produced by Sapio, an independent professional market research agency. The views expressed herein are those of the authors only.

Disclaimer

This report is based on market perceptions and research carried out by GHD and with market research conducted by Sapio. It is provided for general guidance and information purposes only. The information in it should not be relied on in any way or construed as professional, investment or financial advice.

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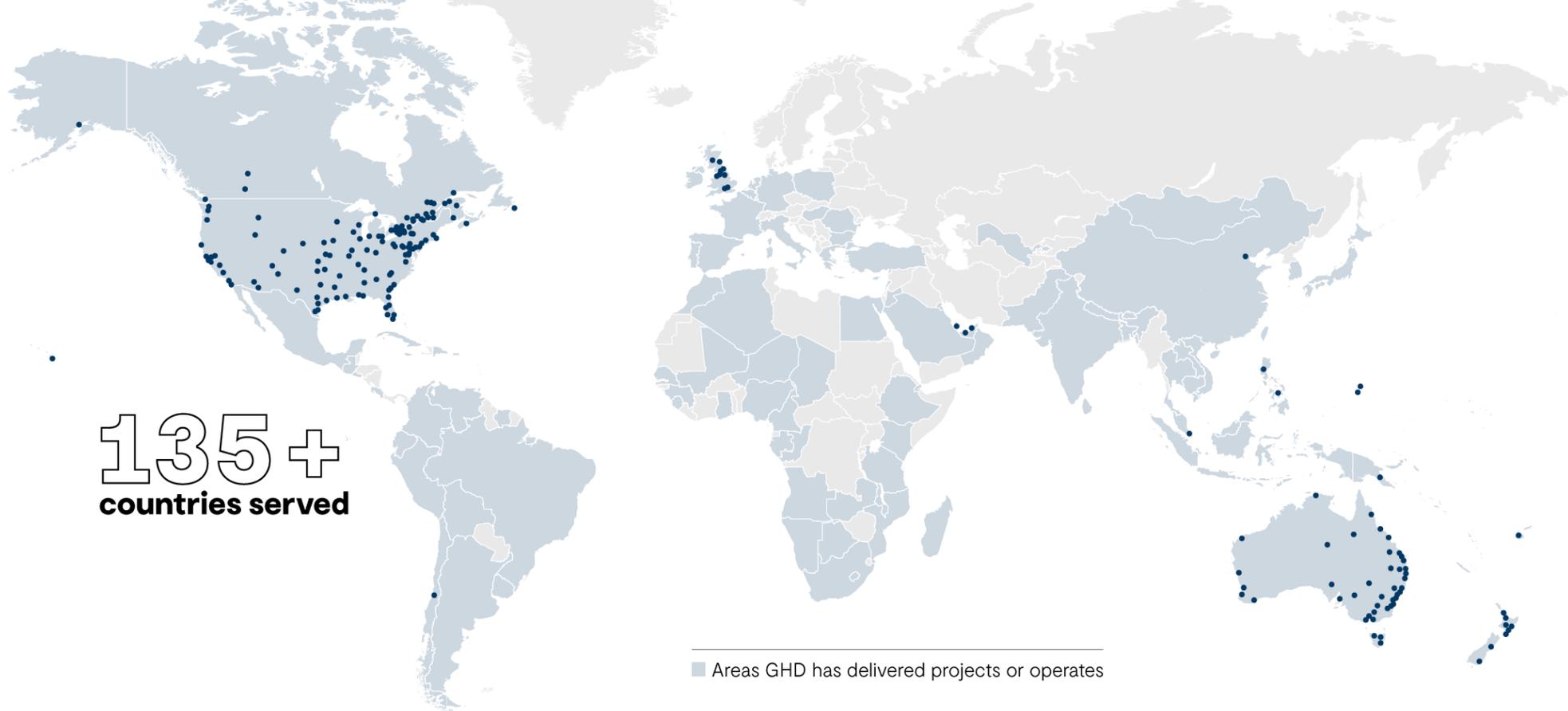
Survey

The survey was conducted among over 8000 consumers in Australia, Canada, New Zealand, Singapore, UK and the USA. The interviews were conducted online by Sapio Research in February 2021 using an email invitation and an online survey. Results of any sample are subject to sampling variation.

The magnitude of the variation is measurable and is affected by the number of interviews and the level of the percentages expressing the results. For any survey it will not necessarily represent the same result that would be obtained if interviews had been conducted with all persons in the universe represented by the sample.

	Base	Margin of error @ 95% confidence limits*
USA	2026	2.2%
Australia	2002	2.2%
UK	1004	3.1%
New Zealand	1002	3.1%
Canada	1004	3.1%
Singapore	1003	3.1%
New York	508	4.3%
Los Angeles	501	4.4%
Vancouver	253	6.2%
Toronto	251	6.2%

**assuming a result of 50%*



About GHD

GHD recognises and understands the world is constantly changing. We are committed to solving the world's biggest challenges in the areas of water, energy and urbanisation.

We are a global professional services company that leads through engineering, construction and architectural expertise. Our forward-looking, innovative approaches connect and sustain communities around the world. Delivering extraordinary social and economic outcomes, we are focused on building lasting relationships with our partners and clients.

Established in 1928, we remain wholly owned by our people. We are 10,000+ diverse and skilled individuals connected by over 200 offices, across five continents – Asia, Australia, Europe, North and South America, and the Pacific region.



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