COALITION FOR URBAN TRANSITIONS

SEIZING MEXICO'S URBAN OPPORTUNITY

HOW URBAN TRANSFORMATION CAN REDUCE POVERTY AND INEQUALITY AND BUILD RESILIENCE

About the Seizing the Urban Opportunity series

This series, a collaborative effort by more than 36 organisations across five continents brought together by the Coalition for Urban Transitions, is being launched as a call to action ahead of COP26 in Glasgow. Our aim is to provide insights from six emerging economies demonstrating how fostering zero-carbon, resilient and inclusive cities can advance national economic priorities for shared prosperity for all. This report focuses on how to seize the urban opportunity in Mexico.

The Coalition for Urban Transitions is a global initiative to support national governments in transforming cities to accelerate economic development and tackle dangerous climate change. Collectively, the contributors hope this report will provide the evidence and confidence that national governments need to submit more ambitious Nationally Determined Contributions in 2021 and to propel inclusive, zero-carbon cities to the heart of their COVID-19 economic recovery and development strategies.

Disclaimer

The analysis, arguments and conclusions presented here are a synthesis of the diverse views of the authors, contributors and reviewers and is an 18-month research effort building on the Coalition's 2019 *Climate Emergency, Urban Opportunity* report. The Coalition takes responsibility for selecting the areas of research. It guarantees its authors and researchers freedom of inquiry, while soliciting and responding to the guidance of advisory panels and expert reviewers. Coalition partners, some as organisations and others as individuals, endorse the general thrust of the arguments, findings and recommendations made in this report, but the text does not necessarily reflect the personal views or official policies of any of the contributors or their members.

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CONTENTS

FIGURES

EXECUTIVE SUMMARY

Mexico is highly urbanised, with over 80% of its population in cities, and nearly 90% of gross value added (GVA) produced in urban areas. Yet although GDP per capita nearly doubled in the past five decades, poverty and inequality remain serious problems. Even before the pandemic, over 27% of Mexican workers worked in the informal sector, and well over half could not access key social programmes.

Urban sprawl is also severe. Mexico's urban areas expanded by 1,821 km^2 between 2000 and 2014 – more than the land area of Mexico City. Social housing construction, two-thirds of which is federally funded, has exacerbated the problem by clustering new homes in peripheral areas, where land is cheaper, but jobs, public services and public transit are limited or non-existent.

Sprawl, in turn, drives costly and unsustainable mobility patterns. Those who can afford to, drive, and between 2006 and 2018, the number of vehicles in Mexico doubled. Yet a majority of Mexicans do not own cars. With inadequate public transport, especially in the urban periphery, the poor often endure long, complex and even dangerous commutes.

COVID-19 has also exposed deep vulnerabilities in Mexico's social fabric. The country has one of the highest pandemic mortality rates in the world, and the economy has been devastated, with GDP shrinking by 8.5% in 2020. Millions have fallen into poverty, the vast majority in urban areas, and inequality has deepened.

At the same time, Mexico faces growing climate-related risks, including water scarcity, high heat, and disasters such as floods and landslides. Building resilience – both by addressing physical and systemic risks, and by tackling poverty and inequality – is an urgent priority.

Modelling for the Coalition shows a bundle of existing technologies and practices could cut urban greenhouse gas (GHG) emissions in the buildings, transport and waste sectors by 34% (98 Mt CO_2-e) in 2030 and 87% (284 Mt CO_2-e) in 2050, relative to a baseline scenario. One-fifth (19%) of this potential is in Mexico City, but more than half is in cities with less than a million residents.

Implementing these low-carbon measures would require US$963 billion in incremental investments through 2050, but analysis for the Coalition suggests they would more than pay for themselves in cost savings alone, and yield returns with a net present value of US$208.8 billion. They could also support about 526,000 new jobs in 2030.

Mexico faces significant economic challenges due to the COVID-19 pandemic. By putting compact, connected, clean, and inclusive cities at the heart of its recovery strategy, aligned with a long-term vision, it can emerge stronger from this crisis, with particular benefits for poor and marginalised people. To date, Mexico's COVID-19 fiscal stimulus has been relatively modest, US$28 billion as of February 2021, weighted heavily towards high-carbon investments. Future stimulus efforts should prioritise low-carbon urban measures – especially those with high job creation potential and/or large benefits for the poor.

Mexico also needs institutional and fiscal reforms, as well as targeted measures to strengthen municipalities' technical and financial capacities and to support municipal-level coordination. The good news is that much of this can be accomplished without significant new expenditure, as it involves mainly changes in governance and reallocation of existing resources.

Some important reforms are already underway, including a proposed National Strategy of Territorial Planning 2020–2040 that prioritises resilience, access to key services and mobility, and the 2019–2024 National Housing Programme, which seeks to provide homes that are not only affordable, but truly meet residents' needs, and is also empowering low-income communities.

There are many ways for the national government to help unleash the power of compact, connected, clean and resilient cities. Four such opportunities are:

- **Support the creation of metropolitan authorities** to enable integrated land use and transport planning.
- **Expand the supply of well-located social urban housing** that is adequate, secure and affordable, complemented with inclusive and resilient mass transit options.
- **Prioritise a just transition to net-zero-carbon cities**, with special attention to the needs of poor and marginalised people.
- **Scale up support for programmes to foster the social production of housing and habitat**, leveraging low-carbon strategies to reduce poverty.

Shopping at a local market in Queretaro, Mexico. Source: Cesar Gomez/Shutterstock

INTRODUCTION

In Mexico and around the world, national leaders face a triple challenge right now: ensuring a successful recovery from the devastation of COVID-19, pushing forward on their longer-term vision for equitable development, and addressing the enormous threats posed by climate change. The pandemic has wrought havoc on the global economy, with particularly severe impacts on the poor. It has also highlighted the urgency of building resilience to a wide range of shocks, especially the growing impacts of climate change.

Cities are at the centre of that triple challenge. As population hubs and economic engines, they will play a crucial role in the recovery and in countries' long-term economic vitality. Many have also been particularly hard-hit by the pandemic, however. So now, more than ever, national leadership is crucial to ensure cities can "bounce back" and fully realise their potential as engines of sustainable, inclusive growth. As outlined in the Coalition's 2019 flagship report, *Climate Emergency, Urban Opportunity*,[1] only national governments can mobilise resources at the scale needed, and they control or drive key policy realms: from energy, to transport, to social programmes.

Recognising that developing and emerging economies face particularly complex challenges, the Coalition is focusing on six key countries in the lead-up to COP26 in Glasgow: China, India, Indonesia, Brazil, Mexico and South Africa. Together, they produce about a third of global GDP[2] and 41% of CO_2 emissions from fossil fuel use.[3] They are also home to 42% of the world's urban population.[4] The extent to which these six major emerging economies can unleash the power of cities to catalyse sustainable, inclusive and resilient growth is therefore critical not only for their future trajectory, but for the whole planet.

This paper presents the results of policy analysis and modelling on Mexico, delving deeper into findings summarised in the Coalition's new *Seizing the Urban Opportunity* report.[5] But first, for context, we outline our key findings across the six countries, and how they fit with the Coalition's previous work.

Powering the recovery and long-term sustainable growth through cities

Climate Emergency, Urban Opportunity showed that a bundle of technically feasible low-carbon measures could cut emissions from buildings, transport, materials use and waste by almost 90% by 2050; support 87 million jobs in 2030 and 45 million jobs in 2050, and generate energy and material savings worth US$23.9 trillion by 2050.[6] Compact, connected, clean and resilient cities have significant wider economic, social and environmental benefits as well. With deliberate attention to equity and inclusion, low-carbon measures can also help lift people out of poverty by improving their access to jobs, education and vital services. And by avoiding urban sprawl, countries can protect agricultural land and natural ecosystems around cities, with benefits for food security and resilience.

The COVID-19 pandemic has mobilised historic levels of public spending in many countries, but only a fraction promotes sustainability or climate resilience, and very little focuses on cities.[7] Local leaders, meanwhile, have continued to raise their

ambition: from embracing the concept of "15-minute cities" where people can get almost anything they need within a 15-minute walk or bike ride,[8] to joining the Cities Race to Zero, pledging to reach net-zero carbon emissions by mid-century or sooner.[9]

Aiming to inform and inspire national leaders in the lead-up to COP26, the Coalition set out to answer three questions: 1. How can national governments in these six key economies leverage cities to build shared prosperity while decarbonising and building resilience? 2. How can they make the most of the potential for compact, connected, clean and inclusive cities to drive the COVID-19 recovery? 3. How can insights from these six countries inform efforts by other national governments, development partners and financial institutions to support a shift towards low-carbon, inclusive and resilient cities?

Three themes emerge clearly from our analysis:

1. **A low-carbon urban transformation is within reach, with broad benefits.** National governments can significantly accelerate decarbonisation by investing in compact, connected, clean and inclusive cities – and reap substantial economic, social and environmental benefits.

2. **Building resilience to climate change is as urgent as decarbonisation.** In all six countries, climate risks are immediate and severe, especially for the urban poor. Resilience-building is a multifaceted challenge: from embedding climate resilience in infrastructure and urban development, to adopting new technologies and practices to reduce climate risks, to addressing the socio-economic drivers of vulnerability in cities.

3. **There are many ways to foster low-carbon, resilient and inclusive cities.** National governments have a wide range of options to choose from, including low-cost and immediate opportunities, and there are many synergies between decarbonisation, resilience-building, COVID recovery efforts, and development programmes.

The global report lays out an agenda for action for national and local leaders as well as for the broader development community, including financial institutions. Transforming cities to become catalysts of sustainable, inclusive and resilient growth is a major undertaking, and it is likeliest to succeed if we all come together behind a shared vision. In the sections that follow, we delve into the challenges and opportunities for Mexico in particular.

THE PROMISE – AND CHALLENGES – OF MEXICO'S CITIES

Mexico is a highly urbanised country, with cities at the heart of its economy. By 1980, two-thirds of the population lived in urban areas, and today it is over 80% – more than 104 million people.[10] Cities are also major economic engines, producing nearly 90% of gross value added (GVA).[11] Between 2000 and 2016, an estimated 64% of Mexico's GDP growth was generated in major metropolitan areas (with populations over 500,000).[12]

Cities serve as magnets for education, services, goods and employment, and as hubs of innovation and global interface. Powered to a great extent by export-driven industries that benefit from Mexico's preferential access to U.S. markets, [13] cities in key regions of the country have created upward mobility for millions of people. GDP per capita rose from US$7,791 in 1990 to US$10,386 in 2018 (in constant US$).[14] Yet, unlike other industrialised countries, Mexico has struggled to rise from middle-income to high-income status. Almost a quarter of Mexicans still lived on less than US$5.50 per day in 2018, and 41.9% met the national standard for poverty.[15] Similarly, though Mexico's Gini index – a measure of inequality – has improved substantially, from 54.3 in 1989 to 45.4 as of 2018, it is still relatively high.[16] Achieving greater equality is a national priority, and compact, connected, clean and resilient cities are a key part of the solution.

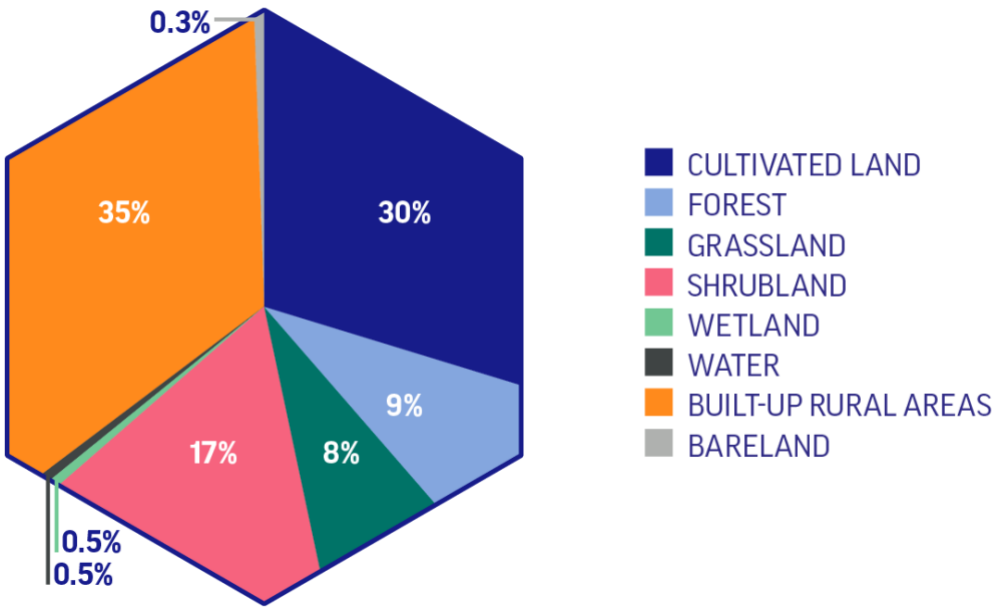
Many Mexicans work in the informal economy, and more than half lack access to key social programmes. At the start of 2020, almost 28% of Mexican workers were in the informal sector –selling goods and services from their homes, on the street or from small, unregistered businesses,[17] which together produced 11.5% of Mexico's GDP in 2019.[18] An equally large share of Mexican workers were informally employed, as day labourers or contract workers, or in other precarious arrangements. Altogether, 56% of workers were considered informal at the start of 2020.[19] Because Mexico's social safety net is heavily payroll-based, the vast majority of informal workers lack access to key government benefits such as social security, public health care, and the national housing savings and credit programme.[20] For instance, at the start of 2020, 62% of workers lacked access to public health care.[21] Urban residents were somewhat better off in this regard than people in less urbanised areas, but the situation is still dire, with a 44% informality rate and 50% lacking public health care access.[22]

COVID-19 has also exposed deep vulnerabilities in Mexico's social fabric. As of 25 March 2021, Mexico had 2.2 million confirmed COVID cases and almost 200,000 deaths.[23] The economy has been devastated, with GDP shrinking by 8.5% in 2020.[24] Inequality has worsened as poverty has increased.[25] By one estimate, the pandemic will drive 12.2 million people into poverty, more than half into extreme poverty.[26] Another estimate puts it at 7.5–8.7 million, four-fifths of them in urban areas, with deepening inequality.[27] Government data suggest that despite the crisis, and even though only 20–23% of jobs in Mexico can be done remotely,[28] most people who were employed at the start of 2020 have kept working. The number of non-farm formal workers declined by 2.6% from the first quarter of 2020 to the last, and non-farm

informal workers, by 4.5%. Still, that is a drop of more than 2 million employed people in a country with an already-low labour participation rate. [29]

Tackling spatial disparities is a priority for reducing poverty, and more compact, connected, clean and resilient cities are a key part of the solution. Mexico's cities are sprawling: New analysis for this report shows urban areas expanded by 1,821 km^2 between 2000 and 2014 – one-fifth more than the entire land area of Mexico City (see Figure 1).[30] Two-thirds of that expansion was onto cropland or built-up rural areas. For many decades, poor farmers were granted access to collectively held lands called *ejidos* as a way to protect agrarian communities, though not all ejido land was actually cultivated. Since a 1992 reform that allowed non-agricultural uses for ejidos, agrarian authorities have sold off large swathes of that land, which appealed to developers as a cheaper alternative to urban land. In the peri-urban regions of metropolitan areas, the rate of expansion is four to seven times greater than the rate of population growth.[31] For decades, new social housing construction, two-thirds of which is federally funded,[32] exacerbated the problem, with most homes built in peripheral areas that were far from jobs and public services, with little or no public transit. The poorest of the poor, meanwhile, are concentrated in informal settlements on the outskirts of cities.[33] The result is deeper inequality: well-serviced and prosperous urban centres on one side, and peripheries without economic opportunities on the other. Resources have also gone to waste. Despite a chronic housing shortage (850,000 as of March 2020),[34] the national government estimated in 2019 that there were more than 650,000 abandoned homes in Mexico.[35] This abandonment is linked to poor location or quality and, in some areas, violence from drug cartels.[36]

Figure 1. Land converted to urban areas in Mexico by type of land cover, 2000–2014



Source: Marron Institute of Urban Management, New York University, for the Coalition for Urban Transitions and the Food and Land Use Coalition. See Annex 3 for full methodology.[37]

Urban sprawl and limited public transport, in turn, drive costly and unsustainable mobility patterns. Without high-quality public transit, or services within walking distance, those who can afford cars drive, exacerbating air pollution, traffic congestion and greenhouse gas (GHG) emissions.[38] A study of 32 Mexican cities found congestion added an average of 100 hours per year to people's commutes.[39] In 2017, road accidents killed 15,900 people and cost 2.6% of GDP.[40] Between 1990 and 2015, the number of vehicles in Mexico grew 3.5 times faster than the population;[41] it actually doubled between 2006 and 2018 alone, with the majority of new cars registered in urban areas.[42] On average, transport accounted for 19% of Mexican households' expenses in 2016, more than in any other G20 country[43] – though the numbers are skewed by wealthier households' high spending on cars.[44] Lower-income people, meanwhile, pay with their time. Even in cities with well-developed public transport systems, the quality of service often mirrors users' socio-economic status.[45] People in more central neighbourhoods and inner suburbs – the better-off working class – may commute by metro, light rail or bus rapid transit (BRT). But the poorest urban residents, living on the cities' outskirts, have to endure long, complex and sometimes dangerous commutes.

Shifting the allocation of public budgets could incentivise transit-oriented development and shared and active urban mobility. Funding for urban mobility is often fragmented and tends to favour roads over transit, walking or biking.[46] Inefficient coordination between sectors and levels of government makes it difficult to integrate housing and transport investments, especially across metropolitan areas. There is a major opportunity to improve coordination among the disparate bodies responsible for financing urban investment, especially between Banobras (the state-owned development bank), SEDATU (the federal Secretariat of Agrarian, Land, and Urban Development), Infonavit (the federal institute for worker housing), CONAVI (the national housing commission) and Sociedad Hipotecaria Federal (the federal mortgage society).

Metropolitan-level coordination, supported by reallocated public budgets, is also crucial to transforming urban mobility and improving housing development. Since many people who work in a city commute from beyond its administrative boundaries, metropolitan-scale integrated planning – via a unified authority or a collaborative arrangement among multiple authorities – can enable more cohesive development strategies. Metropolitan planning is currently limited in Mexico: there are few policies or legal architecture to enshrine systems and incentives for coordination, and financing for metropolitan projects is insufficient and poorly targeted.[47] The Guadalajara Metropolitan Authority is a positive example of a metropolitan agency; other urban areas (including Mexico City) are attempting to follow suit.

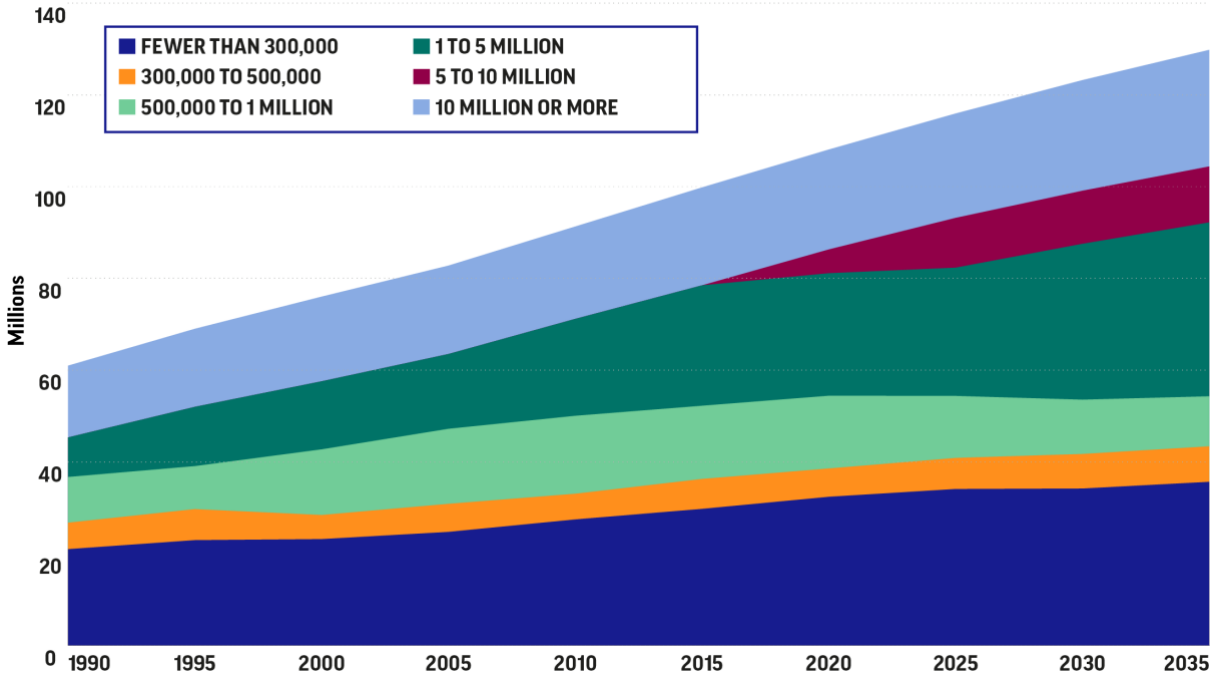
Important national reforms are already underway. A proposed National Strategy of Territorial Planning 2020–2040 would, for the first time, provide a nationwide, long-term vision for urbanisation to guide municipal plans.[48] The strategy prioritises resilience, access to key services, and mobility. The 2019–2024 National Housing Programme, meanwhile, seeks to provide homes that are not only affordable, but

truly meet residents' needs[49] – for example, by ensuring they can access economic opportunities and key services. The programme is also empowering low-income communities to build or upgrade their own housing and to shape their own neighbourhoods.[50] This is a far more inclusive approach than the usual reliance on large-scale developers, with significant potential to improve living conditions for some of Mexico's poorest and most vulnerable urban residents – and in the process, build broader social resilience.

The national housing finance system is also moving in the right direction. CONAVI is now allocating subsidies away from new housing construction and towards retrofit or expansion of existing stock.[51] About a third of loans from Infonavit, the largest mortgage originator in Mexico, now go towards home improvements ("Mejoravit") – 170,500 of the 521,961 loans issued in 2019, for instance.[52] Infonavit has also launched Unamos Créditos, a programme that allows household members to combine their credit, so they can afford better-situated housing.[53] And the agency is supporting self-building through programmes such as ConstruYO,[54] recognising low-income homeowners' key role in improving the housing stock. An April 2020 government report projected that 55.2% of the demand for home loans in 2020 would be for new purchases, 36.9% for upgrades, and 7.9% for self-building.[55] Demand for loans for self-building was projected to rise by 29% from 2019 levels, even though overall demand for home loans was expected to drop by 9% due to the weak economy and subsidy cuts. Clearly there was an unmet need, and the policy shift is resonating with households.

Mexico's cities need stronger institutional capacities and more resources to address urgent urban challenges. Capacity-building of municipal staff – especially in smaller cities – is crucial to enable inclusive, sustainable urban development, including at the metropolitan scale.[56] The need is particularly great because, as shown in Figure 2, half the urban population in 2020 was in cities with fewer than 1 million residents.[57] While many national government agencies and larger municipalities have skilled, informed staff, several cities in Mexico struggle to recruit and retain sufficient staff with expertise. Capacity constraints, particularly in smaller cities, combined with high turnover and some instances of corruption, prevent cities from effectively enacting and enforcing policies to shape urban development.[58] Such policies that require specialised administrative expertise include defining land uses, granting building licenses, crafting urban plans and related regulations, raising own-source revenues through property taxes and other mechanisms, and accessing finance through Banobras,[59] the state-owned development bank, and other federal programmes.

Figure 2. Mexico's urban population by city size class, 1990–2035 (historical and projected)



Source: Coalition for Urban Transitions analysis based on data from UN DESA, 2018. Data to 2015 are historical, 2020–2035 are projections.[60]

Municipal governments need significantly more own-source revenue to support urban infrastructure and service improvements. Mexico as a country has the lowest tax-to-GDP ratio in the OECD, 16.2% in 2018, compared with 24.4% in the United States and an OECD average of 33.4%.[61] And although local tax revenue collection has risen in recent years,[62] Mexico also has the lowest local share of overall tax collection in the OECD.[63] Mexico's property taxes (*impuesto predial*) are set and collected by municipal governments, generally based on the location, size and built-up area of a plot, using state-approved value maps.[64] Improving property tax collection, based on updated information, represents an opportunity to increase municipalities' own-source revenue and improve the social justice of the tax burden by reducing the burden on low and middle-income households. Cities can also use land value capture (LVC) strategies[65] to help fund mass transit, water supply and other infrastructure. This can help ensure that the economic returns on public investments are used for public benefit, especially to improve the lives of poor and marginalised residents.

Strategic policies and investments are needed to shift entrenched patterns and make the housing market more sustainable and inclusive. There is a strong cultural preference in Mexico for homeownership over renting, and for single-family homes over multi-family housing. But if the market provides attractive options, those preferences could shift.[66] Making good alternatives available is particularly important for lower-income households and for younger people who have not yet been able to save much, or may not be ready to settle down.[67] Renting would enable workers to move more freely to pursue economic opportunities. And high-quality rentals might

also prove attractive to adults without children, older people and others. Yet formal rental housing makes up just 15.9% of the housing stock[68] – or, including informal rentals, about 23%.[69] The National Housing Programme 2019–2024 calls for expanding rentals, especially for affordability, but there is significant potential to do more to grow and improve Mexico's rental market.[70]

Similarly, the success of Mexico's auto industry depends on moving beyond outdated mindsets. The auto industry contributes 3–4% of Mexico's GDP, which makes it the fourth-largest contributing sector, after petroleum, education and food; it also employed more than 824,000 people in 2017, mostly in cities.[71] However, eight of every ten autos produced in Mexico, and most of the auto parts, are for export. This has important implications. Though Mexico's own market for electric vehicles (EVs) is still tiny, the auto industry urgently needs to catch up with fast-rising global demand. Automakers around the world, including key clients of Mexican manufacturers, are racing to become leaders in EVs and announcing plans to end internal-combustion-engine production.[72] Some governments are also investing heavily in EV technologies and supply chains – but Mexico, not yet. The national government has developed a National Strategy for Electric Mobility.[73] Stepping up efforts should be a priority, not just for sustainability, but for economic competitiveness. At the same time, Mexico can continue to build on programmes to reduce car dependency, and it can also raise its fuel economy standards, which are among the lowest in the OECD.[74]

Confronting climate change

Mexico faces growing climate-related risks. Already, average temperatures are 0.85°C warmer than in the 1970s, and there are fewer cool days and more warm nights.[75] The country is projected to see increasingly severe coastal storms, sea-level rise and related impacts, more extreme weather – including torrential downpours – and resulting floods and landslides, but also drier conditions in most of the country, more frequent droughts and worsening water scarcity, even as demand for water grows.[76] Human health is also at risk, as vector-borne diseases such as dengue fever are expected to become more prevalent. Already in 2013, the National Climate Change Strategy had found that 1,385 municipalities with 27 million residents were vulnerable to climate-related disasters.[77] A 2020 analysis found most of Mexico's southern and western states (except Yucatán, Quintana Roo, Baja California and Baja California Sur) have "high" or "very high" or very high vulnerability to urban floods, and so does Mexico City.[78] Vulnerability to urban landslides is even more acute, with most of the country, including arid regions, deemed to be at "high" or "very high" risk.[79] The combination of climate change and sustainability issues can compound risks – for instance, excessive water use in water-scarce areas, and heat island effects in heavily built-up areas exacerbating the impact of rising temperatures.[80] Mexico City is a prime example. It is sinking due to excessive groundwater abstraction, and climate change is expected to worsen already-severe water scarcity[81] while increasing floods, landslides and other hazards.[82]

Poor and marginalised communities are in particular peril. Many informal settlements on the edges of cities are built on slopes or at the base of hills, where they are exposed to landslides.[83] From 2008 to 2017, more than a third of the Natural

Disasters Fund was allocated to recovery in marginalised settlements in only 10 states.[84] As noted, severe climate risks are spread across hundreds of municipalities, which creates daunting challenges for small cities that have few resources or technical expertise.[85] Local governments urgently need national support to build resilience – both by reducing physical risks, and by building social resilience, addressing poverty and other drivers of vulnerability. Better transport infrastructure is also key. As the COVID-19 crisis has highlighted, the physical isolation of poor and vulnerable people in peri-urban areas, with limited public transport, can itself deepen poverty *and* vulnerability to the pandemic. Recognising this, a May 2020 analysis called for significant improvements in public transport, as well as walking and cycling infrastructure, as necessities for urban resilience.[86] Several cities have significantly expanded bike lanes, at least temporarily, including Mexico City, Guadalajara, Monterrey and Puebla.[87]

Mexico's climate mitigation commitments have been modest, with no increase in ambition in its latest Nationally Determined Contribution. In its initial NDC, Mexico pledged to reduce greenhouse gas (GHG) emissions by 22% by 2030, relative to a baseline scenario, and to reduce black carbon emissions by 51%. Yet despite a reduction in emissions due to the pandemic, the country does not appear to be on track to meet that commitment.[88] In its updated NDC, submitted in December 2020, the government expressed support for global collaboration to meet the goals of the Paris Agreement, but did not ratchet up ambition.[89] This is a missed opportunity, especially as it is clear from existing policies and programmes that the social and economic development potential of shifting towards a low-carbon economy – and of urban measures that would support that shift – is already recognised.

Early successes have built a foundation for ambitious action. For example, Mexico was one of the first emerging economies to introduce a carbon tax, in 2013.[90] It is expected to reduce annual emissions by 1.6 Mt CO_2-e.[91] The tax collected 5.15 billion MXN in 2019 (about US$256.6 million). Mexico City's Green Job Programme, launched in 2019 in collaboration with the International Labour Organization, includes training on sustainable energy systems.[92] Progress has also been made in building energy efficiency,[93] with incentives such as the Green Mortgage programme, which encourages developers to build housing that includes solar heating, thermal insulation and other sustainable technologies.[94] Energy efficiency and resilience-building measures could also be incorporated into the Urban Improvement Programme, which targets areas that have fallen into disrepair and/or face significant socio-economic challenges.[95] SEDATU estimates that the programme could generate more than 200,000 jobs,[96] while improving the quality of both formal and informal housing.

Mexico can free up resources for transformative investments by unwinding fossil fuel subsidies. In 2015–2016, Mexico spent an average of more than US$523 million per year on fossil fuel subsidies.[97] In 2019, the federal tax expenditure on vehicle fuel alone amounted to MXN 86,650 million[98] (US$4.2 billion),[99] more than 16 times the 2020 budget of the Urban Improvement Programme. Nevertheless, only a fraction of Mexicans own cars, with car ownership more prevalent in relatively higher-income groups. In 2012, 80% of fuel subsidies benefitted only the upper half of

Mexico's population.[100] These subsidies also contributed to the growth of Mexico's highest CO_2-emitting sectors. In phasing out fossil fuel subsidies, it is essential to prioritise the needs of low-income households and offset the impact of higher energy costs for those households. At the same time, freed-up resources can be invested in improving social welfare, including by addressing energy poverty, making clean and efficient technologies affordable to the poor, and improving overall living conditions.[101]

Skaters and cyclists enjoy Avenida Paso de la Reforma in Mexico City, which is closed to cars on Sundays.
Source: Carl Campbell/Unsplash

BOX 1: HOW WE BUILT OUR ANALYSIS

This report combines original climate and economic modelling, spatial analysis, policy research and analysis, and country-specific insights gathered by consulting iteratively with urban, energy and climate policy experts in China, India, Indonesia, Brazil, Mexico and South Africa.

First, the Stockholm Environment Institute (SEI) modelled the urban greenhouse gas abatement potential in six countries, using a bottom-up assessment of mitigation options in residential and commercial buildings, road transport, waste management, and materials for urban buildings and transport infrastructure.

The model covers CO2 emissions from energy consumption, process emissions from the production of cement and aluminium used in urban infrastructure, and methane (CH4) emissions from landfills. It is important to note that emissions from industries within cities are not included. Thus, the urban share of emissions may appear smaller than in other studies. It is also important to note that this analysis was undertaken prior to the full impacts of COVID-19 being known. Hence, the baseline scenario, for example, does not factor in the potential economic impacts of COVID-19 on emissions pathways. Any planned future analysis will be adjusted to take this into account.

The baseline scenario reflects countries' commitments in their first round of Nationally Determined Contributions (NDCs) under the Paris Agreement, but not the latest updates. This means the abatement potential between 2020 and 2050 identified in the analysis is all additional to the first NDCs. For details on data sources, measure-specific assumptions and analytical steps, see Annex 1.

Second, Vivid Economics modelled the incremental investments through 2050 – that is, investments beyond baseline levels – needed to realise the abatement potential identified by SEI, using existing technologies and practices, and accounting for learning that would reduce costs over time. They also modelled the cumulative returns on those investments through 2050. Across all countries, the estimates presented in this report are net returns (i.e. net present value, or the extent to which benefits exceed costs over the period to 2050), discounted at 3.5% per year, assuming a 2.5% annual increase in real energy prices from 2014 levels. That is the central scenario in the analysis; for a comparison of results with different assumptions, see Annex 2, Part 3. Note that the economic returns estimate only considers direct energy and material cost savings and is thus partial. The returns would be higher if factors such as time savings from avoided congestion, increased productivity, improved health and environmental quality, and avoided climate change impacts were taken into account.

Finally, the Vivid analysis estimates the direct, indirect and induced jobs (full-time equivalent) that the modelled measures could support in 2030 and 2050, taking into account technology-specific labour productivity factors and adjusted to reflect typical differences in labour productivity between OECD and non-OECD countries. The estimates are based on uniform labour productivity assumptions for the six countries and provide indicative job numbers. Further work should collect more country-specific information to refine the results. The job numbers reflect an estimate of net jobs by comparing green investment with an equivalent investment in fossil fuel projects, while fully recognising the uncertainties in such counterfactuals. In all of these categories, we provide overall numbers as well as selected sector- and measure-specific estimates. For details on data sources and the full methodology, see Annex 2.

The third modelling exercise that informed our analysis was by the Marron Institute of Urban Management at New York University, which examined the scale and composition of the conversion of land to urban purposes in each of the six countries in the period 2000–2014. The results show not only how much cities' collective footprint grew in that time, but also what they displaced: farmland, built-up rural areas, forests, grassland, etc. For a detailed methodology, see Annex 3.

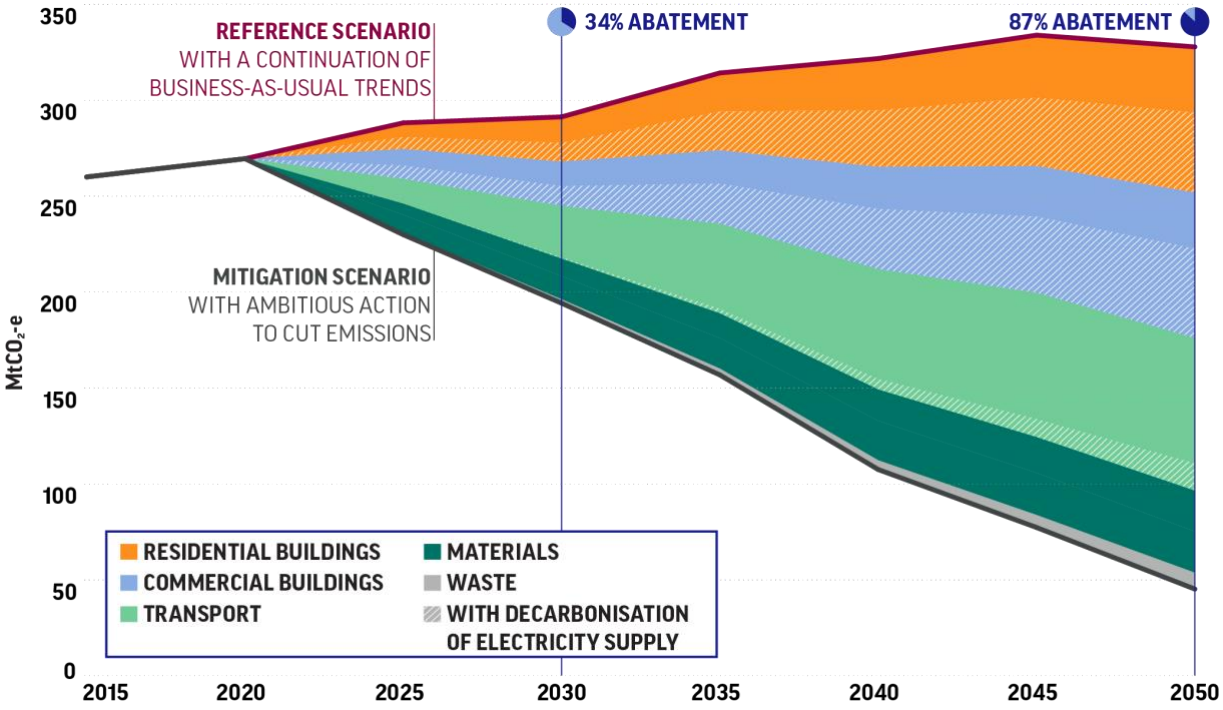
Finally, recognising that coastal populations are particularly exposed to climate change impacts, including sea-level rise, storm surges and other hazards, we drew on the work of the Institute for Demographic Research at City University of New York, the Center for International Earth Science Information Network at Columbia University, and the Institute of Development Studies to estimate the share of each country's population living in coastal zones at less than 10 metres above sea level, and the urban share of that population. While a detailed mapping of coastal climate risks in the six countries is beyond the scope of this report, this analysis provides some indication of the extent of the risk. For a detailed methodology, see Annex 4.

The four modelling exercises inform analysis in this report as well as the Coalition's global synthesis report, based on detailed literature reviews (including policy documents, peer-reviewed studies, grey literature and media coverage) and close collaboration with experts in the six countries, with additional input from a wide range of Coalition partners. The resulting recommendations are meant as illustrative examples, and should not be seen as an exhaustive list of options for national policy-makers in each country.

HOW URBAN ACTION CAN DRIVE DECARBONISATION AND ECONOMIC GROWTH

Urban climate action could help Mexico get on a path to a net-zero carbon future. Modelling for the Coalition shows adopting a bundle of low-carbon measures in the buildings, transport and waste sectors could reduce urban GHG emissions by 34% (98 Mt CO_2-e) in 2030 and 87% (284 Mt CO_2-e) in 2050, relative to a baseline scenario.[102] For perspective, emissions from those sectors made up 56% of Mexico's energy-related CO_2 emissions in 2015 – the largest share among the six countries examined in this study.[103] One-fifth (19%) of the urban abatement potential identified is in Mexico City; 28% is in cities with 1–5 million residents, such as Guadalajara and Puebla; and 53% is in cities with fewer than 1 million residents.

Figure 3. GHG abatement potential in key urban sectors in Mexico to 2050



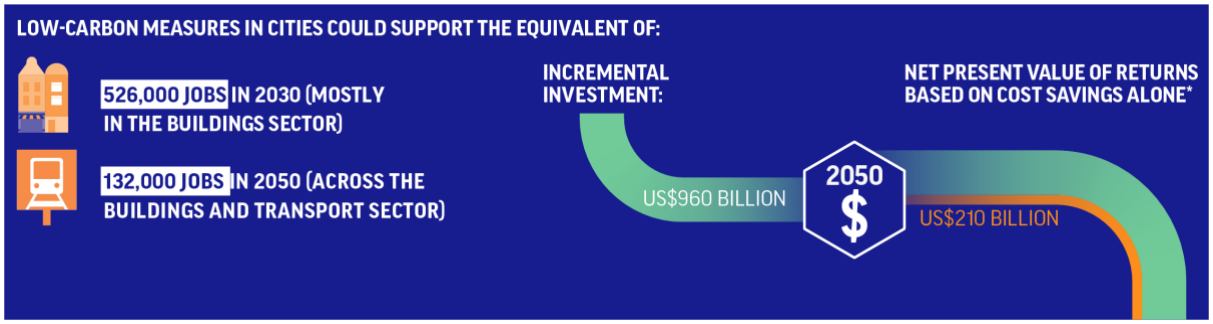
Source: Modelling by the Stockholm Environment Institute for the Coalition for Urban Transitions.[104]

Decarbonising Mexico's power supply is crucial to realising the full abatement potential. The analysis shows 30% of the modelled GHG reduction potential – mainly in the buildings sector – depends on a switch to clean electricity. As of 2019, 79% of Mexico's electricity came from fossil fuels, 60% from natural gas alone.[105] Solar photovoltaics (PV) and wind power, meanwhile, contributed only 2% and 5% of the power supply, respectively. Installed capacity has grown rapidly, especially for PV, rising from 1.97 GW in 2018 to 7.55 GW in early 2021 (wind capacity has grown from 4.88 GW to 8.86 GW in the same period).[106] Based on solar radiation and roof availability, 29 cities have been estimated to have a distributed generation potential of 84 GW; by 2030, 70% of residential electricity demand could be met by installing 25

GW of rooftop solar.[107] However, the government has not signalled that solar power expansion is a priority. Indeed, in June 2020, the state-owned utility, Comisión Federal de Electricidad (CFE), announced it would not conduct any more energy auctions, reducing prospects for short-term large-scale PV development.[108] Many private investors are reportedly dropping their plans in Mexico.[109] Government data show that direct foreign investment in the electricity sector dropped by 61.7% from 2019 to 2020.[110]

Investing in urban decarbonisation could bring significant economic benefits. Modelling for the Coalition suggests that fully implementing the bundle of low-carbon measures discussed above would require US$963 billion in incremental investments through 2050. But they could more than pay for themselves in energy and materials savings alone, yielding returns with a net present value of at least US$208.8 billion by 2050 (Figure 4).[111] Many benefits that are not quantified in that analysis might be even more attractive for Mexico and its cities: the value of time saved through avoided traffic congestion and better public transport; health benefits from improved air quality and more walking and cycling; higher quality of life; improved access to jobs, public services and urban amenities for low-income people who are now isolated in peri-urban areas; and the medium- and long-term benefits of mitigating climate change. The analysis also provides indicative numbers of jobs that could be supported by the investments, suggesting that they could collectively support about 526,000 new jobs in 2030, mostly in energy efficiency in the buildings sector.[112]

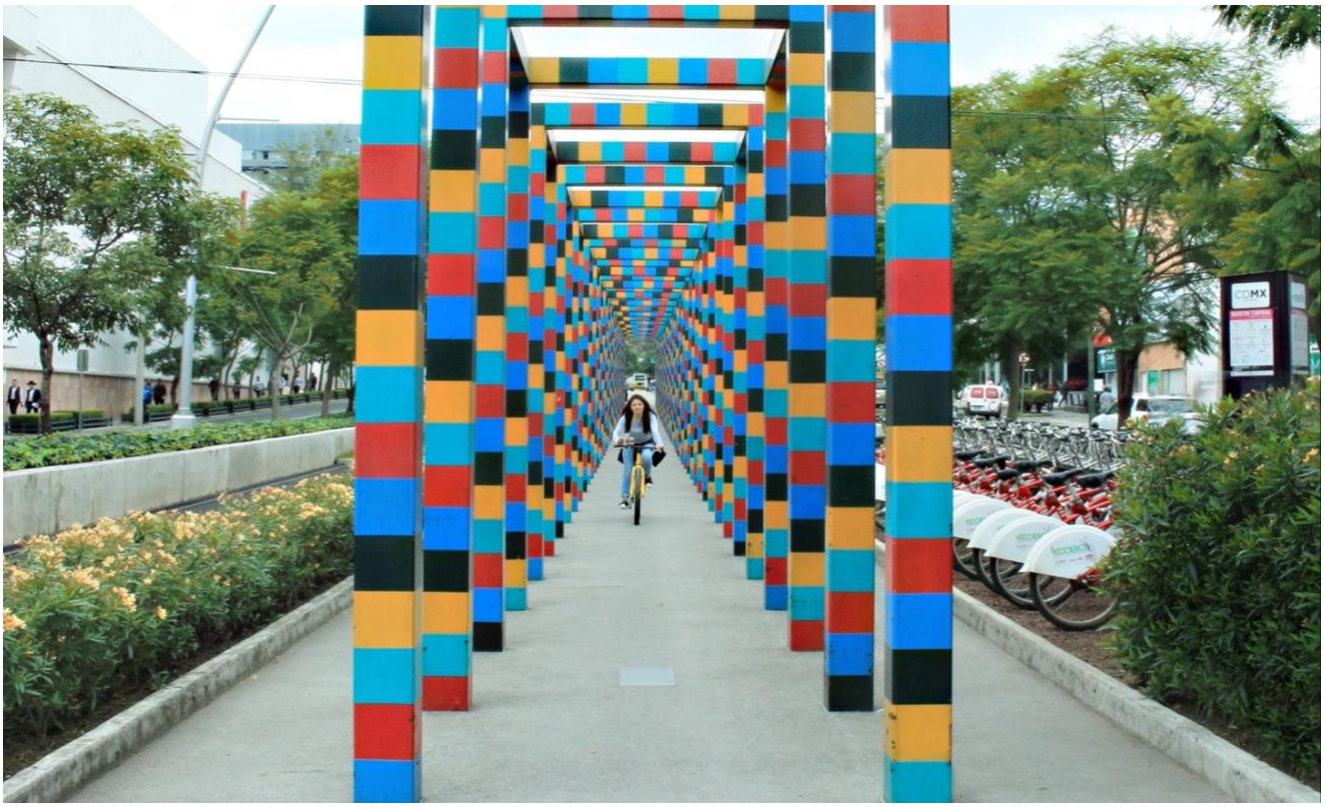
Figure 4. The economics of selected low-carbon measures in Mexican cities



Source: Modelling by Vivid Economics.[113] Note that these job and growth numbers are indicative estimates only and not forecasts of future outcomes. The job numbers in particular are subject to a high level of uncertainty, as explained in Annex 2*, and should be interpreted with caution.*

The most economically attractive options are in transportation, which accounts for 28% of urban abatement potential but would require just 8% of total investments. Reducing travel demand, integrating transport planning and land use, and encouraging a shift away from motorised transport could reduce emissions from Mexican cities by over 8 Mt CO_2-e by 2030 and 17.33 Mt CO_2-e by 2050, and vehicle efficiency and electrification could save a further 6.83 Mt CO_2-e by 2030 and 19.67 Mt CO_2-e by 2050. The national government is already working on an electric mobility strategy,[114] but there is significant scope to expand public transit and non-motorised transport investments.

Building energy efficiency measures could provide more than half the abatement potential, but account for nearly 90% of total investment needs. The economic analysis shows that deep building retrofits offer the largest job creation potential, with huge opportunities for the construction sector, which employs a large share of low-skilled workers. With national housing programmes increasingly supporting home improvements, and the Urban Improvement Programme bringing upgrades to poor and marginalised communities in particular, there are prime opportunities to start realising this potential, even if resources are not yet available to do this on the scale that that will ultimately be needed.



Cyclist in Mexico. Source: Designer_Cesareveles/Pixabay

UNLOCKING THE POTENTIAL OF MEXICO'S CITIES

Mexico faces significant economic challenges due to the COVID-19 pandemic. By putting compact, connected, clean, and inclusive cities at the heart of its recovery strategy, aligned with a long-term vision, it can emerge stronger from this crisis, with particular benefits for poor and marginalised people.

To date, Mexico's COVID-19 fiscal stimulus has been relatively modest, US$28 billion as of February 2021, weighted heavily towards high-carbon investments.[115] For example, funds have been allocated to a flagship oil refinery and a new airport.[116] In addition, significant support has been provided for the energy sector, including US$3.03 billion in tax breaks for Pemex, the state-owned oil company, and US$916 million for clean energy.[117] There has been some green investment as well, most notably for expansion of Mexico City's cycling network. Future stimulus efforts should prioritise low-carbon urban measures – especially those with high job creation potential and/or large benefits for the poor.

To fully realise its cities' potential to support sustainable, inclusive and equitable growth, Mexico also needs institutional and fiscal reforms as well as targeted measures to strengthen municipalities' technical and financial capacities and to support municipal-level coordination.[118] The good news is that much of this can be accomplished without significant new expenditure, as it involves mainly changes in governance and reallocation of existing resources. And, as noted, several important reforms and programmes are already underway.

There are many ways for the national government to help unleash the power of compact, connected, clean and resilient cities. Four such opportunities are:

Support the creation of metropolitan authorities to enable integrated land use and transport planning. The Guadalajara Metropolitan Authority provides a potential model, which other urban areas (including Mexico City) are seeking to emulate. Given that much of the urban growth in Mexico is occurring in smaller cities, capacity-building of municipal staff is also crucial to enable inclusive, sustainable urban development, including at the metropolitan scale.[119] Municipal Planning Institutes (IMPLANES) have already helped many cities develop long-term planning strategies, build technical and institutional capacities, and ensure continuity across political cycles. This model could be more widely replicated, especially to support smaller cities.[120]

Expand the supply of well-located social urban housing that is adequate, secure and affordable, complemented with inclusive and resilient mass transit options. Recent reforms to national housing and lending programmes should facilitate this. Safe housing and greater access to jobs and key services in the cities will also strengthen the resilience of vulnerable populations. More strategic site selection and compact development can also help slow urban expansion and protect natural and agricultural areas.

Prioritise a just transition to net-zero-carbon cities, with special attention to the needs of poor and marginalised people. Mexico's long-term prosperity and global competitiveness depend on whether it can successfully transform its

economy for a net-zero future. With strong national support, cities can drive that shift, pioneering new technologies and policies. In that context, a strong commitment to a just transition is essential, so that informal workers and others living in precarious conditions get to share in the benefits and are not unintentionally hurt, even short-term, by decarbonisation measures.

Scale up support for programmes to foster the social production of housing and habitat, leveraging low-carbon strategies to reduce poverty. Mexico's new housing and land use policies have the potential to transform the lives of many poor and marginalised people, not least by enabling them to shape the urban infrastructure they rely on. This is also a powerful tool to build social resilience in communities that are now deeply vulnerable.

Aerial view of Taxco de Alarcón, Mexico. Source: Pedro Lastra/Unsplash

ENDNOTES

[1] CUT, 2019, "Climate Emergency, Urban Opportunity."
[2] Their collective share in 2019 was 31.7%, including 17.3% from China. Authors' calculations based on World Bank GDP data (PPP, in current international $). See https://data.worldbank.org/indicator/NY.GDP.MKTP.PP.CD.
[3] Authors' calculations based on 2018 data from the International Energy Agency (total CO_2 emissions): https://www.iea.org/data-and-statistics.
[4] Authors' calculations based on 2018 data from UN DESA, 2018, "World Urbanization Prospects: The 2018 Revision." China alone is home to 20% of the world's urban residents, and India, to another 11%.
[5] CUT, 2021, "Seizing the Urban Opportunity: How National Governments Can Recover from COVID-19, Tackle the Climate Crisis, and Secure Shared Prosperity through Cities."
[6] CUT, 2019, "Climate Emergency, Urban Opportunity."
[7] Vivid Economics, 2021, "Greenness of Stimulus Index: An Assessment of COVID-19 Stimulus by G20 Countries and Other Major Economies in Relation to Climate Action and Biodiversity Goals (February 2021 Release)."
[8] C40 Cities, 2020, "How to Build Back Better with a 15-Minute City."
[9] See http://www.citiesracetozero.org and the listing of cities in the Climate Ambition Alliance, at https://climateaction.unfccc.int/views/cooperative-initiative-details.html?id=94.
[10] UN DESA, 2018, "World Urbanization Prospects: The 2018 Revision." As of 2018, it was 79.3%, but by 2020, UN DESA projected the urban share would be 80.7%.
[11] Kim and Zangerling, 2016, *Mexico Urbanization Review: Managing Spatial Growth for Productive and Livable Cities in Mexico*. Gross value added (GVA) data are based on 2010 estimates and indicate that cities produce 87% of Mexico's GVA.
[12] OECD, 2018, "Regions and Cities at a Glance 2018 – Mexico."
[13] Sánchez Almanza, 2016, "Sistema de ciudades y redes urbanas en los modelos económicos de México," *Problemas del Desarrollo. Revista Latinoamericana de Economía*.
[14] See World Bank GDP per capita data (in constant 2010 US$): https://data.worldbank.org/indicator/NY.GDP.PCAP.KD?locations=MX.
[15] US$5.50 per day (in constant 2011 PPP) is the World Bank's poverty line for upper-middle-income countries. See https://data.worldbank.org/indicator/SI.POV.UMIC.GP?locations=MX. Mexico's National Council for Evaluation of Social Development Policy (CONEVAL) measures poverty along multiple dimensions, including income as well as access to key services and programmes, education and other factors. See https://www.coneval.org.mx/Medicion/Paginas/PobrezaInicio.aspx.
[16] By comparison, the Gini index for the U.S. was 41.1 in 2016, and Canada's was 33.3 in 2017. See World Bank estimates: https://data.worldbank.org/indicator/SI.POV.GINI?locations=MX-CA-US.
[17] See "strategic indicators" tables for the first quarter of 2020 from the National Institute of Statistics and Geography (INEGI) for the National Occupation and Employment Survey: https://www.inegi.org.mx/programas/enoe/15ymas/#Tabulados.
[18] See informality measures data from INEGI: https://www.inegi.org.mx/temas/pibmed/.
[19] See https://www.inegi.org.mx/app/buscador/default.html?q=informalidad#tabMCcollapse-Indicadores. The informality rate has not changed significantly due to the pandemic; in December 2020, it was 55.8%. See https://www.inegi.org.mx/app/saladeprensa/noticia.html?id=6233.

[20] For a discussion of the equity implications of basing Mexico's housing finance system on payroll deductions, see Heeckt and Huerta Melchor, 2021, "Compact, Connected, Clean and Inclusive: A New Vision for Transport and Housing in Mexico's Cities."
[21] See "strategic indicators" tables for the first quarter of 2020 from the National Institute of Statistics and Geography (INEGI) for the National Occupation and Employment Survey: https://www.inegi.org.mx/programas/enoe/15ymas/#Tabulados.
[22] INEGI's statistics distinguish between "most urbanised" areas and, among the "less urbanised" areas, between medium- and low-urbanisation areas and rural areas. The data presented here are for "most urbanised" areas, also in the first quarter of 2020.
[23] See Johns Hopkins University Coronavirus Resource Center: https://coronavirus.jhu.edu/data/mortality.
[24] IMF, 2021, *World Economic Outlook – Update January 2021: Policy Support and Vaccines Expected to Lift Activity*.
[25] Lustig and Martínez Pabon, 2020, "The Impact of COVID-19 Economic Shock on Inequality and Poverty in Mexico"; Lustig and Martínez Pabón, 2020, "El COVID-19 en México: impacto en pobreza y desigualdad," *Foco Económico* (blog).
[26] Székely, Acevedo, and Flores, 2020, "Magnitud Del Impacto Social Del COVID-19 En México y Alternativas Para Amortiguarlo: Resultados Por Entidad Federativa."
[27] Lustig and Martínez Pabon, 2020, "The Impact of COVID-19 Economic Shock on Inequality and Poverty in Mexico."
[28] Monroy-Gómez-Franco, 2020, "¿Quién Puede Trabajar Desde Casa? Evidencia Desde México."
[29] See "occupied population" tables for the first and last quarter of 2020 from the National Institute of Statistics and Geography (INEGI) for the National Occupation and Employment Survey: https://www.inegi.org.mx/programas/enoe/15ymas/#Tabulados. OECD statistics show Mexico had the second-lowest labour participation rate in the OECD in 2019, after Turkey – 71.5%, compared with an average of 78.4% for the OECD as a whole. See https://data.oecd.org/emp/labour-force-participation-rate.htm. Note that the OECD's metrics differ from INEGI's – OECD measures the labour participation rate of people aged 25–64, while INEGI looks at all people over the age of 15 (with no presumed retirement age).. By the latter measure, INEGI data show a labour participation rate of 57.5% in the fourth quarter of 2020. See "strategic indicators" table: https://www.inegi.org.mx/programas/enoe/15ymas/#Tabulados.
[30] Analysis for the Coalition by the Marron Institute of Urban Management, New York University. See Annex 3 for a full description of the data sources, approach and limitations: https://urbantransitions.global/urban-opportunity/seizing-the-urban-opportunity/annexes/. The land area of Mexico City is 1,485 km^2 (the city proper, not the metropolitan area).
[31] Zubicaray et al., 2020, "Las Ciudades Mexicanas: Tendencias de Expansión y Sus Impactos."
[32] See Sistema Nacional de Información e Indicadores de Vivienda (SNIIV) data: http://sniiv.conavi.gob.mx/cubo/financiamientos.aspx
[33] Heeckt and Huerta Melchor, 2021, "Compact, Connected, Clean and Inclusive: A New Vision for Transport and Housing in Mexico's Cities."
[34] Sociedad Hipotecaria Federal, 2020, "Demanda de vivienda 2020."
[35] SEDATU, 2019, "Programa Nacional de Vivienda 2019–2024."
[36] Infonavit, 2015, "Atlas Del Abandono de Vivienda"; Contreras, 2014, "The Role of Drug-Related Violence and Extortion in Promoting Mexican Migration: Unexpected Consequences of a Drug War," *Latin American Research Review*.

[37] Analysis for the Coalition by the Marron Institute of Urban Management, New York University. See Annex 3 for a full description of the data sources, approach and limitations: https://urbantransitions.global/urban-opportunity/seizing-the-urban-opportunity/annexes/.
[38] Heeckt and Huerta Melchor, 2021, "Compact, Connected, Clean and Inclusive: A New Vision for Transport and Housing in Mexico's Cities"; Zubicaray et al., 2020, "Las Ciudades Mexicanas: Tendencias de Expansión y Sus Impactos"; Estrada et al., 2020, "An Analysis of Current Sustainability of Mexican Cities and Their Exposure to Climate Change," *Frontiers in Environmental Science*. Estrada et al. find that more developed cities and cities with low development rely heavily on private vehicle fleets for transportation. However, medium-sized cities with higher levels of development, such as Monterrey and Guadalajara, exhibit smaller per capita private vehicle fleets, more efficiency and lower CO_2 emissions than larger urban areas with similar levels of development
[39] IMCO and SinTráfico, 2019, "El costo de la congestión: vida y recursos perdidos."
[40] ITF, 2019, "Mexico Road Safety Annual Report 2019."
[41] IMCO, 2019, "Índice de Movilidad Urbana 2018: Barrios Mejor Conectados Para Ciudades Más Incluyentes."
[42] See INEGI, "Sistema Estatal y Municipal de Bases de Datos," 2020, https://www.inegi.org.mx/.
[43] IMCO, 2019, "Índice de Movilidad Urbana 2018: Barrios Mejor Conectados Para Ciudades Más Incluyentes." For comparison, the share in Canada is 16%, and in the United States, 10%.
[44] INEGI, 2018, "México – Encuesta Anual de Transportes 2018, Información 2017."
[45] IMCO, 2019, "Índice de Movilidad Urbana 2018: Barrios Mejor Conectados Para Ciudades Más Incluyentes."
[46] Heeckt and Huerta Melchor, 2021, "Compact, Connected, Clean and Inclusive: A New Vision for Transport and Housing in Mexico's Cities"; Zubicaray et al., 2020, "Las Ciudades Mexicanas: Tendencias de Expansión y Sus Impactos"; Estrada et al., 2020, "An Analysis of Current Sustainability of Mexican Cities and Their Exposure to Climate Change," *Frontiers in Environmental Science*; SEDATU, 2018, "Anatomía de la movilidad en México: Hacia dónde vamos."
[47] Zubicaray Díaz et al., 2020, "Acciones federales para la planeación urbana: Hacia mejores ciudades para todos."
[48] SEDATU, 2020, "Estrategia Nacional de Ordenamiento Territorial 2020-2040"; Senado de la República, 2020, "Presenta Sedatu al Senado Estrategia Nacional de Ordenamiento Territorial," Coordinación de Comunicación Social.
[49] SEDATU, 2019, "Programa Nacional de Vivienda 2019–2024."
[50] The concept of social production of housing – and more broadly, of "habitat" – is seen as a key strategy to achieve more inclusive and socially just urbanisation. See, e.g., García, 2019, "Producción Social de La Vivienda: Proceso Transformador de Las Ciudades Mexicanas," *WRI México* (blog); Arébalo et al., 2012, "El Camino Posible: Producción Social Del Hábitat En América Latina."
[51] SEDATU, 2020, "Reglas de Operación Del Programa de Vivienda Social."
[52] Infonavit, 2020, "Informe Anual de Actividades 2019." The share of loans issued through Mejoravit was 32.6% in 2019, up from 31.3% in 2018 and just 7.6% in 2016; see Infonavit, 2019, "Informe Anual de Actividades 2018"; 2017, "Informe Anual de Actividades 2016." For an overview of how Infonavit works, see Box 1 in Heeckt and Huerta Melchor, 2021, "Compact, Connected, Clean and Inclusive: A New Vision for Transport and Housing in Mexico's Cities."
[53] See https://portalmx.infonavit.org.mx/wps/portal/infonavit.web/trabajadores/unamosCreditosInfonavit/.

[54] See https://portalmx.infonavit.org.mx/wps/portal/infonavit.web/trabajadores/construYO.
[55] Sociedad Hipotecaria Federal, 2020, "Demanda de vivienda 2020."
[56] Heeckt and Huerta Melchor, 2021, "Compact, Connected, Clean and Inclusive: A New Vision for Transport and Housing in Mexico's Cities."
[57] UN DESA, 2018, "World Urbanization Prospects: The 2018 Revision."
[58] Heeckt and Huerta Melchor, 2021, "Compact, Connected, Clean and Inclusive: A New Vision for Transport and Housing in Mexico's Cities."
[59] See https://www.gob.mx/banobras.
[60] UN DESA, 2018, "World Urbanization Prospects: The 2018 Revision."
[61] See OECD tax revenue data: https://data.oecd.org/tax/tax-revenue.htm#indicator-chart.
[62] OECD, 2020, "Revenue Statistics 2020."
[63] As of 2014, only 1.6% of tax revenue in Mexico was collected by local governments, compared with 14.1% in the United States, for example. See Table 2 in OECD, 2016, "Revenue Statistics 2016 – Highlights."
[64] De Cesare, 2012, "Improving the Performance of the Property Tax in Latin America."
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[66] Heeckt and Huerta Melchor, 2021, "Compact, Connected, Clean and Inclusive: A New Vision for Transport and Housing in Mexico's Cities."
[67] King et al., 2017, "Confronting the Urban Housing Crisis in the Global South: Adequate, Secure, and Affordable Housing."
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[69] OECD, 2015, *OECD Urban Policy Reviews: Mexico 2015: Transforming Urban Policy and Housing Finance*.
[70] See extensive discussion of these issues, including innovative strategies, in Heeckt and Huerta Melchor, 2021, "Compact, Connected, Clean and Inclusive: A New Vision for Transport and Housing in Mexico's Cities."
[71] INEGI and AMIA, 2018, "Conociendo La Industria Automotriz."
[72] O'Neil, 2021, "Mexico Shifts Into Reverse on Electric Vehicles," *Bloomberg.Com*.
[73] SEMARNAT, 2018, "Estrategia Nacional de Movilidad Eléctrica."
[74] IEA, 2017, "International Comparison of Light-Duty Vehicle Fuel Economy 2005-2015: Ten Years of Fuel Economy Benchmarking."
[75] CEDRSSA, 2020, "Impacto Económico Del Cambio Climático En México."
[76] INECC, 2019, "Atlas Nacional de Vulnerabilidad al Cambio Climático."
[77] SEMARNAT, 2013, "Estrategia Nacional de Cambio Climático: Visión 10-20-40."
[78] See Map 5.1 in INECC, 2019, "Atlas Nacional de Vulnerabilidad al Cambio Climático."
[79] See Map 6.1 in INECC, 2019, "Atlas Nacional de Vulnerabilidad al Cambio Climático."
[80] Estrada et al., 2020, "An Analysis of Current Sustainability of Mexican Cities and Their Exposure to Climate Change," *Frontiers in Environmental Science*.
[81] Méndez, 2021, "Mantiene Sistema Cutzamala tendencia a la baja; 100% de su cuenca registra sequía," *Excélsior*.
[82] Kimmelman, 2017, "Mexico City, Parched and Sinking, Faces a Water Crisis," *The New York Times*.
[83] INECC, 2019, "Atlas Nacional de Vulnerabilidad al Cambio Climático."
[84] Instituto Nacional del Suelo Sustentable, 2020, "Política Nacional de Suelo"; See also: Ruiz-Rivera and Lucatello, 2017, "The Interplay Between Climate Change and Disaster Risk

Reduction Policy: Evidence from Mexico," *Environmental Hazards*. While Mexico gained reputation for its efforts to integrate climate change (CC) and disaster risk reduction (DRR) policies at the national and international levels, current fragmented normative frameworks and jurisdictions impede shared, coordinated actions. The institutional framework needed to integrate CC and DRR policy has yet to overcome difficulties imposed by jurisdictional fragmentation.

[85] UNEP, 2019, "Banking on Nature: A Mexican City Adapts to Climate Change," *United Nations Environment Programme* (blog).

[86] IMCO, 2020, "COVID-19: Ciudades resilientes apuestan por una movilidad competitiva."

[87] Olvera, 2020, "CdMx, MYT, Guadalajara y Puebla Abren Más Vías a Bicis Por COVID-19, Pero Aún Les Falta Protección," *SinEmbargo*.

[88] See Climate Action Tracker: https://climateactiontracker.org/countries/mexico/pledges-and-targets/.

[89] Government of Mexico, 2020, "Contribución Determinada a Nivel Nacional – México ante el cambio climático."

[90] Muñoz, 2016, "Mexico's Carbon Tax"; Altamirano and Martínez, 2017, "Mexico's 3 Big Steps Towards Comprehensive Carbon Pricing," *World Resources Institute* (blog). The carbon tax was approved in the Fiscal Reform presented by the administration of President Peña Nieto in 2013 and applied since January 2014.

[91] Ruis, 2014, "Economic Analyses to Support the Environmental Fiscal Reform." While the "approved" carbon tax measures were expected to reduce emissions by 1.61 Mt/CO_2 per year – 0.33% of Mexico's total emissions – the "proposed" measures are projected to reduce a greater total of 5.83 Mt/CO_2. See also Altamirano and Martínez, 2017, "Mexico's 3 Big Steps Towards Comprehensive Carbon Pricing," *World Resources Institute* (blog).

[92] See https://www.trabajo.cdmx.gob.mx/empleos-verdes.

[93] Center for Clean Air Policy, 2013, "Promoting Sustainable Growth in the Residential Sector: Mexico."

[94] Elizondo et al., 2017, "Mexico's Low Carbon Futures: An Integrated Assessment for Energy Planning and Climate Change Mitigation by 2050," *Futures*.

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[96] SEDATU, 2020, "Generará Sedatu 228 mil empleos directos con estrategia emergente de mejoramiento urbano," Press release 292/2020.

[97] CUT, 2019, "Climate Emergency, Urban Opportunity."

[98] 1 US$ = 20.21 Mexican pesos (MXN) as of November 19, 2020.

[99] CEFP, 2019, "Presupuesto de Gastos Fiscales 2019-2020: Análisis Institucional."

[100] IISD, 2019, "Más allá de los combustibles: Transición fiscal en México"; see also Rosas-Flores et al., 2017, "Distributional Effects of Subsidy Removal and Implementation of Carbon Taxes in Mexican Households," *Energy Economics*. Through a microsimulation analysis evaluating the distributional effects of fuel subsidies on Mexican households, the authors find that low-income households benefit less from gasoline subsidies than high-income households.

[101] IISD, 2019, "Más allá de los combustibles: Transición fiscal en México."

[102] Modelling for the Coalition by the Stockholm Environment Institute. See Annex 1 for a detailed methodology: https://urbantransitions.global/urban-opportunity/seizing-the-urban-opportunity/annexes/.

[103] See Table A1.3 in Annex 1: https://urbantransitions.global/urban-opportunity/seizing-the-urban-opportunity/annexes/.

[104] This analysis estimates global urban GHG abatement potential using a bottom-up assessment of mitigation options in urban buildings, transportation, infrastructure construction and waste management. For a detailed methodology, including assumptions and data sources, see Annex 1: https://urbantransitions.global/urban-opportunity/seizing-the-urban-opportunity/annexes/.
[105] See IEA data: https://www.iea.org/countries/mexico.
[106] See data from the national Energy Information System: http://sie.energia.gob.mx/bdiController.do?action=cuadro&cvecua=DIPS_SE_C33_ESP.
[107] See Diario Oficial de La Federación (DOF) data: https://www.dof.gob.mx/nota_detalle.php?codigo=5585823&fecha=07/02/2020.
[108] Reuters, 2019, "Mexican Oil Regulator Cancels October Auctions to Pick Pemex Partners."
[109] Zarco, 2020, "The Weekend Read: Mexico Headed for a Solar Slowdown," *PV Magazine*.
[110] Government of Mexico, 2021, "Informe Estadístico Sobre El Comportamiento de La Inversión Extranjera Directa En México (Enero-Diciembre de 2020)." COVID-19 was likely a factor, of course, but overall, DFI dropped by 11.7% – one-fifth as much as DFI in the electricity sector. Total DFI in that sector was US$1.3 billion in 2019 and US$506 million in 2020.
[111] Modelling for the Coalition by Vivid Economics. See Annex 2 for a detailed methodology: https://urbantransitions.global/urban-opportunity/seizing-the-urban-opportunity/annexes/.
[112] These estimates are indicative only, and include direct, indirect and induced jobs.
[113] These estimates of annual returns and net present value are sensitive to discount rates, energy prices, learning rates, and other factors. Job creation estimates are only indicative and include direct, indirect and induced full-time equivalent jobs. For a detailed methodology and data sources, see Annex 2: https://urbantransitions.global/urban-opportunity/seizing-the-urban-opportunity/annexes/.
[114] SEMARNAT, 2018, "Estrategia Nacional de Movilidad Eléctrica."
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[117] See Energy Policy Tracker: https://www.energypolicytracker.org/country/mexico.
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Annex 3: Global conversion of land to urban purposes

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PARTNERS

The Coalition partners listed endorse the general thrust of the arguments, findings and recommendations made in this report.*

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ENERGYUNLOCKED

European Bank for Reconstruction and Development

GLOBAL COMMISSION ON ADAPTATION

GGGI

ICLEI Local Governments for Sustainability

IKATAN AHLI PERENCANAAN INDONESIA IAP

iied International Institute for Environment and Development

ITUC CSI IGB

LSE THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

PART OF THE M2020 CAMPAIGN

#IMAGINETHEFUTURE

NYU Marron Institute of Urban Management

OECD

ODI

pwc

SIEMENS

sdi.

SEI Stockholm Environment Institute

香港科技大學 THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

清華大學 Tsinghua University

UN HABITAT FOR A BETTER URBAN FUTURE

UCLG United Cities and Local Governments

ACDI African Climate & Development Initiative

UNIVERSITY OF LEEDS

vivideconomics

WWF

*The text does not necessarily reflect the personal views or official policies of any of the contributors or their members.

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