

Highlights

OECD Regional Outlook: Addressing COVID-19 and moving to net zero greenhouse gas emissions



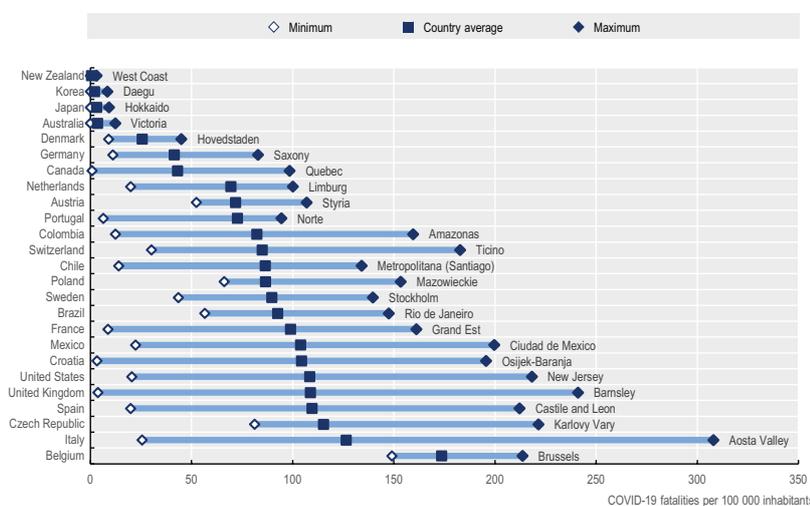
COVID-19 and climate change are both global challenges requiring local action

COVID-19 has moved across the globe with unprecedented speed, bringing much human suffering. The pandemic has highlighted that risks to the foundations of human well-being are real global threats. They can cause systemic crises, with multiple and often unexpected cascading effects on economy and society. COVID-19 has also underlined that a crisis which is global can still have effects that are territorially highly different – even within countries. As with COVID-19, the climate challenge is global, systemic, and territorially different, albeit on a larger scale and longer time horizons. And, as with the pandemic, the response needs to build on regional and local actors, natural environments, geographies and infrastructures.

The COVID-19 crisis has also revealed how intricately resilience and inclusiveness are linked. The most precarious populations are often among those most severely hit when disaster strikes. Anticipation is therefore central, and efforts to address the challenge early on protect vulnerable individuals the most. At the same time, alleviating

economic impacts in worst-hit communities and providing the resources they need to respond to the shock is particularly effective to strengthening resilience, as the system may only be as strong as the most vulnerable communities in it. Doing so can also build up trust in governments.

The experience with the COVID-19 crisis allows to draw lessons for the territorial dimensions of the climate challenge. Maybe the most important is the need for a both place-based and inclusive approach. This implies integrating climate objectives into urban and rural development agendas, as well as to make multi-level governance systems conducive for climate action at all levels of government. The origins of the pandemic also allude to the close relationship between environmental risks and human wellbeing. Addressing the climate challenge can inspire lasting transformations that make urban and rural regions more resilient. Regional policy needs to contribute to making these transitions happen.



Within-country differences in COVID 19 mortality

COVID-19 fatalities per 100,000 inhabitants, TL2 regions, as of January 2021

The epidemic has hit regions at different moments and intensity

Urban areas with high population density and links to other global cities were among the most exposed to the virus early on. They took extreme measures to reduce transmission early. In some rural areas in which the prevalence of COVID-19 was initially low, clusters led to community spread. In such situations, limited hospital capacity, as well as older and less healthy populations put rural residents at greater risk.

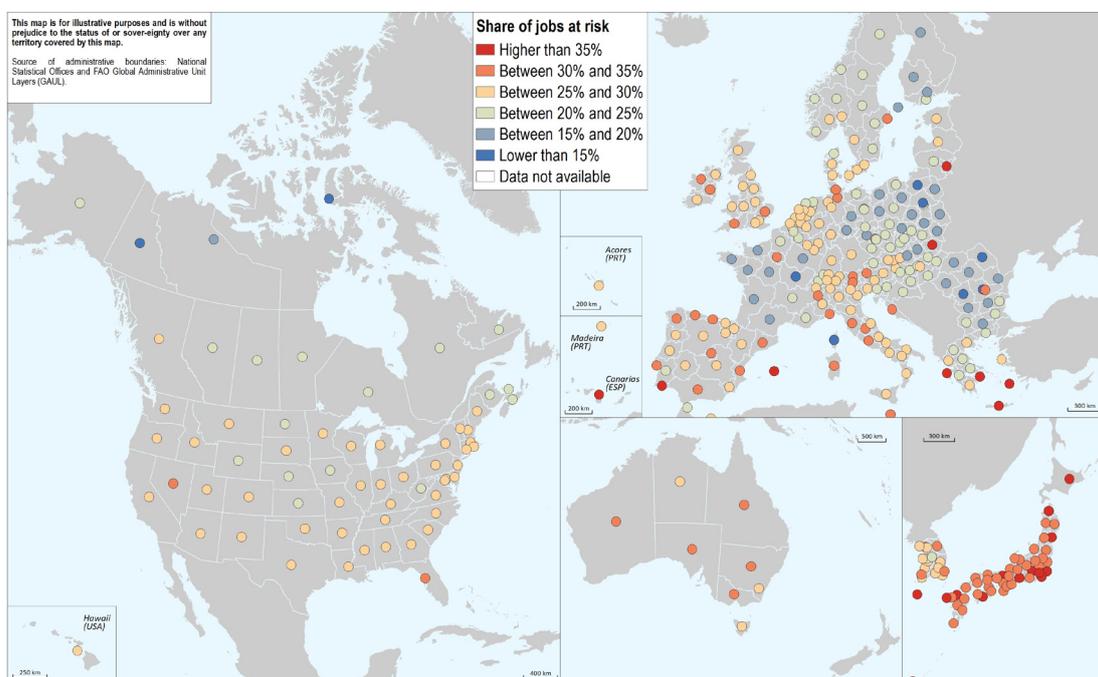
Poorer residents in crowded living and working conditions have substantially more exposure to the virus and if infected often suffer worse health outcomes. Indeed, crowded housing appears to be a primary source of COVID-19 transmission. Many residents of such neighbourhoods work in jobs that require personal contact and transmit the virus to more people at home. For example, poorer, working-class boroughs of New York City, such as the Bronx and Staten Island, had up to three times higher incidence of COVID-19 than the richer borough of Manhattan.

Economic impacts vary according to sectoral specialisation and type of employment

The economic crisis COVID-19 has triggered is the most serious and territorially diverse in decades. The social and economic impacts differ from the territorial patterns of infections or deaths. The longer and more stringent the containment measures, the bigger the impacts. The fall in travel, for example, hurt regions that depend heavily on tourism. The OECD estimates that international tourism fell by 80% in 2020.

The drop in economic activity resulted in temporary environmental improvements. CO2 emissions declined to levels of about 10 years ago in 2020. However, this one-off decline will not have a noticeable long-term impact on the climate. Air pollution also diminished and water quality improved temporarily. To address climate change while improving inclusive economic prosperity, it is necessary to decouple economic activity from greenhouse gas emissions, requiring broad and profound transformations of regional economies, the theme of Part II of this Regional Outlook.

Share of jobs potentially at risk from COVID-19 containment measures





Regions with many SMEs and workers in non-standard employment are hit worse

Economic and social impacts have varied with sectors of activity and their position in global value chains. Employment at risk may vary from less than 15% to more than 35% across 314 regions in 30 OECD and 4 non-OECD European countries in May 2020. In one of five OECD/EU regions, more than 30% of jobs are potentially at risk during a lockdown.

Regional differences in non-standard employment help explain differences in job loss. Workers in undeclared employment, on short-term contracts or own-account workers are often on low pay. Many work in the most impacted sectors, such as arts, entertainment and tourism. They disproportionately concern women and young people. Non-standard employment is not evenly spread across territories, It is more common in regions with a lower-educated workforce, higher unemployment, and a smaller share of gross value added in tradable sectors. Cultural and creative activities account from about 1 to above 5% of employment across OECD regions.

On average across OECD countries, SMEs may account for 75% of employment in the most affected sectors. 15% of working people in

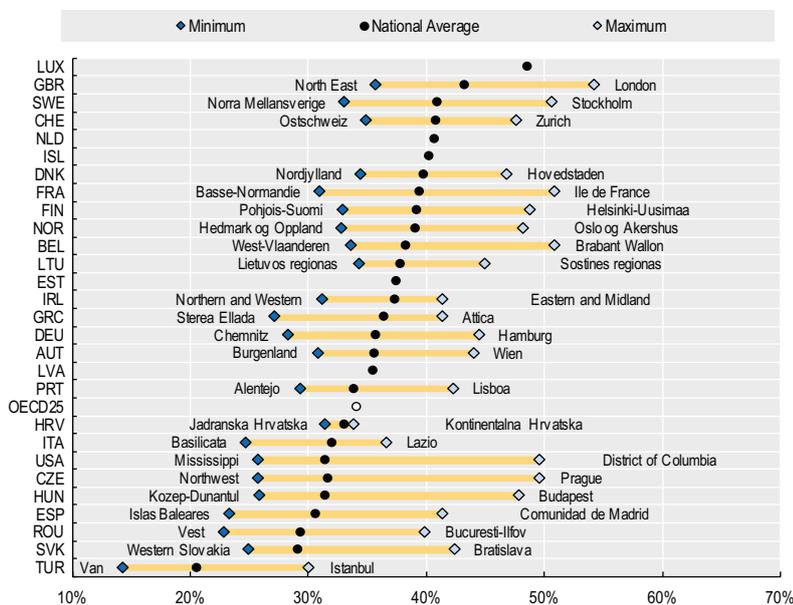
these sectors are self-employed with marked differences across regions. The way in which many of the self-employed engage with their customers, suppliers and collaborators is being uprooted.

Workers on non-standard employment and the self-employed often have less social protection. They do not always benefit from unemployment insurance or have only limited entitlements. They may not benefit from full health insurance benefits including sick pay. The high share of self-employed, freelancers and SMEs in the cultural sector creates unique challenges that general support schemes may not address.

Poor labour market outcomes, such as unemployment and low wages, can be associated with a broader range of challenges for individuals and communities, from poor mental and physical health to drug abuse to crime. Key public service provision such as education and leisure services may also diminish, impacting vulnerable low-income households and young people the most. In New York State for example, small businesses' income has remained around 40% below the pre-crisis level and employment on low wages 20%.

Telework mitigates the jobs impact in some regions

The potential for remote working is unevenly distributed. Urban areas display a nine percentage point higher share of occupations that can be performed remotely than rural areas. Differences in connectivity and available equipment might further reinforce urban-rural divides.



Remote work opportunities differ among and within countries

Share of jobs that can potentially be performed remotely (%), 2018, NUTS-1 or NUTS-2 (TL2) regions

Note: The number of jobs in each country or region that can be carried out remotely as the percentage of total jobs. Countries are ranked in descending order by the share of jobs in total employment that can be done remotely at the national level. Regions correspond to NUTS-1 or NUTS-2 regions depending on data availability. Outside European countries, regions correspond to Territorial Level 2 regions (TL2), according to the OECD Territorial Grid.

Digitalisation and automation could rapidly accelerate beyond the crisis. There is some discussion around whether increased possibilities for teleworking will lead many people to leave large cities and establish residence in smaller cities or suburban areas.

Risks are large for inclusive sustainable regional development

Estimates suggest that up to 400 million people worldwide could be pushed into extreme poverty, adding to the roughly 700 million in poverty prior to the pandemic. A large share of the new extremely poor is projected to be in South and South-East Asia and Sub-Saharan Africa.

Polarised labour markets and segregated housing have reinforced strong divides caused by COVID-19. High-skilled workers

with relatively secure jobs may make the most of telework opportunities in comfortable housing while low-skilled workers in face-to-serve service and retail jobs are subject to higher risks. This includes a higher incidence of mental illnesses, notably depression, to which vulnerable groups are more sensitive. This may be compounded by unequal access to health services, ICT access as well as IT based education during lockdowns, which also risks reinforcing the intergenerational transmission of inequality to education outcomes and future job opportunities for young people. Women, who are overrepresented in service sectors (e.g. tourism, hotels, restaurants) that rely on contact with customers, are more likely to be negatively affected by the economic downturn. The elderly, many of whom live alone, are most affected by physical distancing.

The COVID-19 crisis highlights the need for place-based inclusive and preventive policies

Governments at all levels have taken unprecedented actions to contain the spread of COVID-19 and mitigate the large economic impacts on people and firms. Local and regional actors play an increasingly important role. The regionally differentiated impacts call for a territorial approach to policy responses on the health, economic, social, fiscal fronts, and for strong inter-governmental coordination. Preventive, anticipative action minimises major adverse impacts on health, wellbeing and the economy.

This requires partnerships across government, mobilising and coordinating multiple policy areas. Effective central-government level leadership needs to set the strategy and guidelines. Bottom-up approaches have produced innovative ways to deal with the crisis and can help build up trust. Clear responsibilities and well-resourced subnational governments facilitate such partnerships.

As policy-makers realised the need for a place-based approach from summer 2020, targeted localised lockdowns lowered the costs of lockdowns. Countries and regions which have incorporated previous experience in health crisis management were better prepared to coordinate actions. This can also be source of learning for others. Early and preventive action, as adopted in Korea, limited the severity of health and economic impacts, thereby also preventing much of the risks for inequality. In view of the bigger health and economic impacts on vulnerable

groups, efforts to halt the pandemic need to be combined with support to disadvantaged areas.

Hardest-hit regions and cities may face the biggest loss in revenues and the biggest increase in spending. Without concerted action, this could derail rebuilding efforts in the regions hit the most. Therefore, as national emergency supports such as broad short-time work schemes are phased out, place-based support for poor and worst-affected households, firms and workers will become more important. This will require reviewing financial frameworks, analysing and responding to shortcomings in fiscal equalisation schemes and strengthening expenditure and revenue effectiveness. Recovery stimulus spending needs to become consistent with addressing climate change.

Post-crisis efforts can be turned into an opportunity to improve people's lives and address upcoming challenges. Societies have shown they are willing to act to overcome the COVID-19 crisis. This can inspire cities and regions to engage lasting transformations to address the climate challenge. National, regional and local governments need to deploy investments and resources to recover from the pandemic in a way that is consistent with these transformations. Overall this is not yet the case.



The climate challenge also requires place-based, inclusive and early action

Reaching the objectives of the Paris Agreement will prevent major threats to the foundations of human wellbeing. These threats are substantially worse with 2 degrees Celsius global warming than with 1.5 degree warming. Key risks from 2 degrees and above include world-wide food shortages, high risks of water scarcity in dryland regions and large-scale wildfires. Most OECD countries have therefore set net zero targets for their domestic greenhouse gas (GHG) emissions by 2050. While the challenge is global, the actions it requires depends on local contexts. The three pillars of climate mitigation action – energy, land use, urban policy -- are at the heart of regional development.

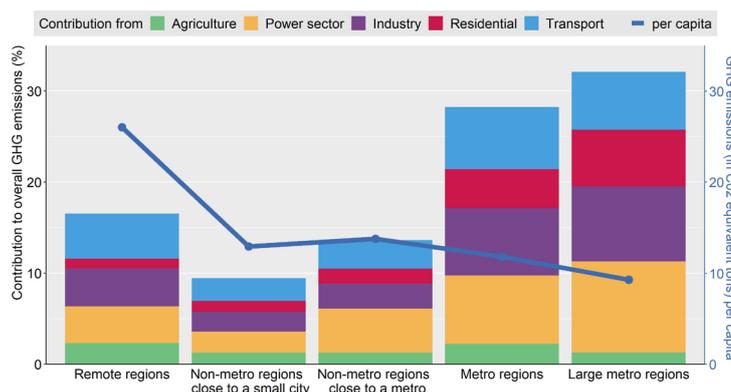
Deep transformations of economic systems of unprecedented breadth over a short period of time are needed. Even so, cost may amount up to only 1-2% of GDP until 2050 in fossil-fuel importing countries. And in many regions, wellbeing benefits, beyond the climate benefits, may more than offset the cost. Moreover, unlike the climate benefits, they often arise locally and in the near term. Hence, rural and urban regions are central to get climate action done and harness multiple non-climate wellbeing benefits and help minimise trade-offs, costs and vulnerabilities. Costs are uneven across regions though. Delayed action raises these costs to cities and regions in the form of wasted investment in long-lived capital goods and infrastructure not aligned with the net-zero emission objective.

Greenhouse gas emissions vary hugely across territories and degree of rurality

Variation in estimated emissions per capita is much larger within countries than between countries. Regions will therefore have different transition pathways. While metropolitan regions across OECD countries combined contribute the most (about 60%) to total GHG emissions, rural regions' emissions are higher per capita. Power supply and energy-intensive industry are capital intensive and their capital goods are often long lived. Therefore, regions with much emissions-intensive activity may be subject to particularly large risk of economic losses if they continue investing in them.

Metropolitan regions emit the most greenhouse gas emissions, while production-based emissions per capita are highest in remote regions

Contribution to GHG emissions (bars) and GHG emissions per capita (line) by type of region, 2018



Note: OECD countries, Romania and Bulgaria. Greenhouse gas emissions excluding emissions from land use and land use change.

Regions need to move more decisively away from coal to renewables

Regions need to move particularly fast to a zero-carbon electricity mix. In this way electrifying energy end-use, such as in passenger transport, eliminates emissions cost-effectively. Yet, the transition to zero-carbon electricity production remains regionally unequal. Many regions are still far off near-term benchmarks for meeting the Paris Agreement temperature goals. For net-zero emission objectives by 2050, the phase-out of coal should be completed by 2031 for cost effective climate mitigation.

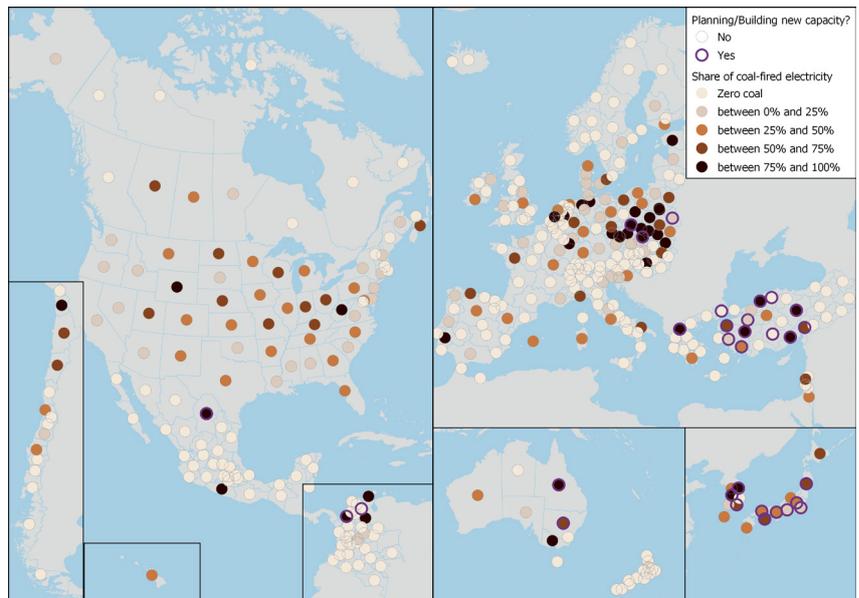
Japan, Korea, Australia, Turkey, Poland, Colombia and Greece still have regions where coal-fired power plants are planned. Since the average lifespan of a coal power plant is 40 years, adding



capacity exposes these regions to lost investment. Continued coal use can have additional negative impacts for the coal-using and neighbouring regions, in terms of air and land pollution, risks for biodiversity and competing use of water, which will become scarcer with increasing heat waves in many regions.

Most OECD regions, especially in the Americas, are no longer adding or planning to add new coal-fired electricity capacity

Shares of coal-fired electricity generation in large regions (TL2), 2017, and whether that region still has new coal-fired electricity capacity planned* (last updated in October 2020)



Note: * New planned capacity is defined as new capacity announced, pre-permit, permit or in construction.

Some regions with intensive coal use have a much lower GDP per capita than their national average and need support not to be left behind.

The generation of wind-based power is especially skewed toward the most rural regions. Non-metropolitan regions also contribute a bigger share to solar electricity generation than to total electricity. With utility-scale solar photovoltaic installations continuing to produce electricity at a lower cost than rooftop, the strength of solar electricity in non-metropolitan regions may continue. This contrasts with the spatial distribution of nuclear or fossil-fuel-based electricity.



To align with the Paris Agreement, average shares in OECD countries will need to increase to 8% and 14% by 2025 and to 20% and 30% by 2040 respectively for solar and wind. Currently, 73% of small regions (TL3) have smaller shares than the 2025 benchmark for both. Of course, regional expansion of renewables will depend on their natural potentials, which are shown in the online country notes to this Regional Outlook.

Electric cars, public transport and active mobility need to grow rapidly

A cost-effective date for phasing out the sale of new internal combustion engine cars is 2030. With an average useful life of 15 years, that would be well on time for reaching net zero emissions in 2050. The roll-out of charging infrastructure is key. Currently, electric vehicles are most common in medium-sized metropolitan and remote rural regions. In Korea, Jeju's share grew faster because its regional government expanded public charging infrastructure and offered additional incentives. Regions that are more rural tend to be more car dependent. However, the low operating cost of electric cars can make their phase-in attractive, provided the switch-over is early enough to prevent dropping prices of used cars in second-hand markets.

Additional to electrifying transport, mobility should move from cars towards public transport and active mobility. Such a shift can ease the transition by reducing energy demand as well as infrastructure and material needs related to electrification, car and battery production. It can also provide more wellbeing benefits from reduced congestion, air and noise pollution, increased safety and public space, as well as provide substantial health benefits specifically from active mobility.

Public transport performance tends to be higher in the large capital cities, and often also in richer cities. This suggests national policies are needed the most in the poorest cities to improve public transport. Additionally, regions and cities need to engage with the decarbonisation of road freight. This includes better logistics and new technologies as well as to shift to multimodal transport, especially in road freight hub regions, such as Barcelona, Madrid and Valencia in Spain, Västergötlands län in Sweden and Hamburg in Germany.

Wellbeing co-benefits of climate action can drive regional climate action

Policies towards net-zero greenhouse gas emissions can bring many regional benefits beyond halting climate change. Air pollution is among the greatest environmental health threats across the world. This is particularly true for cities. Pure air is also a source of health resilience. Air pollution contributes to the airborne transmission of SARS-CoV-2 and to a higher risk of mortality due to COVID-19.

A large majority of the population in OECD regions and cities is exposed to small particle pollution above the WHO-recommended threshold and virtually all population in the enhanced engagement countries. In most OECD countries, all large regions have at least 25% of population exposed to pollution above this threshold. Regions with higher pollution levels tend to have a lower average life satisfaction compared to their country's average.

Moving towards zero CO₂ emissions will reduce most air pollution. There is a range of other co-benefits from a zero emissions transition, some hard to quantify. They include reduced noise pollution, reduced traffic congestion, healthier diets, enhanced health due to increased active mobility, health benefits through thermal insulation, and improved water, soil and biodiversity protection.

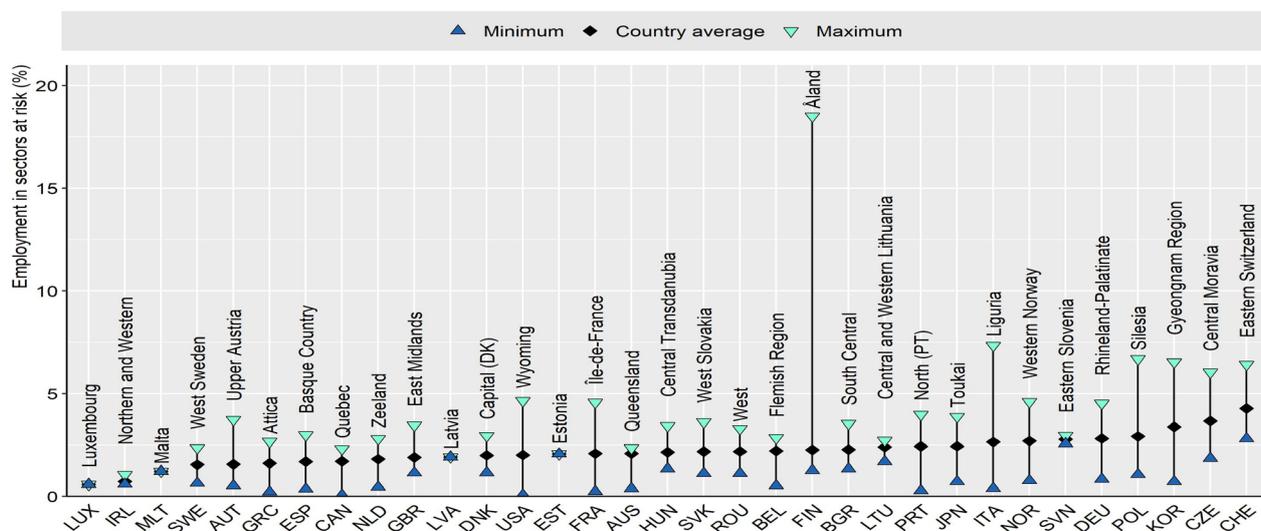
Employment risk from the net zero transition appear limited

The transition to net-zero emissions will bring some economic restructuring, though much less than digitalisation, for example. The employment loss risks are on average modest in comparison to past sectoral job reallocation. Although some regions in Switzerland, Czech Republic, Korea, Poland and Germany might be hit slightly harder, few countries have large regions with more than 5% of employment in sectors which on average are most at risk of some

employment loss. However, job losses may be concentrated within large regions. The region with the highest risk of employment losses do not generally appear to be regions with lower life satisfaction or income nor do they significantly differ in terms of long-term unemployment rates or poverty risk. However, some of these regions do have higher poverty risks and higher long-term unemployment and require particular policy attention.

Few countries have regions with over 5% of employment in sectors at risk of employment losses due to the net zero carbon transition

Share of employment in sectors with employment at risk, large regions (TL2), 2017



Place-based adaptation needs to complement decisive mitigation

Adaptation is key to protect human livelihoods and ecosystems. Adaptation can reduce climate risk more effectively under 1.5°C than under 2°C warming, so is a complement to strong emission reduction policies. Adaptation can also generate additional benefits, including leisure benefits of nature.

Marginalised and poor people bear the highest costs of damage relative to income and are at higher risk to hazards. Elderly people, women, and people with less education are more vulnerable to increased temperature variation. For example, climate change raises relative land prices in more protected areas, making them less accessible to the

poor. Rising poverty may reduce political power of the poor and their representation in adaptation decisions.

Limiting adaptation to physical assets would lose track of well-being among poor people. Regional convergence of income, access to basic services such as health services and good social income protection diminish the impact of climate change on poverty substantially. A broad definition should encompass physical, social- and knowledge infrastructure. Local social networks contribute to knowledge on exposures, vulnerable people and infrastructures, complementing scientific knowledge, and increase communities' willingness to participate in climate policy.

Multilevel governance and finance need to integrate the climate challenge

Local and regional governments have jurisdiction over crucial sectors for climate action, including buildings and parts of transportation, other local infrastructure and waste management. Almost all decisions taken by local authorities affect GHG emissions directly or indirectly, including construction work, spatial planning, and their economic policies.

Reaching national net-zero emissions by 2050 requires multi-level governance across regions and upscaling climate finance. Multi-

level climate governance systems need to identify goals for government levels and regions, for example, for the zero-emission consistent refurbishment of all buildings before 2050. Some goals may be region-specific, for example, the growing of forests. This also means moving from a patchwork of individual local policies to developing an integrated approach. Integrating scientific advice, along with governments, parliaments and the public, into climate governance has proven to improve the success of climate policy.

Subnational governments should make full use of all financing sources

Subnational government spending has accounted for 55% of public spending and 64% of public investment in sectors with impact on the environment, including climate change. Subnational governments are important to make sure stimulus investment plans to recover COVID-19 pandemic are consistent with the transition to net zero GHG emissions by 2050. Infrastructure investment will have to be different to be net-zero-emission consistent than it has been so far and there will need to be more of it. There are several sources of subnational government revenue that could help finance the net-zero transition:

- Making the most of grants and subsidies to deliver on climate objectives: Grants and subsidies to subnational governments represent around 37% of revenue in OECD countries. Transfers need to be linked to climate policy goals, so subnational
- governments have the incentives and resources to make all their policy action consistent with reaching net-zero emissions.
- Reviewing own revenues and spending for its consistency with the net-zero transition: Subnational green budgeting and green public procurement can improve the consistency of revenue and spending systems with environmental objectives and eliminate environmentally harmful subsidies. For example, the property tax on land and buildings and land value capture mechanisms can be designed to avoid urban sprawl and favour the development of urban cores and transport linkages.
- Borrowing frameworks should be adapted to integrate environmental sustainability, making room for well-targeted investment serving the net-zero emission transition.

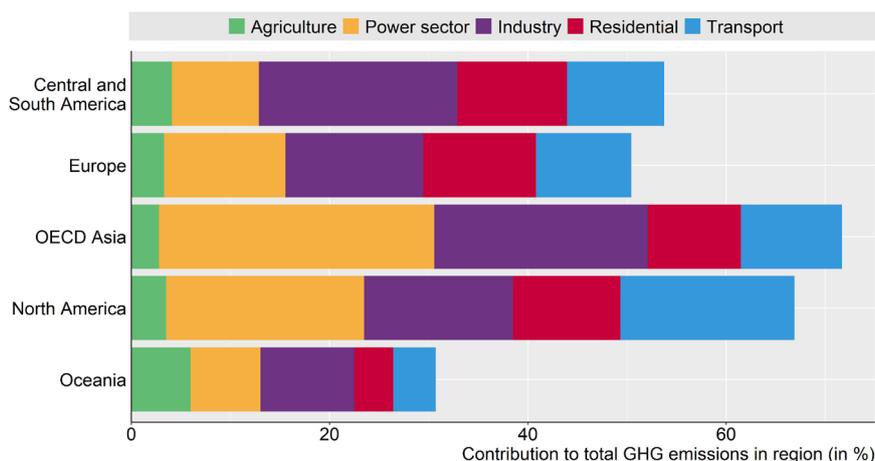
Cities require major rapid and lasting transformations

Metropolitan regions account for more than 60% of production-based GHG emissions in OECD countries. Their contribution is particularly large in OECD-Asia and North America. CO₂ emissions predominate in cities. CO₂ emissions need to move to net zero several years before the total of GHG emissions and become net negative by 2050. Moving ahead early will save unnecessary costs, avoiding wasting money on transition-inconsistent investment. It can also help solve other problems in urban life and thereby provide competitive gains.

Cities need metropolitan governance to coordinate policies throughout the municipalities which belong to commuting areas. This enables them to decarbonise urban planning, transport and housing effectively, while improving accessibility of jobs and services, reducing air pollution and congestion. National urban policies can coordinate sectoral policies, for example to better connect new housing to jobs. Support networks of cities and their metropolitan areas bring more structured learning.

Metropolitan regions contribute the most to greenhouse gas emissions in OECD Asia and North America

Contribution of metropolitan regions to total production-based GHG emissions by macro-region, 2018



Preparing the net-negative-emissions city by 2050

Cities hold large untapped potentials for modular technologies to integrate solar rooftop photovoltaic panels (PVs), small-scale wind turbines and heat pumps. These distributed energy systems require coordination within the overall electricity system but cities can influence uptake. For example, low-income households may not invest in these technologies and there is a risk that subsidies are regressive. Therefore,

it is important to engage with the local communities.

Cities can also facilitate decarbonisation of buildings through engagement with developers and regulators based on passive heating and cooling. Green urban designs, such as hanging gardens, green roofs and urban food production contribute to climate mitigation, damp heat waves and protect freshwater.

Transport is a large and still growing contributor to CO₂ emissions. In cities, more than a shift to electric vehicles is required. Cycling and walking connects people, jobs and facilities at low cost to city governments and users, while providing large health benefits. Provided it replaces individual car use, digital-based, on-demand ride sharing can sharply lower CO₂ emissions while limiting energy consumption, materials and infrastructure needs. It also frees expensive urban space and improves connectivity and accessibility, especially for low-income households and households in suburban areas, who are often less well connected to public transport.

More diverse soft and shared transport offers would also allow more options to cope with COVID-19 without individual car use. Road use charges are needed as a complement, to avoid that mobility options increase transport demand, for example, through urban sprawl, and to replace fuel taxes, set to disappear.

Circular economy policies can reduce emissions from the consumption of goods and services in high-income cities

In high-income cities, the greenhouse gas emissions inherent to the consumption of goods and services are typically much higher than the emissions these cities generate locally. This is because their residents, firms and public administrations consume many goods produced elsewhere.

Cities have low cost options to reduce consumption-based emissions. Policies to lower consumption-based emissions also offer the advantage that they do not result in displacement of production. However, they may only contribute to national net zero emission targets if the goods and services consumed are produced in the same country. The adoption of a circular economy framework in building materials and eliminating food waste, for example, can help accelerate the transition at lower cost.

Rural regions are pivotal for their natural endowments

Rural regions cover 80% of OECD land and are home to 30% of the OECD population. Rural land hosts eco-system services that produce clean air, clear water and are the basis of food production. These ecosystem services need protection and expansion. Trees and wetlands for example sequester the equivalent of one third of global emissions.

Rural land is also essential for renewable energy production from wind, water and biomass. Agriculture and forestry are responsible for around 25% of global GHG emissions (including emissions from land use and land use change) with much variation across regions. Afforestation,

reforestation, bioenergy use are some of the key contributions to net zero emissions from rural regions.

Decisions on land-use are still largely defined by short term production objectives. Regional governments have an important role to play in integrating social, economic and ecological impacts. Spatial development plans can identify areas for land use improvement, attaching weights to environmental services and social considerations. They should also integrate climate adaptation. Heat waves and drought will become common in many regions where they have not been so far.

Payment schemes for ecosystem services (PES) can mitigate climate change and offer potential for rural development. They are most likely to be effective in intensive farming and if they are outcome-oriented (OECD, 2020). Redirecting subsidies for agriculture in this way would also remove environmentally harmful subsidies. These actions need to be scaled to reach net zero greenhouse gas

emission objectives for 2050. Options with the highest potential include afforestation, conversion of cropland to grassland and reduced tilling.

Rural regions need to take a more active role in the energy and industrial transition

For rural populations to benefit more from renewables potentials, rural community and participation in benefits and decision-making is important. Trust has been highlighted as one of the most important factors needed to gain the acceptance of renewables deployment. The state of North Rhine-Westphalia (Germany) for instance has set up state-wind energy dialogues and mediation on local renewable energy projects.

Rural regions with more intensive car use can benefit from the low operating cost of electric cars but must prepare the transition with infrastructure, smartly connected to the variable low-cost production of wind and solar electricity. In rural regions with strong renewables potentials, hydrogen production, processing and use can make a contribution to sectors that are otherwise difficult to decarbonise, notably in industry and heavy road transport.



Smart specialisation can help leave no region behind

The net-zero emissions transition will destroy some jobs and create many others. The job reallocations it generates are smaller than those from digitalisation but are locally concentrated. Regions facing job losses in the net-zero-emission transition need to attract new economic activity that is consistent with this transition. Regions with the highest shares of population employed in coal mining tend to have a lower per capita GDP compared to the national average. Unlike previous shocks, the net-zero emission transition allows to identify economic activities that are likely to suffer employment losses or substantial transformations in advance. This provides an opportunity to prepare.

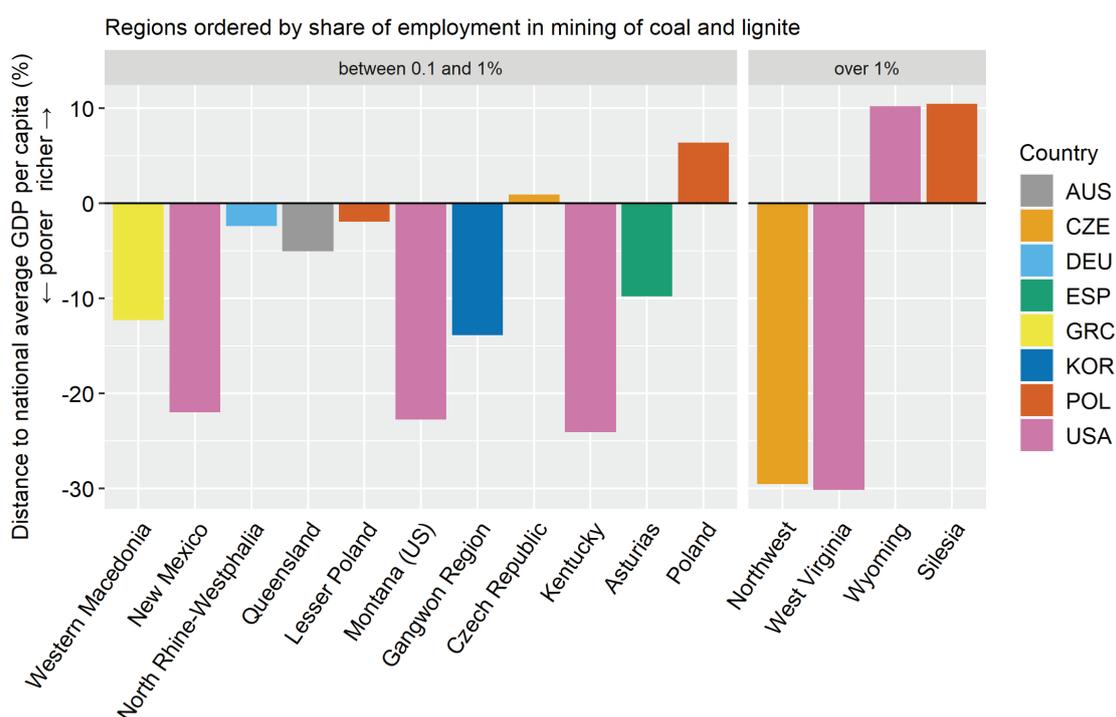
Place-based innovation policies can identify new sustainable activities that can connect to established local businesses and workers. Doing so in a way that harnesses skills and assets rooted in these regions, including those inherited from industries that are set to disappear in the transition, can help

avoid protracted regional decline, often characterised by self-reinforcing emigration of businesses and workers.

Early stakeholder involvement is key. Building consensus around future specialisations can help, building on higher education institutions, innovative businesses, regional and local governments and civil society. Their knowledge is however often fragmented over sites and organisations. A range of tools can help these regions to foster collaboration, such as advisory boards and public-private committees. Successful industrial transformation needs to rest on local actors. They need to link local capacities to global scientific, technological and economic trends. Governments can tailor local employment services accordingly. Prompt remediation and restoration of contaminated sites support ecological redevelopment as well as economic development on brownfield sites.

Regions with the highest shares of population employed in coal mining tend to have a lower per capita GDP compared to the national average

Relative difference to country means, large regions (TL2)



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