



OECD work in support of climate action

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For further information:

oe.cd/climate-action



OECD work in support of climate action

The urgency and scale of the climate challenge is clear, reinforced by the recent IPCC Special Report on Global Warming of 1.5°C (IPCC, 2018). Achieving the goals of the 2015 Paris Agreement requires unprecedentedly rapid economic, social and technological transformations to steer countries onto low-emissions, climate-resilient development pathways that are consistent with keeping the global average temperature increase well-below 2°C above pre-industrial levels, and pursuing efforts to limit it to 1.5°C.

The vast majority of countries are taking action, but aggregate efforts to reduce greenhouse gas (GHG) emissions set out in countries' Nationally Determined Contributions are not sufficient. Future infrastructure investment decisions are crucial, but recent OECD analysis shows that while decarbonisation is underway, infrastructure being built today is not compatible with a well-below 2°C future. We are at risk of locking the world into an emissions-intensive development pathway, or creating stranded fossil-fuel assets on a massive scale. In parallel, the devastating effects of climate change and weather extremes are becoming ever more visible, exposing the lack of resilience in many of our societies to such far-reaching change. Climate action and support for such action in developing countries need to be scaled up urgently.

The OECD is playing an active role. As well as supporting the international climate negotiations over many years, the OECD has increased its efforts to help countries to deliver on their national and international climate commitments and contributions. OECD work focuses on the environmental, economic, financial and social dimensions that are critical to the creation of low-emissions, climate-resilient development pathways. Examples, which are detailed further in this brochure, include:

- Integrating the climate and wider sustainable development agendas
- Operationalising and implementing the Paris Agreement
- Tracking climate finance
- Designing more effective and efficient climate policies
- Aligning policy, financial and planning frameworks with climate and other environmental and well-being goals
- Strengthening the adaptive capacity of our societies
- Enhancing finance and investment in low-carbon, resilient infrastructure
- Promoting a just low-carbon transition, including in cities.

“Strong climate action is not a threat to, but the foundation of, our future economic well-being”.

Angel Gurría – OECD Secretary-General

Climate action and the economy

Meeting climate objectives and achieving sustainable economic growth are critical to enhancing societal and economic resilience, improving productivity and – in parallel with other policy reforms – reducing inequalities. Chronic underinvestment has left its mark on infrastructure and productivity growth has slowed down in many economies. Global trade growth has been stalling and inequality is increasing.

The urgency, scale and speed of the required economic transformation are unprecedented, and infrastructure choices made over the next few years will be crucial. Yet the national plans put forward for the Paris Agreement are collectively insufficient to meet the global goals that have been agreed. This disconnect is in part due to concerns over the implications of climate action for economic growth and development. But it is a continuation of fossil-intensive development pathways which puts at risk our future well-being and that of the natural systems we depend on.

Pro-growth reform measures, combined with measures to mobilise investment in low-emission and climate-resilient infrastructure, can spur growth and improve well-being in the short-term while also accelerating progress towards climate goals. Rather than adding to economic challenges, decisive climate action should form an integral part of economic development plans.

A decisive transition can deliver economic well-being and a low-emissions, climate-resilient future

The OECD report *Investing in Climate, Investing in Growth* shows how governments can not only build strong economic growth but also limit future climate damages if they collectively act for a “decisive transition” towards low-carbon, resilient economies. This requires combining climate-consistent, growth-enhancing policies with well-aligned policy packages for mobilising investment in low-carbon, climate-resilient infrastructures and technologies. OECD modelling work presented in this report suggests that such a “decisive transition” to a



Transitioning to a low-carbon economy later on will be costly with a 2% GDP loss if climate action is delayed until 2025.

well-below 2°C future is compatible with continued economic development. The benefits of combined growth and climate policies more than offset the impact of higher energy prices, tighter regulations, and stranded high-carbon assets. The overall macroeconomic benefits of the modelled policy package also include substantial reductions in most countries’ public debt-to-GDP ratios.

Delaying climate action will increase costs

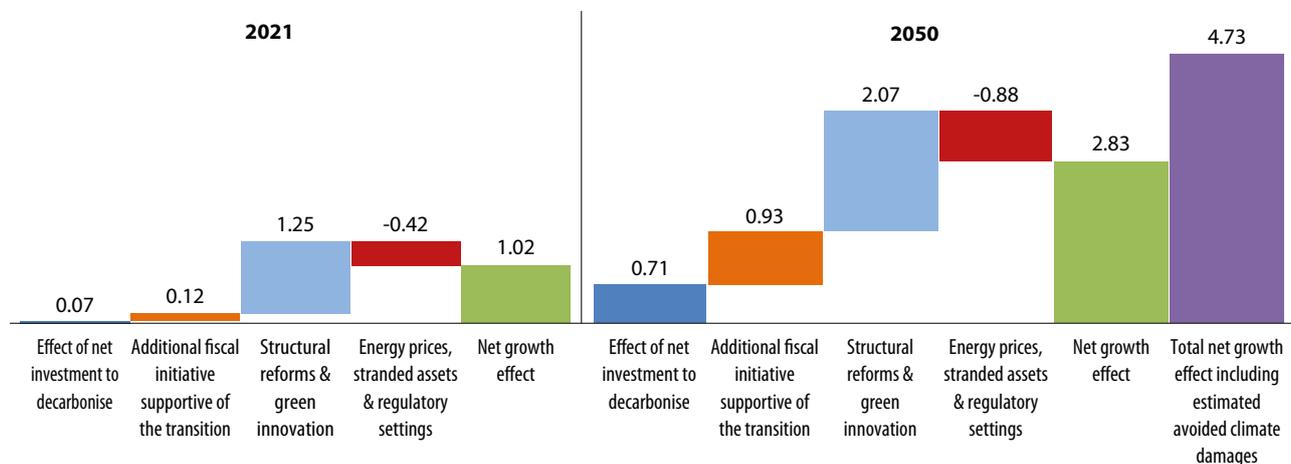
There are also significant costs associated with delaying action to reduce emissions. If more stringent policies were introduced later they would affect a larger stock of high-carbon infrastructure built in the intervening years, leading to higher levels of stranded assets across the economy.

Investment in modern, smart and clean infrastructure in the next decade is hence a critical factor for the low-carbon transition and sustainable economic growth. *Investing in Climate, Investing in Growth* estimates that USD 6.3 trillion of investment in infrastructure will be required annually on average between 2016 and 2030 to meet global development needs. An additional USD 0.6 trillion a year over the same period would make these investments compatible with a well-below 2°C goal, a relatively small increase considering the short and long-term gains in terms of growth, productivity and well-being.

OECD *Economic Surveys* address climate challenges and a number of Surveys (e.g. Japan, India, Mexico) have

Positive growth effects for the G20 by combining climate action with economic reforms in a decisive transition (50% probability of achieving 2°C)

Average across G20, GDP difference to baseline, %



Source: OECD (2017), *Investing in Climate, Investing in Growth*, <http://dx.doi.org/10.1787/9789264273528-en>.

encouraged countries to integrate more ambitious climate policy in economic policy making. In addition, several Surveys (e.g. Sweden, Luxembourg, Switzerland) point out that climate change and climate change mitigation can generate new financial risks and opportunities for investors. They call on governments to strengthen climate-related risk disclosure, especially for financial intermediaries.

Clean Power for a Cool Planet: Electricity Infrastructure Plans and the Paris Agreement (2018) sheds light on the extent to which current electricity generation projects under construction at the global level are inconsistent with what a low-carbon transition requires. The paper also explores the challenges and opportunities for governments to shift away from fossil fuel energy sources, and the role governments could play to accelerate the low-carbon transition.

Moving to a transformational agenda for climate action

Current infrastructure investment and financial flows are insufficient and remain poorly aligned with climate and sustainable development goals. The report *Financing Climate Futures: Rethinking Infrastructure* provides guidance for countries to move beyond an incremental approach to financing low-emission, resilient infrastructure systems towards the transformational agenda needed for decisive climate action.

The initiative, supported by the German Government, stems from the 2017 G20 Hamburg Climate and Energy Action Plan, which called on the OECD, World Bank Group and UN Environment, to “compile ongoing public and private activities within the G20 for making financial flows consistent with the Paris goals and, building on this, to analyse potential opportunities for strengthening these efforts”.

Financing Climate Futures highlights six transformative areas and twenty key actions that are key to aligning financial flows with climate and development goals.

The six transformative areas are:

- Plan sustainable and resilient infrastructure for a low-emission and resilient future;
- Unleash innovation to accelerate the transition to low-emissions technologies, business models and services;
- Ensure fiscal sustainability for a low-emission, resilient future;
- Reset the financial system in line with long-term climate risks and opportunities;
- Rethink development finance for climate; and
- Empower city governments to build low-emission and resilient urban societies.

Climate change mitigation through a well-being lens

Efforts to mitigate climate change are likely to be more successful and less costly when climate action and broader efforts towards human well-being and sustainable development are mutually supportive. On the one hand, action in non-climate policy areas should, wherever and to the maximum extent possible, support and not undermine climate change mitigation goals. On the other hand, climate change mitigation will be more attractive if it also meets other important societal goals, such as clean air and improvements in health, improved access through integrated public transport infrastructure, or energy access through distributed renewable energy generation. These non-climate benefits will often be realised on a shorter timescale than the longer-term benefits of mitigation, thus countering to some extent the challenges associated with the up-front costs of the low-carbon transition and the short-termism pervasive in decision making at a range of levels, from individuals to governments.

The report *Accelerating Climate Action: Refocusing Policies through a Well-being Lens* offers a new rationale for action centred on peoples' well-being that could enable countries to garner and catalyse support for mitigation domestically. Part 1 of the report elucidates how inaction on mitigation will harm current and future well-being across sectors (electricity, heavy industry, residential, surface transport and agriculture). It highlights that the attainment of the SDGs – whether gender equality, education for all, or biodiversity – depends on a stable climate. The report provides guidance on how to drive policy action in five key sectors that achieves multiple priorities, underscoring the opportunity to enhance climate action by focusing on a broader set of well-being dimensions. Each chapter includes a set of indicators to help countries track the impacts of mitigation on well-being across sectors. Part 2 of the report will be released in early 2020, and will detail how to better design climate policies to foster well-being and attenuate any trade-offs.

A just transition

The transition to low-emissions, resilient economies will affect everyone, from central and local governments to the private sector, as well as the labour force and

citizens, whose diverse interests and influence will come into play. Creating opportunities for workers most affected by the low-carbon transition will be essential. The aggregate effect of the transition on jobs may be modest, but reallocation across sectors and activities will be necessary.

The OECD's 2018 *Green Growth and Sustainable Development Forum* focussed on the theme of "Inclusive Solutions for the Green Transition: Competitiveness, jobs/skills and social dimensions". The conference addressed the political economy of green and low-carbon policy reforms, discussing their distributional impacts, and exploring inclusive solutions for households, workers, sectors and regions that may otherwise be hit hard by the transition. The 2019 Forum will examine how a shift to a circular and low-carbon economy will affect the extractive and heavy industries and society as a whole.

The OECD is implementing a project to develop recommendations for improving regional development outcomes for regions and cities specialised in mining and extractive industries, including through a just transition.

KEY PUBLICATIONS

OECD (2018), *Clean power for a cool planet: Electricity infrastructure plans and the Paris Agreement*, www.oecd-ilibrary.org/environment/oecd-environment-working-papers_19970900.

OECD (2017), *Investing in Climate, Investing in Growth*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264273528-en>.

OECD/The World Bank/UNEP (2018), *Financing Climate Futures: Rethinking Infrastructure*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264308114-en>.

KEY WEBSITES

Financing Climate Futures

– www.oecd.org/environment/cc/climate-futures/

2018 GGSD Forum "Inclusive Solutions for the Green Transition"

– www.oecd.org/greengrowth/ggsd-2018/

OECD work on climate change – <http://oe.cd/climate-action>

#ClimateAction: 25 actions to get us back on track by 2025

– <http://oe.cd/climate25>

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In the 2015 report *Climate Finance in 2013-14 and the USD 100 billion Goal*, public and private finance mobilised by developed countries for climate action in developing countries was estimated at USD 62 billion in 2014, up from USD 52 billion in 2013.

International climate negotiations

Operationalising and implementing the Paris Agreement

The Paris Agreement, which was adopted at COP21 and entered into force earlier than expected, provides both Parties and non-Party stakeholders greater impetus to act on climate change. In 2018, the Katowice Climate Package was adopted providing details on rules and guidelines for a number of items necessary for operationalising the Agreement. These items included an enhanced transparency framework, accounting for the progress towards and achievement of Nationally Determined Contributions (NDCs), and the Global Stocktake, a periodic review of collective progress towards achieving the long-term goals under the Paris Agreement. Parties made progress in negotiations on many aspects of the draft rules for Article 6 of the Paris Agreement (market and non-market approaches), but did not ultimately reach an overall consensus. At COP25, in Madrid, Spain, Parties will strive to achieve an outcome on Article 6, and finalise the rulebook under which the Paris Agreement will operate.

The OECD-IEA Climate Change Expert Group (CCXG) is engaging with Parties and non-Party stakeholders to improve the understanding of methodological and procedural elements arising from the Paris Agreement. In these areas, the CCXG is undertaking analytical work to identify gaps, draw lessons from existing practice and present options for future arrangements. The CCXG

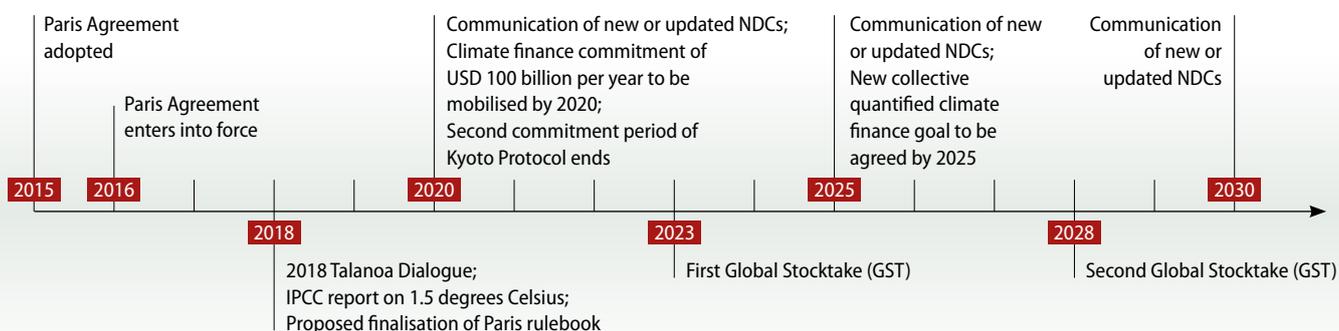
provides a neutral, non-negotiating platform for experts from a wide range of countries and other organisations to facilitate a dialogue and improve understanding around the technical issues feeding into the UNFCCC process. It has an excellent track record of providing technical input, which has positively contributed to the negotiation process.

Tracking public and private climate finance

Tracking climate finance is key to building trust and accountability in the international efforts to address climate change. Tracking can further inform the effective design of public interventions to mobilise finance for climate action, including in the broader context of making financial flows consistent with climate objectives as stated in Article 2.1 c of the Paris Agreement. The OECD is working to help address these issues based on its established expertise in tracking public and private climate finance.

The Creditor Reporting System (CRS) of the OECD Development Assistance Committee (DAC) provides a robust system for monitoring climate-related development finance provided by its members, a few non-DAC members and climate-specific funds and programmes. Since 2013, seven multilateral development banks (MDBs) have provided project-level data on their climate-related development finance for the CRS. The CRS provides consolidated activity-level data for bilateral and multilateral climate-related development finance via the so-called “Rio markers”, which are considered descriptive rather than strictly quantitative. Many OECD DAC members use this data as a starting point for their financial reporting to the UNFCCC.

Timeline of key events related to climate negotiations



The OECD DAC and Research Collaborative on Tracking Finance for Climate Action, in co-operation with public finance providers, have made significant progress on developing methods and collecting data for measuring the mobilisation of private finance by public climate finance. Data collection by the OECD is now institutionalised within the DAC statistical system. These developments have in particular contributed to

OECD analysis of progress made by developed countries towards the goal of mobilising USD 100 billion a year by 2020 for climate action in developing countries.

Estimating the effects of public capacity building and policy interventions on private finance is more challenging. Further work is being conducted in this area for identifying suitable methodologies and possible reporting formats.

KEY PUBLICATIONS

OECD-IEA Climate Change Expert Group (CCXG)

Lo Re, L., Ellis, J., Vaidyula, M. and A. Prag (2019), "Designing the Article 6.4 mechanism: Assessing selected baseline approaches and their implications", *OECD/IEA Climate Change Expert Group Papers*, No. 2019/05, OECD Publishing, Paris, <https://doi.org/10.1787/59feca56-en>.

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Climate finance

OECD (2019), *Climate Finance Provided and Mobilised by Developed Countries in 2013-17*, OECD Publishing, Paris, <https://doi.org/10.1787/39faf4a7-en>.

McNicoll, L., et al. (2017), "Estimating Publicly-Mobilised Private Finance for Climate Action: A South African Case Study", *OECD Environment Working Papers*, No. 125, OECD Publishing, Paris, <https://doi.org/10.1787/a606277c-en>.

OECD (2016), *2020 Projections of Climate Finance Towards the USD 100 Billion Goal: Technical Note*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264274204-en>.

OECD (2015), *Climate Finance in 2013-14 and the USD 100 billion Goal: A Report by the OECD in Collaboration with Climate Policy Initiative*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264249424-en>

KEY WEBSITES

CCXG – www.oecd.org/environment/cc/ccxg.htm

Research Collaborative – www.oecd.org/env/researchcollaborative/

OECD Statistics on External Development Finance Targeting Environmental Objectives Including the Rio Conventions – <http://oe.cd/RioMarkers>

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Moving to low-emissions pathways

Climate change mitigation: What is at stake?

Understanding the consequences of climate impacts on the economy and ecosystems plays a key role in building up momentum for policy action. The OECD has found that while the economic impacts of climate change spread across all sectors and regions, the largest negative consequences are projected for health and agriculture. Regionally, damages are especially strong in non-OECD countries in Africa and Asia. By 2060, global macroeconomic costs of climate change are projected to be in the range of 1.0% to 3.3% of GDP, although uncertainties are large. Recent analysis also highlights that changes in international competitiveness are driven by the relative impacts of climate change vis-à-vis competitors, rather than by the sign of the impacts themselves. Climate change also has implications for other environmental concerns, such as water availability and biodiversity loss.

Early policy action is warranted to avoid the lock-in of large damages in the short and medium run, and to avoid the high risks of crossing climate tipping points. Governments should align policies for adaptation and mitigation, and take sectoral damages into account, to avoid the largest negative consequences and reap the most cost-effective opportunities to confront climate change.

Pricing carbon for effective climate mitigation

Low-emission pathways consistent with the Paris Agreement require global emissions to peak as soon as possible, with a subsequent rapid fall in emissions. In order to limit warming to 2°C, modelling suggests that CO₂ emissions would have to reach net zero by about 2075, and in order to stay below 1.5°C, net CO₂ emissions would need to reach zero by around 2050 (IPCC 2018). Removing fossil fuel subsidies and pricing carbon are an essential part of a larger package of policies that can reduce greenhouse gas emissions. OECD work, however, highlights that many national climate strategies have not yet integrated these key principles sufficiently. Fossil fuel support needs to be removed and the carbon pricing gap closed urgently to drive the low-carbon transition.

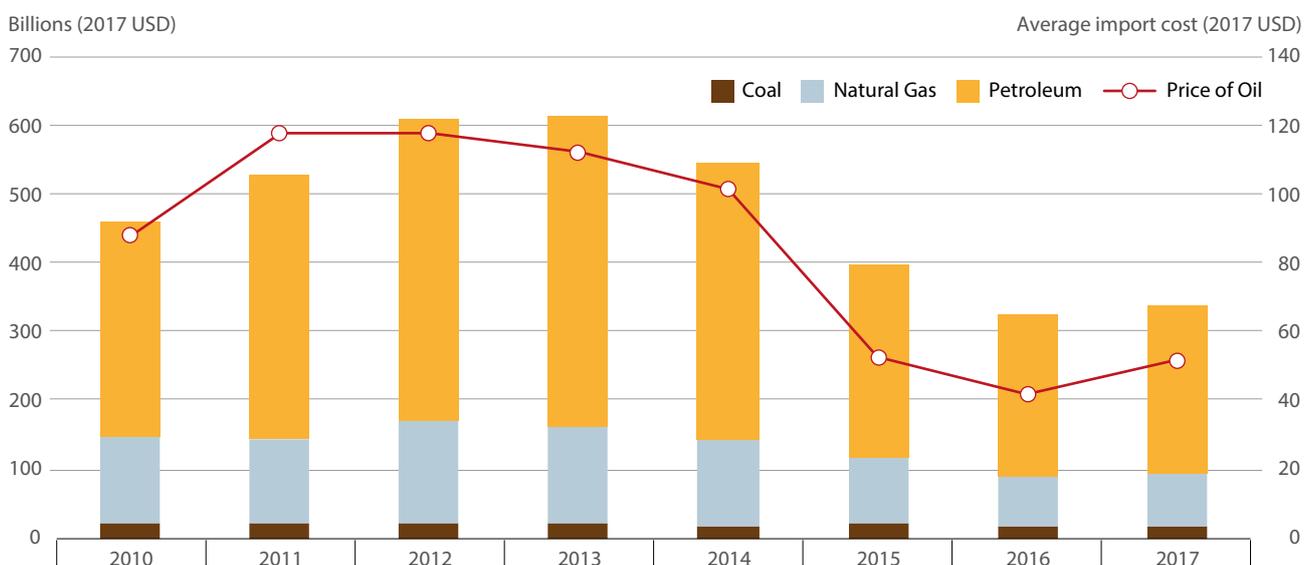


Early and ambitious mitigation action can help economies avoid half of the macroeconomic consequences by 2060 and could reduce projected global damages from 2-10% to 1-3% of global GDP by the end of the century (OECD, 2015).

Countries around the world continue to implement energy-pricing reforms. For example, Argentina, India, Indonesia, and several MENA countries took important steps towards reducing their energy subsidies for consumers. On the production side, the subsidised hard coal industry in Western Europe has been phased out and efforts to end state aid to coal-fired power generation in the European Union are continuing. While reforms of fossil-fuel subsidies have translated into reduced fiscal deficits and a better alignment of prices with costs in several countries, recent policy developments show that such gains might be under threat, depending particularly on the evolution of oil prices.

The OECD *Inventory of Support Measures for Fossil Fuels*, covering 44 OECD and G20 economies, shows that progress in reducing support slowed down in 2017 and IEA estimates indicate that fossil-fuel subsidies for consumption are on the rise in several developing economies. The combined OECD-IEA global estimate, including subsidies in 76 economies, rose to USD 340 billion, a 5% increase compared to 2016. The production of fossil fuels continues to be supported through tax incentives in many countries across the globe, and policies that keep consumer prices artificially low persist in others. In order to reduce fossil fuel use and avoid locking in fossil-fuel based capacity, reforms need to be accelerated.

IEA-OECD combined estimate of support for fossil fuels show that progress has slowed down



Source: OECD Inventory of Support Measures for Fossil Fuels 2019.

Taxing polluting sources of energy is an effective way to curb emissions that harm the planet and human health, and the income generated can be used to ease the low-carbon transition for vulnerable households. Yet, the OECD's Taxing Energy Use 2019 report shows that 70% of energy-related CO₂ emissions from advanced and emerging economies are entirely untaxed, offering little incentive to move to cleaner energy. Taxes on coal – which is behind almost half of CO₂ emissions from energy – are zero or close to zero in most countries. For international flights and shipping, fuel taxes are zero, meaning long-haul frequent flyers and cargo shipping firms are not paying their fair share. Broadening the scope to emissions trading systems, as is done in the

OECD's *Effective Carbon Rates 2018* publication, does not change the overall conclusion.

The OECD paper "The Joint Impact of the European Union Emissions Trading System (ETS) on Carbon Emissions and Economic Performance" (2018) empirically estimates the impact of the EU ETS, Europe's main climate change policy, on carbon emissions and economic performance of regulated companies based on micro-data. It shows that the EU ETS has reduced carbon emission by around 10% but had no negative impact on employment or profits of regulated firms while boosting revenues and investment. It demonstrates that carbon pricing can go hand in hand with firms' competitiveness.

Table 1. Overall, taxes are not being used to provide meaningful carbon price signals

	Average* fuel excise per tCO ₂ in 2018	Average* explicit carbon tax per tCO ₂ in 2018	Average* effective carbon tax per tCO ₂ in 2018
Coal and other solid fossil fuels	0.61	0.13	0.73
Fuel oil	3.50	0.46	3.96
Diesel	70.65	3.11	73.76
Kerosene	4.27	0.34	4.61
Gasoline	84.34	1.50	85.83
LPG	10.23	0.89	11.12
Natural gas	4.08	1.19	5.26

Note: *Emission-weighted average across 44 OECD and G20 countries and int. aviation & maritime

Source: OECD (2019), *Taxing Energy Use 2019: Using Taxes for Climate Action*, OECD Publishing, Paris, oe.cd/TEU2019

“Improving economic efficiency and climate mitigation outcomes through international co-ordination on carbon pricing”, (OECD, forthcoming) presents the potential benefits and challenges of enhanced international co-ordination on carbon pricing and outlines the different types and levels of co-ordination that are available for national and sub-national governments.

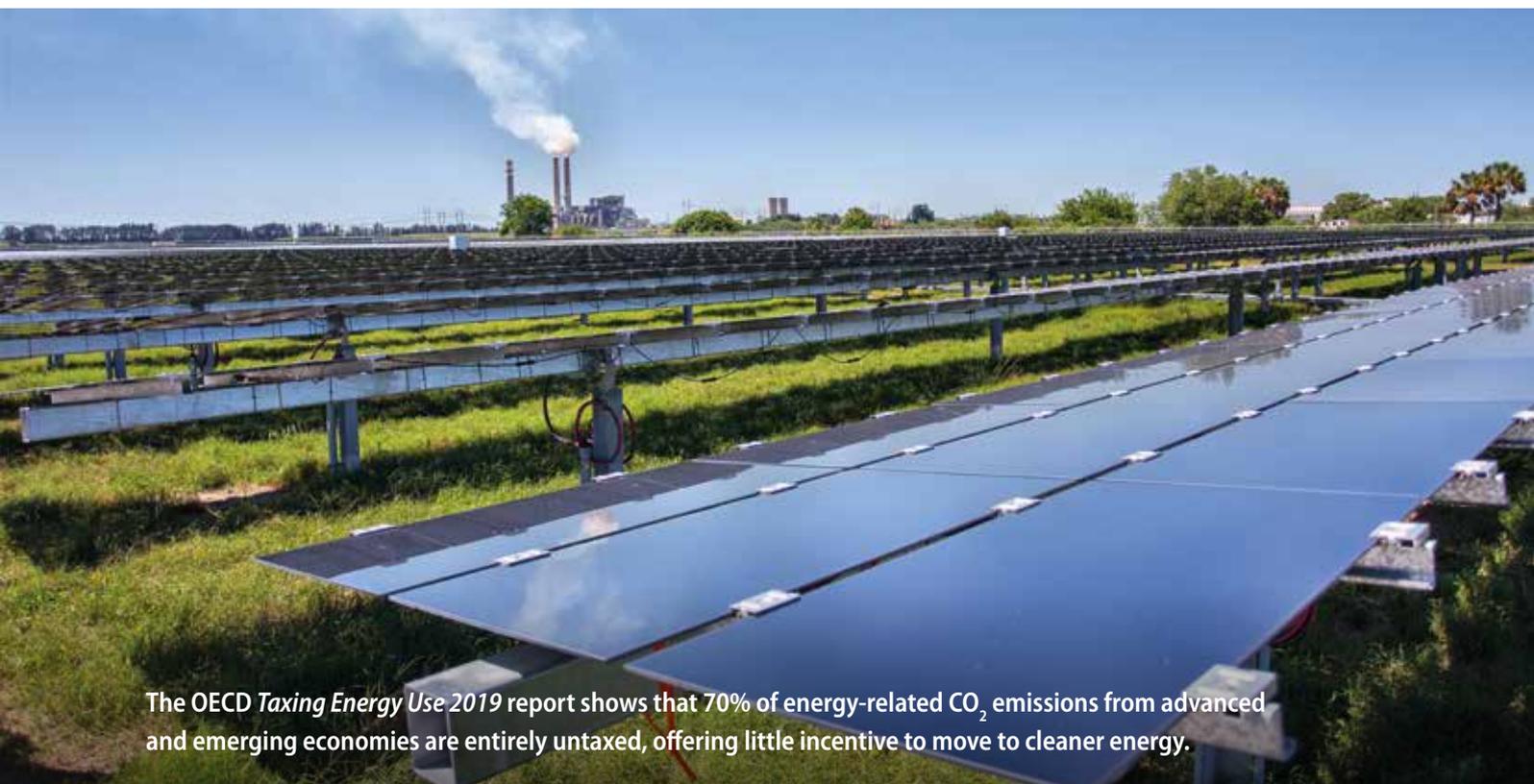
Appraising policy options using cost-benefit analysis

Cost-benefit analysis (CBA) has long been a core tool of public policy. The systematic process of calculating the benefits and costs of policy options and projects is now widely regarded as an essential step in the policy process. It helps decision makers to have a clear picture of how society would fare under a range of policy options for achieving particular goals. *Cost-Benefit Analysis and the Environment: Further Developments and Policy Use* (2018), provides a timely update on recent developments in the theory and practice of CBA. Perhaps the most significant development is the contribution of climate economics in its response to the challenge of appraising policy actions to mitigate (or adapt to) climate change. Work in this area has increased the focus on how to value costs and

benefits that occur far into the future, particularly by showing how conventional procedures for establishing the social discount rate become problematic in this intergenerational context and what new approaches might be needed. The contribution of climate economics has also entailed thinking further about uncertainty in CBA, especially where uncertain outcomes might be associated with large (and adverse) impacts.

Monitoring the nexus between economy and environment

The OECD, in close co-operation with other international organisations, is working on the compilation of accounts according to the System of Environmental-Economic Accounting (SEEA) 2012 Central Framework. These accounts link environmental statistics, including on GHG-emissions, to economic activities as recorded in the system of national accounts. Furthermore, methodological improvements are made in the data available, for example in the area of emissions by air transport, by using data on air movements from the International Civil Aviation Organization (ICAO). This data will improve the monitoring and analysis of the nexus between economy and environment.



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Decarbonising transport

Transport emissions continue to increase globally despite the implementation of disruptive innovations. The International Transport Forum (ITF) has estimated that passenger transport and global freight demand will triple between 2015 and 2050 based on the current demand pathway. Transport CO₂ emissions remain a major challenge. The extrapolation of current policy ambitions into the future shows that these will fail to mitigate increases in transport CO₂ emissions in the face of strong growth in transport demand. In a scenario where current and announced mitigation policies are implemented, worldwide transport CO₂ emissions are projected to grow by 60% by 2050. Although disruptive innovations such as automation, shared mobility, e-commerce, high-capacity vehicles, energy transition in long-distance road freight, and autonomous vehicles have the potential to reduce emissions, appropriate regulatory frameworks would need to be in place.

Through its Decarbonising Transport initiative, the ITF has launched two new projects in 2019:

- The “Decarbonising Transport in Latin American Cities” project focuses on helping policy makers in Bogotá, Buenos Aires and Mexico City achieve their CO₂ reduction ambitions for the transport sector.

- The “Decarbonising Transport in Emerging Economies” project, supports transport decarbonisation in Argentina, Azerbaijan, India and Morocco, and includes the design of a common assessment framework for transport emissions that will cover several transport sub-sectors and transport modes.

Both projects will lead to the development of effective policy pathways for achieving national or local transport CO₂ reduction goals in 2050. ITF also continues its partnership with the European Union through the “Decarbonising Transport in Europe” project, which aims to help the European Union to achieve its CO₂ reduction ambitions for the transport sector. The project will provide European policy makers with better quantitative evidence on the actual impact of CO₂ mitigation measures.

Policies that could change travel behaviour will have significant mitigation impact. In the ITF’s “Understanding Consumer Vehicle Choice: A New Car Fleet Model for France” report, a model was developed to better understand consumers’ vehicle purchase choice and ways in which to increase the uptake of electric vehicles. Factors that determine vehicle choice go beyond vehicle technology and include personal preferences, the availability of recharging infrastructure for electric vehicles, and policy incentives, such as subsidies or preferential vehicle use rights.

Aligning policies for a low-carbon transition

Core climate policies must be complemented and supported by governments ensuring that policies and regulatory frameworks are aligned with climate policy goals. OECD work has identified a number of misalignments in investment, fiscal and innovation policies, which, if corrected, could help countries increase their ambition, improve the effectiveness of climate policies, as well as contribute to other policy objectives consistent with green and inclusive growth.

These include the need to scale up and shift infrastructure investments away from fossil fuels. Continued investment in carbon-intensive infrastructure will result in a carbon lock-in. Economic policies – particularly those linked to taxation – should be tailored to push consumers into making low-carbon choices. Taxation favouring carbon-intensive products (e.g. favourable personal tax treatment of company cars) should be revised. Policies focusing on innovation, green technology deployment as well as international trade also have a considerable role to play in achieving climate mitigation goals. A comprehensive approach to the transition is needed, as demonstrated by “Power struggle decarbonising the electricity sector” (2018), which shows that climate policies, non-climate policies, as well as political economy factors, must support and mutually reinforce each other.

The OECD Development Centre’s Policy Dialogue on Natural Resource-based Development helps design transformational development strategies aligned with the 2030 Agenda, focusing on sustainable transition of natural resource-rich developing countries towards a low-carbon economy and better integration into global value chains. The extractive industries sector is in resource-rich developing countries often the single largest CO₂ emitter and energy user. The Policy Dialogue supports the decarbonisation of the mining industry, and of fossil fuel production processes. The Policy Dialogue also focuses on the role of sovereign wealth funds and strategic investment fund in climate finance, and more generally on the use of resource revenues to support the low-carbon transition.

In the years to come, the OECD will deepen and expand its work to help governments move to low-emissions, climate resilient development pathways.

It will provide tools to diagnose misalignments and prioritise and phase climate action across sectors and time. Understanding the political economy factors surrounding the transition (e.g. identifying communities at risk of being stranded; revenue losses for governments; benefits of climate action on air quality) and adopting a well-being lens to mitigation will be key components of a successful low-carbon transition. Through the Environmental Performance Review programme, the OECD will continue to assess countries’ climate and broader green growth policies, and their progress towards a low-emissions economy.

In a scenario where current and announced mitigation policies are implemented, worldwide transport CO₂ emissions are projected to grow by 60% by 2050.



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Policy Dialogue on Natural Resource-based Development – www.oecd.org/dev/natural-resources.htm

Effective Carbon Rates – www.oecd.org/tax/effective-carbon-rates-2018-9789264305304-en.htm

OECD Action on Climate Change – www.oecd.org/environment/action-on-climate-change/

CIRCLE – www.oecd.org/env/indicators-modelling-outlooks/circle.htm

Environmental Performance Review – <http://oe.cd/ep>

Taxing Energy Use – <http://oe.cd/TEU2019>

ITF Decarbonising Transport initiative – www.itf-oecd.org/decarbonising-transport

ITF Transport Outlook Project – www.itf-oecd.org/itf-transport-outlook-project

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Climate resilience and adaptation

Climate change poses risks to people, ecosystems and every sector of the global economy. Significantly reducing greenhouse gas emissions is not enough – impacts of climate change are increasingly being felt today and need to be met with co-ordinated action to increase resilience. Climate adaptation policies reduce the adverse consequences of climate impacts that are already underway and help societies proactively prepare for the future.

How do we make the right decisions in the face of uncertainty and long-term time horizons? What needs to be in place or be overcome to implement adaptation? What does success look like? The OECD is working with countries to address these and other key issues and put in place the right policies to prepare for the effects of a changing climate.

Adaptation planning

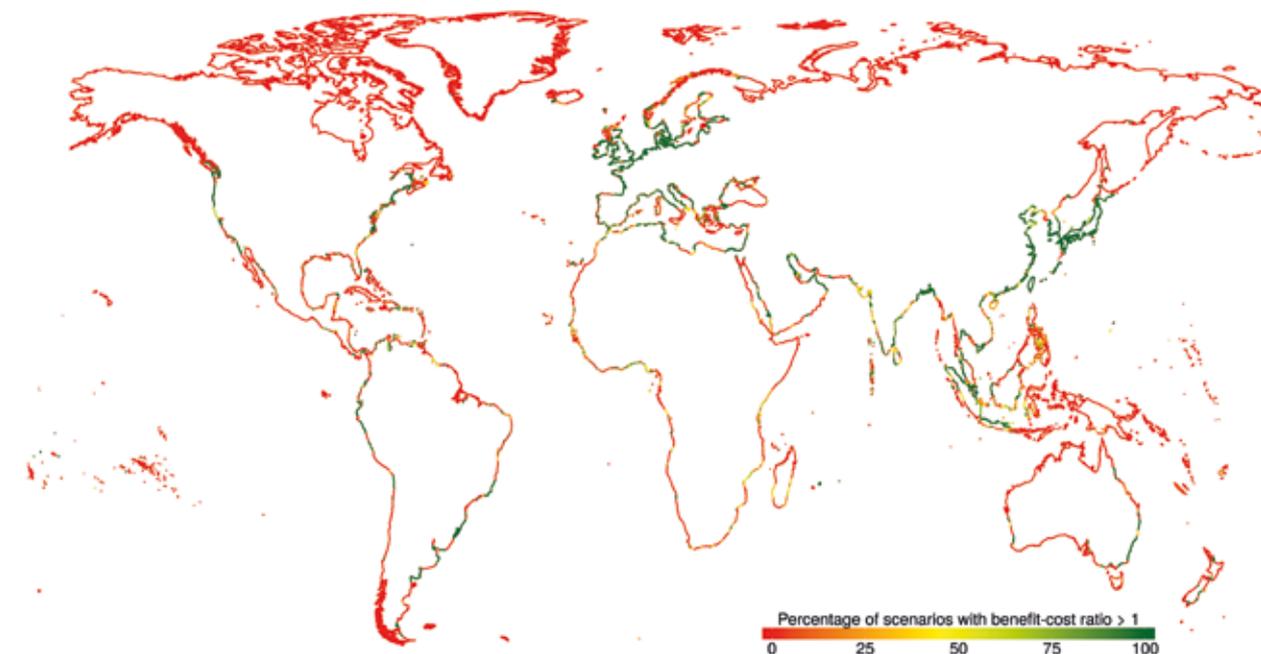
The characteristics of risks are increasingly difficult to predict over long time-horizons. Proportionate, flexible and iterative approaches are required to manage these risks. The policy response should improve knowledge about the risks from climate change through national assessments and use these assessments to plan for a range of possible outcomes rather than one “most likely” projection. *The Real Cost of Disasters* (2018) highlights pathways to improving the understanding of disasters’ impacts, a key step towards improving knowledge about the risks from climate change.

It will not be possible to eliminate risks entirely, so effective response and recovery systems are needed to address those that remain. *Climate Change Risks and Adaptation: Linking Policy and Economics* (2015) provides an iterative process for managing the risks from climate change, gives an overview of costs and benefits of adaptation at the national and regional scale and discusses adaptation finance in OECD countries.



Economic robustness of coastal protection globally

At the level of coastline segments in terms of the percentage of scenarios with benefit-cost ratio (BCR) > 1 and countries in terms of the shares of a countries' coast having a BCR > 1 under all scenarios considered



Source: OECD (2019), *Responding to Rising Seas: OECD Country Approaches to Tackling Coastal Risks*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264312487-en>, drawing from Lincke, D. and J. Hinkel (2018).

Sectoral action

Adaptation challenges, opportunities and constraints vary by sector. The OECD is supporting the implementation of adaptation at the sectoral level through targeted recommendations.

- Sea-level rise will affect the world's coasts by increasing flood and erosion risks, and potentially fully inundating some areas. As risks increase, so will the associated economic and human costs from extreme events and slow-onset changes. OECD's work on coastal adaptation takes stock of how OECD countries are responding to coastal risks, examines the relative distributional impacts of these policies, and highlights what is needed for an effective adaptation response.
- Reliable infrastructure networks underpin economic activity. By building resilience into decisions both to upgrade existing systems and build new networks, there is the scope to enhance overall resilience to climate change and avoid the risk of costly retrofitting in the future. The Policy Perspectives report on "Climate-Resilient Infrastructure" (2018) provides a framework for action aimed at national policy makers

in OECD countries to help them ensure new and existing infrastructure is resilient to climate change. Future work will examine how this framework can be applied in specific country contexts.

- The use of nature-based solutions is gaining traction as a cost-effective, flexible response to climate risks. However, their implementation remains piecemeal as they face a variety of barriers. On the basis of a policy evaluation framework, the OECD is working on a series of detailed country case studies, focusing on current decision-making approaches for water-related disaster risk management, to understand how to mainstream the use of nature-based solutions in existing policies and practices. The goal of this work is to provide guidance on the enabling conditions needed for nature-based solutions to be considered on an equal footing with grey options, and ultimately unlock replicable and scalable approaches to nature-based solutions.
- Developing countries are disproportionately affected by extreme weather events. To help address these risks, the OECD is producing guidance for development co-operation actors and governments on strengthening climate resilience. Case studies on Peru, Ghana, and



the Philippines have been developed under this work, and an interim report focusing on the links between climate adaptation and disaster risk management in a development context will be released in early 2020. With a specific focus on the private sector, the OECD is also examining the role of development co-operation in engaging private sector in climate change adaptation and risk management. Development of a working paper, *Enabling Private Sector Engagement for Climate Change Adaptation: the Role of Development Co-operation Provider*, is underway. The OECD is also conducting three country case studies in Guatemala, the Philippines and Senegal. Outcomes of this work will inform development of the guidance.

Supporting learning and accountability

Given the scale of the adaptation challenge, it is essential that effective approaches are being adopted, implemented, and that lessons are shared.

Robust monitoring and evaluation is needed to inform policy development. Monitoring and evaluation can improve policy learning and strengthen accountability by tracking how resources are spent and whether the

policy or project is delivering as expected. *National Climate Change Adaptation: Emerging Practices in Monitoring and Evaluation* (2015) draws upon emerging monitoring and evaluation practices across developed and developing countries to tools that countries can draw upon for their climate adaptation policies. The report *Policy lessons on managing disaster-related contingent liabilities in public finance frameworks* sets out policy guidance to take a forward-looking approach to understanding and managing contingent liabilities that can arise from climate-related and other natural hazards.

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Development and Climate Change – www.oecd.org/env/cc/developmentandclimatechange.htm

Water – www.oecd.org/water/

Risk Governance – www.oecd.org/governance/risk/

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Green finance and investment

Investment in the green economy needs to take place on a far greater scale over coming decades to achieve the Sustainable Development Goals (SDGs) and the ambition of the Paris Agreement. This will require the supply of financing – through for example debt, equity and other channels – to significantly increase while its cost – that is the return financiers demand – has to significantly decrease.

Green finance and investment addresses these and other issues relating to the transition to a green, low-emissions and climate-resilient economy. To help catalyse and support this transition through the development of effective policies, institutions and instruments for green finance and investment, in 2016 the OECD established

the Centre on Green Finance and Investment. The Centre provides a focal point for developing new OECD work on green finance and investment, drawing on expertise in finance, environmental policy, development and cities, among other areas. It also provides a global platform for engaging with key players and harnessing the insights of private sector partners.

The flagship event of the Centre is the *OECD Forum on Green Finance and Investment*, which has been held annually since 2014. This event brings together leading actors from the green finance and investment community to promote effective engagement, collaboration and action on green finance and investment, including institutional investors, asset managers, ministries of finance and central banks, financial regulators, commercial and investment banks, international climate funds, multilateral development banks, green investment banks, corporations, civil society, philanthropic sectors and more.



Since 2010 50% of private finance in infrastructure (USD 1.3 trillion) has been directed to renewable energy (*Investing in Climate, Investing in Growth*, OECD 2017).



A range of recent OECD publications contributing to the Centre has been developed on topics relating to renewable energy investment and innovation; investment channels, interventions and institutions for a low-carbon transition; good practice in infrastructure planning and developing a bankable pipeline of projects; green finance and investment in developing countries; and tracking and measuring private climate finance.

Renewable energy investment and innovation

The report *Financing Climate Futures: Rethinking Infrastructure* underscores the critical role of innovation in determining the economic cost and likelihood of achieving the goals of the Paris Agreement. There is an urgent need for governments to accelerate the deployment of existing technologies, business models and services, and swiftly move the next generation of climate solutions from the lab to the market.

The working paper “The Empirics of Enabling Investment and Innovation in Renewable Energy” (2017) provides empirical evidence for the importance of core climate policies and an enabling investment environment. A further study, “State-Owned Enterprises and the Low-Carbon Transition” (2018), highlights the role of state-ownership in the electricity sector. Results show

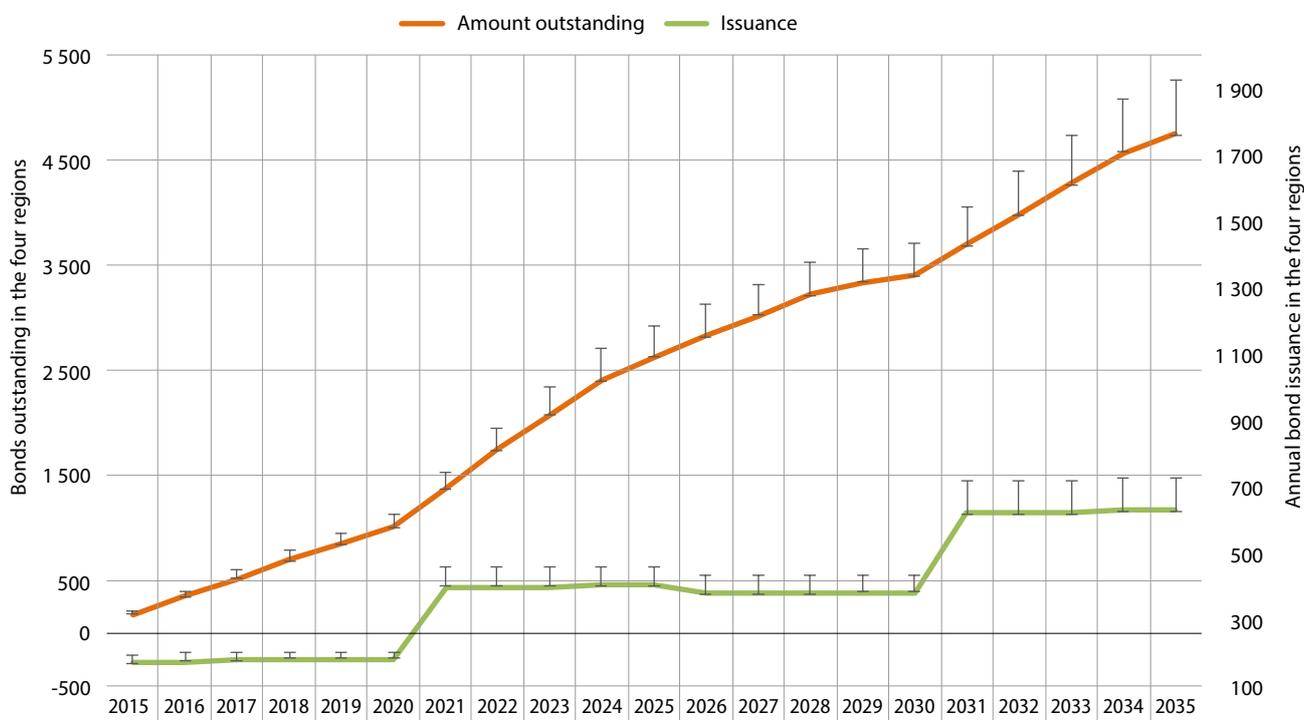
the continued importance of state-owned enterprises (SOEs) both for renewable and fossil-fuel-based electricity generation. They point to an opportunity for governments to use their ownership of SOEs to accelerate the low-carbon transition. Beyond core climate policies and a strong enabling environment, the transition also requires countries to adopt a suite of demand- and supply-side innovation policies and finance measures that are tailored to the climate challenge.

Investment channels, de-risking interventions and institutions for a low-carbon transition

Transitioning to a low-carbon economy will require institutions, instruments and market designs that efficiently allocate capital to zero emission, energy efficient infrastructure and technologies. *Financing Climate Futures: Rethinking Infrastructure* highlights three priority actions to scale up and shift private investment in its chapter “Reset the financial system in line with long-term climate risks and opportunities”: integrate climate impacts in investment decisions and strategies, increase transparency and disclosure of climate-related risks and opportunities in financial markets, and bolster the role of financial supervisory authorities to ensure a stable and sustainable financial system.

Potential for low-carbon bond issuance ranges between USD 620 billion and USD 720 billion per year by 2035

USD billions



Source: OECD (2017), *Mobilising Bond Markets for a Low-Carbon Transition*, DOI: <http://dx.doi.org/10.1787/9789264272323-en>.

The report *Mobilising Bond Markets for a Low-Carbon Transition* (2017) demonstrates the contribution that bond markets can make to a low-carbon transition. Further, *Green Investment Banks: Scaling up private investment in low-carbon, climate-resilient infrastructure* (2016) provides the first comprehensive study of green investment banks, analysing the rationales, mandates and financing activities of this relatively new category of public financial institution.

The working paper “OECD Progress Update on Approaches to Mobilising Institutional Investment in Sustainable Infrastructure” (2018) shows findings of an OECD database of institutional investments in sustainable infrastructure with public interventions at the project-level. The paper builds on “Mapping Channels to Mobilise Institutional Investment in Sustainable Energy” (2015). The database of the progress update includes 152 projects and detailed information on the channels used by institutional investors and the types of public interventions and other actors involved, among others. Based on this information, the work analyses recent developments in the mobilisation of institutional investment in climate-related infrastructure.

Developing robust project pipelines for Low-carbon infrastructure

Developing Robust Project Pipelines for Low-Carbon Infrastructure (2018), looks at “project pipelines”, a key focal point in countries’ efforts to implement their climate and development commitments, including the Nationally Determined Contributions. Meeting climate objectives requires the successful implementation of many new low-carbon infrastructure projects constituting a pipeline of projects, delivered at the right time, providing the right level of service, and involving the right institutions. Through a series of case studies, this report focuses on the concrete actions needed to develop low-carbon project pipelines. It highlights that while governments and public institutions are already taking actions to develop robust pipelines in a range of country settings, these actions nevertheless need to be strengthened significantly to meet long-term climate mitigation objectives.

Key recommendations from the report include:

- Link policy making to forward-looking objective setting and the programmes and institutions to deliver them, providing overall co-ordination and leadership to champion project pipelines;
- Focus on strengthening the interface and mechanisms that governments employ to disseminate information and convene actors, offering transparent processes and communicating relevant information on projects and the pipeline with the financing and investment community;
- Take a holistic, whole-of-government approach to infrastructure planning and investment, feeding lessons back into policy-making processes to bolster the investment enabling environment and providing funding or institutional support to projects when appropriate;
- Fast-track suitable infrastructure project investment in a way that brings the carbon and energy intensities of the country's economy to target levels, prioritising

the deployment of “high-value” and strategically important projects and sectors;

- Foster the development of a diverse set of bankable projects and promote business models suitable for private sector needs, setting strong eligibility criteria to determine which projects should be built and supported and which should not; and
- Increase country resilience to changes in climate and development needs, deploying infrastructure that remains pertinent and relevant over time and tailored to changing external conditions, and avoiding expensive path dependency or lock-in.

Ensuring fiscal sustainability

The way governments choose to raise and spend money is decisive in delivering the low-emission, resilient transformation needed. The climate challenge requires governments to align all channels of public finance with climate and growth objectives, while also taking into account medium-term budgetary cycles and longer-term fiscal sustainability.





The Paris Collaborative on Green Budgeting was launched by the OECD Secretary-General Angel Gurría at the One Planet Summit in Paris on 12 December 2017 to help governments ensure that their fiscal and budgetary actions reflect the environmental and climate goals to which they have committed. It aims to design new, innovative tools to assess and drive improvements in the alignment of national expenditure and revenue processes with climate and other environmental goals. This is a crucial step in achieving a central objective of the Paris Agreement on climate change as well as of the Aichi Biodiversity Targets and the United Nations' Sustainable Development Goals – aligning national policy frameworks and financial flows on a pathway towards low greenhouse gas emissions and environmentally sustainable development.

The OECD Paris Collaborative on Green Budgeting (PCGB) works with governments to ensure that their fiscal and budgetary actions reflect the environmental and climate goals to which they have committed. It aims to design

new, innovative tools to assess and drive improvements in the alignment of national expenditure and revenue processes with climate and other environmental goals. This is a crucial step in achieving a central objective of the Paris Agreement on climate change as well as of the Aichi Biodiversity Targets and the United Nations' Sustainable Development Goals – aligning national policy frameworks and financial flows on a pathway towards low greenhouse gas emissions and environmentally sustainable development.

Green budgeting involves using the tools of budgetary policy-making to help achieve environmental goals. It will support governments in achieving environmental goals by:

- Identifying and evaluating environmental impacts of budgetary and fiscal policies;
- Assessing their coherence towards the delivery of national and international commitments and re-directing budget decisions; and
- Contributing to informed, evidence-based debate and discussion on sustainable growth.

The 2019 OECD Green Growth and Sustainable Development Forum addressed the fiscal implications of the low-carbon transition for countries whose revenues rely on fossil energy resources as well as for countries where energy consumption is a significant tax base.

Financial innovation for sustainable infrastructure

The transition to a low-carbon future requires a visionary reassessment of infrastructure systems and services, from their interaction with consumers all the way through planning, procurement, financing, construction, and operations. Embracing new technologies that enable drastic reductions in greenhouse gas (GHG) emissions will be a crucial element to a successful transition. Emerging distributed ledger technologies (DLT), such as blockchain, have the potential to improve current processes and systems by acting as a digital enabler across the infrastructure value chain.

The case study Blockchain Technologies as a Digital Enabler for Sustainable Infrastructure identifies key

areas where blockchain is already impacting the provision of sustainable infrastructure services, and presents four original case studies where blockchain could unlock value across the infrastructure life cycle. A roadmap for public and private sector actors provides guidance on bringing ideas to life through pilot programmes. The technology's potential advantages and disadvantages are outlined, along with implications for policy makers.

Promoting green finance and investment in emerging and developing economies

Blended finance, an approach to mix different forms of capital in support for development, is emerging as an important solution to help meet the infrastructure investment gap in developing countries by using public support to mobilise commercial finance. OECD Blended Finance Principles have been endorsed by the Development Assistance Committee and will guide the use of development finance in blended approaches going forward. The OECD report, *Making Blended Finance Work for the SDGs* provides a comprehensive assessment of the state and priorities for the use of blended finance in developing countries, and a new OECD Policy Perspectives “Blended Finance: Mobilising resources for Sustainable Development and Climate Action in developing countries” collates the latest OECD work on this topic.

The paper “Scaling up climate-compatible infrastructure: Insights from national development banks in Brazil and South Africa” provides a focus on enabling institutions. National development banks (NDBs) and development finance institutions – domestically focused, publicly owned financial institutions with a specific development mandate – are poised to play a role in bridging the investment gap for climate-compatible infrastructure in developing countries. But delivering on the Paris Agreement will require NDBs to transition from their traditional role as ‘financer’ to ‘mobiliser’ of investment for infrastructure, and to be better recognised in the international climate and development finance landscape. New work on the application of blended finance for climate in Brazil and the role of NDBs for climate-compatible infrastructure in China will similarly advance the topic of greening financial systems in emerging and developing economies.

The GREEN Action Task Force hosted by the OECD also examines and provides comprehensive and consistent record of energy subsidies in countries of Eastern Europe and the Caucasus, conducted a country review of investment needs and policy frameworks to mobilise finance for climate action in Georgia, and explored the role of Shardara Multi-Purpose Water Infrastructure in Kazakhstan.

The OECD's new Programme on Clean Energy Finance and Investment Mobilisation (CEFIM), funded by the Danish government, will help five emerging economies in Latin America, South and Southeast Asia to strengthen their domestic policy frameworks to attract more private sector finance and investment in renewable electricity and energy efficiency. The five-year programme which aims to support the development of bankable clean energy project pipelines will be delivered in close collaboration with governments and other relevant stakeholders.

Tracking the consistency of finance flows with climate objectives

Beyond only looking at finance that contributes to climate action, the OECD-led Research Collaborative on Tracking Finance for Climate Action initiated work to more broadly assess the consistency of investment and finance flows with climate mitigation and adaptation objectives (as called for in the Article 2.1 of the Paris Agreement). This requires an all-encompassing scope in terms of types of finance and geographies. As a first step, the Research Collaborative has initiated country pilots to test data and methods and learn lessons relevant to scale up such analysis across countries. This work may inform both the Global Stocktake under the UNFCCC (see “International climate negotiations” on pages 5-6), as well as domestic policies towards making finance flows more consistent.

Aligning development co-operation and climate action

As countries prepare their next round of commitments under the Paris Agreement, it is timely to assess the progress that providers of development co-operation have made to date in accounting for climate change and aligning their activities with the objectives of the

Agreement. It is vital to identify, analyse and creatively overcome the major barriers that currently undercut coherent and effective climate action in developing countries and that thereby jeopardise sustainable development. The OECD report *Aligning Development Co-operation and Climate Action: The Only Way Forward* examines the imperatives, challenges and priority actions for development co-operation to align with ambitious climate action.

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Another recent OECD publication on Greening Development Co-operation emphasises the importance of going beyond doing no harm to the environment, ensuring that development co-operation providers take every opportunity to do good. It proposes five building blocks to deliberately and proactively integrate environmental concerns including climate into development policies, plans, budgets and actions. It highlights the fact that more needs to be done to invest in biodiversity and to address environmental pollution and associated environmental health issues.

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Centre on Green Finance and Investment – www.oecd.org/cgfi/

Green Budgeting – www.oecd.org/environment/green-budgeting

Environment and Climate Change in Development Co-operation – <http://www.oecd.org/dac/environment-development/>

OECD Blended Finance
– www.oecd.org/dac/financing-sustainable-development/development-finance-topics/blended-finance.htm

Green Growth – www.oecd.org/greengrowth/ggsd2019/

Financing Climate Futures
– www.oecd.org/environment/cc/climate-futures/

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Land-use, ecosystems and agriculture

Land-use systems play a crucial role in achieving a number of the Sustainable Development Goals, including those relating to climate, biodiversity, water, sustainable energy, food security, and poverty.

In particular, agriculture, forestry and other land use will play a critical role towards meeting climate goals under the Paris Agreement, with 21% of global greenhouse gas emissions stemming from agriculture, forestry and land use change, and their role as possible carbon sinks. Effective climate change mitigation through sustainable land-use and management practices are also crucial for meeting the biodiversity goals under the Aichi Targets of the Convention on Biological Diversity. The linkages and interactions between climate change, land use, ecosystems and agriculture offer both opportunities for synergies and the need to reconcile trade-offs when devising policies. The OECD conducts multiple areas of work across this diverse nexus of issues.

Managing the interactions between climate change, land use and terrestrial ecosystems

Climate change is a key pressure on biodiversity and ecosystem services. The OECD *Environmental Outlook to 2050* projects this pressure to increase in the future. The report *Scaling Up Finance Mechanisms for Biodiversity* (OECD, 2013) highlights that various land-use related climate mitigation strategies, such as Reducing Emissions from Deforestation and Degradation (REDD+), as well as ecosystem-based climate adaptation strategies, can offer significant co-benefits for biodiversity and ecosystems. Biodiversity policy instruments that help ensure the conservation and sustainable use of forests, such as payments for ecosystem services programmes and biodiversity offsets, are relevant for climate change mitigation.

Climate change also impacts water quality and quantity (droughts and floods), with potentially adverse impacts on aquatic ecosystems and agricultural productivity. *Water Risk Hotspots for Agriculture* (2017) identifies and proposes targeted responses to address these issues. *OECD Green Growth Indicators* (2017) provides new indicators on land use and land use conversion across a range of OECD and G20 countries, data that can enable more informed policy-making.

Strengthening mitigation and adaptation efforts in the agriculture sector

Agriculture contributes to a significant share of the GHG emissions – 12% directly through agricultural activities and an additional 9% through land use changes. The main direct agricultural GHG emissions are nitrous oxide emissions from soils, fertilisers, manure and urine from grazing animals, as well as methane production by ruminant animals and from paddy rice cultivation. Limited efforts have been undertaken to reduce emissions from agriculture thus far. A continued lack of progress could lead the sector to overtake energy and become the largest source of global GHG emissions by mid-century.

The report *Enhancing Climate Change Mitigation through Agriculture* assesses the economic consequences of different mitigation policies. It finds that market-based instruments are the most cost-effective ways to cut emissions from farming, even though they introduce different trade-offs for farmers, consumers and taxpayers and are challenging to implement. Agriculture policy reforms are needed to correct misaligned agriculture incentives and redirect policy efforts to specific investments that explicitly target climate and sustainability objectives. As shown in the paper “Evaluating the environmental impact of agriculture policies”, some of the existing support policies encourage GHG emissions.

At the same time, agriculture is projected to be the second most economically damaged by climate change. Warming and more prevalent extreme climate events are already impacting agriculture crops and livestock production in many regions. The changing climate will also add to resource problems, such as water scarcity, pollution, and soil degradation. Self-initiated efforts by farmers to adapt to climate change are unlikely to be sufficient, given uncertainties surrounding future projections of weather patterns and extreme weather events. The paper “Overcoming barriers to the adoption of climate-friendly practices in agriculture” examines options to deliver both mitigation and adaptation benefits.

The report *Accelerating Climate Action: Refocusing Policies through a Well-being Lens* includes a specific chapter on climate mitigation and the food sector. It assesses the

potential of the food sector to reduce its GHG emissions while providing a healthy diet to the world’s population. Transitioning to a sustainable agriculture and food sector entails that policy makers:

- Analyse agriculture’s performance beyond food production and GHG emissions. The sectors’ sustainability needs to be assessed in terms of ecosystem services and well-being more broadly (e.g. healthy diets, healthy environment and sustainable resource management).
- Take a food system approach that explores change levers on both the supply (agriculture) and demand sides (e.g. limiting meat consumption and animal proteins in our diets benefits both consumers’ health and climate).

Managing the interactions between climate change and our oceans

Climate change is rapidly impacting marine ecosystems and species. As highlighted in *Marine Protected Areas: Economics, Management and Effective Policy Mixes Policy* (2017), it is estimated that climate change has already resulted in either loss or degradation of 50% of salt marshes, 35% of mangroves, 30% of coral reefs and 20% of seagrass worldwide. The report highlights the key pressures on oceans and examines how instruments such as marine protected areas and blue carbon payments for ecosystem services can be scaled up to help mitigate climate change and enhance ecosystem resilience.

Promoting coherent policy responses

As highlighted in OECD/IEA/NEA/ITF (2015), *Aligning Policies for the Low-Carbon Economy*, sustainable land management practices – reduced deforestation, restoring degraded land, better agricultural practices and increased carbon sequestration in soils and forests – could make a large contribution to the global climate change effort while delivering the productivity improvement needed to respond to growing food demands. As noted in the report *Innovation, Productivity and Sustainability in Food and Agriculture*, governments should minimise policy incoherencies in policies affecting the agriculture sector, and prioritise interventions to the long term performance of the sector.



Effective climate change mitigation through sustainable land-use and management practices are crucial for meeting the Paris Agreement and biodiversity goals under the Aichi Targets of the Convention on Biological Diversity.

Sustainable land-management practices can also improve the resilience of economies to a changing climate by protecting ecosystems. More coherent policy frameworks will therefore be needed to address the multiple and overlapping challenges. On-going OECD work, *Towards Sustainable Land Use: Aligning Biodiversity, climate and food policies*, is examining the interactions, potential synergies and trade-offs across these areas. The work will draw on insights from a selection of OECD and non-OECD

countries with large agricultural and forestry sectors and associated greenhouse gas emissions, many of which also host globally-important biodiversity. Drawing on these countries' relevant national strategies and plans, institutional co-ordination, and policy instruments, the report will provide good practice insights on how to better align land use decision-making processes and to achieve stronger coherence between land use, climate, ecosystems and food objectives.

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Cities and regions

Cities are home to more than half of the world's population, consume 70% of the world's energy, and account for a roughly equivalent share of global greenhouse gas emissions. Because they concentrate physical, human and financial assets, cities are disproportionately vulnerable to climate impacts. Cities also compete for human talent and inward investment. Quality of life and quality of infrastructure are critical and will have major consequences for our ability to manage and adapt to climate risks.

Delivering inclusive climate action in cities

Cities will be key to a just low-carbon transition. They are on the frontline of climate action, and in the search for solutions to ensure that climate strategies effectively respond to major social and economic challenges such as rising inequality, unemployment, poverty and unequal access to opportunities. While many cities have put climate change and rising inequalities at the top of their policy agendas, climate change and inclusive growth have been addressed through separate policy portfolios, with limited attention paid to the trade-offs and synergies between these two areas.

The OECD is supporting subnational governments in delivering on both the climate and inclusion agendas. By launching the OECD Champion Mayors for Inclusive Growth initiative in March 2016, the OECD created a coalition of more than 50 mayors from around the world committed to tackle inequalities and promote more inclusive economic growth. By signing the *Seoul Implementation Agenda for Inclusive Growth in Cities*, Mayors recognised the importance of bridging strategies for climate change and inclusive growth as one of the two key priorities.

The OECD helps cities identify knowledge gaps, advance research, and ultimately promote best practices and policy solutions for achieving more inclusive, sustainable cities. The OECD *Case study of Inclusive Growth in Seoul*, a first of its kind, diagnoses inequalities in Seoul and assesses key dimensions of its Inclusive Growth policy framework, including the interaction between climate change and inequalities.

Subnational governments also have an important role to play in scaling up finance for inclusive climate action, and have at their disposal a broad range of financial tools and incentives. The 2018 Financing Climate Futures case study "*Financing climate objectives in cities and regions to deliver sustainable and inclusive growth*" shows that on average two-thirds of environment- and climate-related public

investment is conducted by cities and regions. The OECD is developing new work, in co-operation with CPI, which aims at “Measuring and tracking subnational climate-related finance for climate action”. This project is part of the initiative on Leadership for Urban Climate Investment (LUCI) led by Germany, which was launched during the UNSG Climate Action Summit in September 2019 under the Cities, Infrastructure and Local Action Track.

Building resilient cities

Extreme weather events can be particularly disruptive to complex urban systems and areas of high population density. Much of the world’s urban population inhabits low-lying coastal areas, making them more vulnerable to storm surges and rising sea levels. Many of these low-lying urban areas are also rapidly expanding, which compounds risks. Cities in developing countries are particularly vulnerable to flood risks, as they are relatively less equipped to prepare for and address the fallout from disasters.

Building Resilient Cities: An Assessment of Disaster Risk Management Policies in Southeast Asia (forthcoming) focuses on national and subnational policy approaches to enhancing urban resilience. It provides a framework for assessing disaster risk management policies in cities, and presents the results of assessments and tailored policy recommendations for five cities of different institutional, geographic, socio-economic and environmental contexts in Southeast Asia. The study was conducted by the OECD with the support of the Global Initiative on Disaster Risk Management (GIDRM), a project commissioned by the German Federal Ministry of Economic Cooperation and Development (BMZ) and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

Improving governance and policy alignment at the subnational level

Cities and regions play a key role in climate action. It is estimated that 50 to 80% of adaptation and mitigation actions are, or will be, implemented at the regional and local level.¹ Multi-level governance is increasingly a feature

1. Networks of regional government for sustainable development (nrg4SD) (2016), *Regions Adapt 2016 Report: An assessment of risks and actions*, available at: <http://www.nrg4sd.org/regionsadapt2016report/>.

of national climate mitigation and adaptation strategies and plans, where regional and city-level actions contribute to overarching national climate policy strategies.

“Delivering the Paris Agreement Through a Whole-of-Government Approach” (forthcoming) highlights the importance of a whole-of government approach involving multiple stakeholders, to effectively implement Nationally Determined Contributions and scale up climate action ambitions. Through a study of policy co-ordination mechanisms between local, regional, and national authorities in the state of California (United States), Canada, France, and Germany, the paper demonstrates that the development of NDCs provides a unique opportunity for co-ordination and alignment across levels of government. The paper also analyses current climate mitigation investments, by applying the *OECD Recommendation on Effective Public Investment across Levels of Government*.

By moving from a linear to a circular economy, cities and regions can greatly contribute to the reduction of greenhouse gas emissions. Ongoing work on *Economics and Governance of Circular Economy in Cities* aims to identify the state of the art of the circular economy in cities, challenges and best practices.

Managing water in cities

Cities face growing water-related challenges, such as implementing more-stringent health and environmental standards, diffuse pollution, competition to access water resources, increased intensity and frequency of extreme weather (affecting precipitation and evaporation), and higher uncertainty about future water availability and demand. Cities in OECD countries face a particular challenge in that most are locked-in to specific technical trajectories. Retrofitting existing infrastructure to address new and emerging pressures is particularly expensive and technically difficult.

The report *Water and Cities: Ensuring Sustainable Futures* explores policy responses at both the central and local government levels and focuses on four mutually dependent dimensions: finance, innovation, urban-rural linkages, and governance. The report builds on OECD work on water economics and governance. It includes detailed case studies from ten cities on the

water challenges they face, the innovative responses they are putting in place, and the barriers that had to be overcome to implement these responses.

Strengthening Spatial Planning

The OECD is currently investigating how cities can tackle climate change through the Spatial Planning Instruments and the Environment (SPINE) project. SPINE examines the urban form in OECD countries to identify how the organisation of built environment affects the energy needs of modern cities, their dependency on private modes of transportation and, in turn, their CO₂ footprint.

Spatial planning and land-use policies play a crucial role in managing the trade-offs between environmental, economic and social objectives. These policies are becoming increasingly important, as demand for housing, food, services and infrastructure grows. It is essential to design and implement the right policies today as spatial planning and land-use policies have

long-term impacts that will determine the economic and environmental outcomes of the future.

Ongoing work focuses on investigating the long-term consequences of potential land-use and transport policy choices through the application of an integrated land-use and transport model (MOLES) to specific city contexts. Every city case study aims at deriving evidence-based conclusions regarding the long-run effect of relevant policy instruments on the shape of future cities and their carbon footprint. These instruments include tools such as road pricing, parking fees, incentives for the adoption of electric vehicles, zero-emission zones, density regulations and property taxation.

The first city case study assesses pathways to reduce emissions in Auckland, New Zealand. Auckland is a representative example of a city low population density, high population growth and structural car dependency. The second city case study looks at the case of Santiago, Chile. It aims to identify synergies and possible trade-offs



between reducing greenhouse gas emissions and tackling air pollution at the urban level. Both studies are due to be published in 2020.

Linking rural development with the transition to a carbon neutral economy

Rural regions are home to one-quarter of the population and contain the vast majority of the land, water and other natural resources in OECD countries. They are complementary to cities through links related to the flow of people, goods and services. Rural economies and livelihoods are closely connected to their natural resource endowments and specialisation in resource-based industries (agriculture, forestry, fisheries, mining and energy). These industries are highly sensitive to climate change. Increasing frequency and intensity of extreme weather events, as well as increased drought heavily affect rural infrastructure and economies. Further, rural areas are disproportionately affected by policy efforts to decarbonise the economy. Carbon intensive rural industries like agriculture, mining and energy are important employers in regions with low economic diversity. Measures to decarbonise the economy, for instance by phasing out certain industries, threaten local livelihoods and prosperity. Similarly, putting a price on carbon affects rural households and firms who are reliant on car and truck transportation and have limited alternatives. Overall, rural economies are less resilient than urban economies in responding to these challenges, especially because their economies are less diverse, more remote and with lower levels of human capital.

Linking Renewable Energy to Regional Development focuses on how regional policy can reconcile energy security, climate change mitigation, and job creation in rural areas from developing renewable energy. It identifies potential complementarities among the three objectives and underlines the need for a shift in approach to rural development policy in many OECD countries. *Mining Regions and Cities* aims to develop guidelines on better regional development in the mining and extractives context. In light of the need to shift to a carbon neutral economy, the project highlights how regions specialised in the extraction of hydrocarbons face adjustment costs, while others can profit from mining associated with a growing market for metals needed for the generation of hydro, wind and solar power.

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“Ambitious climate policy is simply good policy.” **Angel Gurría** – OECD Secretary-General



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