

OECD work in support of climate action

Contents

Climate action and the economy	2
International climate negotiations	5
Moving to low-emissions pathways	7
Climate resilience and adaptation	11
Green finance and investment	14
Land-use, ecosystems and agriculture	20
Cities and climate change	23
Further reading	27

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.

At the same time, countries are seeking to accelerate a low-carbon economic transformation, spurred by the Paris Agreement on climate change and rapid advances in technology. 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*, delivered to the German G20 Presidency and noted by G20 Leaders in their 2017 Declaration, 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-



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

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 well-below 2°C future is compatible with continued economic development in both the short and longer-term, provided that the right fiscal policies and structural reforms are implemented.

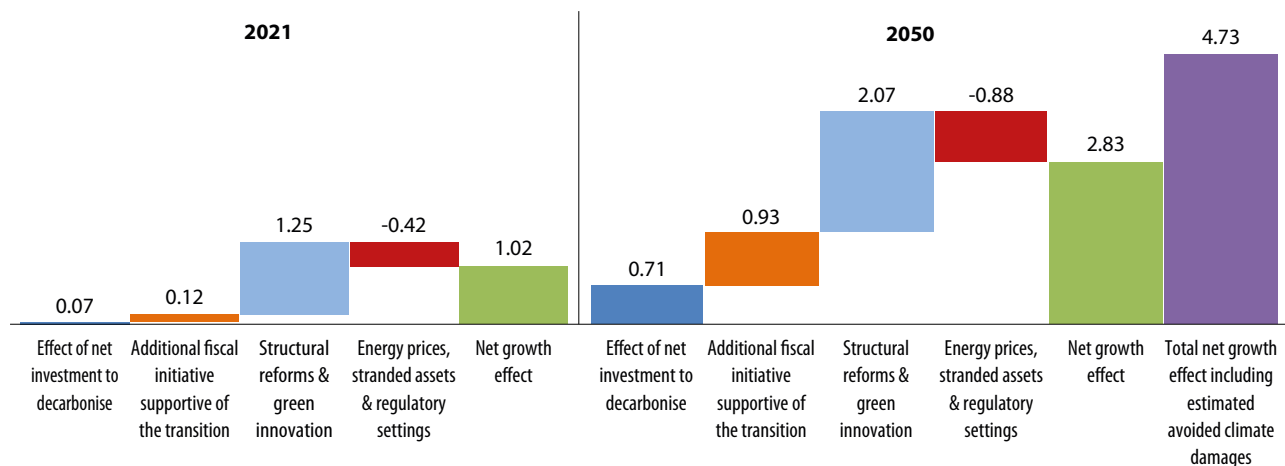
The modelled growth effect is driven by a combination of factors:

- Investment in low-emissions, climate-resilient infrastructure;
- Fiscal initiatives to fund climate-consistent non-energy infrastructure;
- Pro-growth reform policies to improve resource allocation;
- Green innovation; and
- Technology deployment.

The benefits of combined growth and climate policies more than offset the impact of higher energy prices, tighter regulations, and stranded high-carbon assets. Carbon-tax revenues are assumed to be used to lower public debt in most countries. The overall macroeconomic benefits of the modelled policy package therefore also include substantial reductions in most countries’ public debt-to-GDP ratios.

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>.

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.

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 *Financing Climate Futures: Rethinking Infrastructure* initiative aims to provide 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 lays out an agenda that can enable societies around the world to undertake the kind of systemic actions required to deliver the transformation needed for a low-emission, resilient future. It 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.

Adopting a well-being lens to climate mitigation, that is focusing on the dimensions of present and future well-being that include but go beyond economic growth, can therefore help build support for more ambitious climate mitigation action. The creation of long-term low-emission development strategies – a tool encouraged by the Paris Agreement – provides a unique opportunity to pursue this approach. A forthcoming OECD report, *Climate change mitigation through a well-being lens*, will

set out this approach in more detail and discuss how to apply a well-being lens to each of the main emitting sectors, outlining ways to increase synergies and avoid or limit trade-offs between climate action and wider well-being goals.

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.

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 WEBSITE

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

CONTACTS

Anthony Cox – Anthony.Cox@oecd.org

Simon Buckle – Simon.Buckle@oecd.org

Virginie Marchal – Virginie.Marchal@oecd.org



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, climate negotiations have focused on the elaborating the Paris Rulebook, the operating manual needed to implement the Paris Agreement. The Paris Rulebook is expected to provide details on rules and guidelines for a number of items including 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. At COP24, in Katowice, Poland, Parties will strive to put together the outcomes of the discussions to form an operational framework.

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

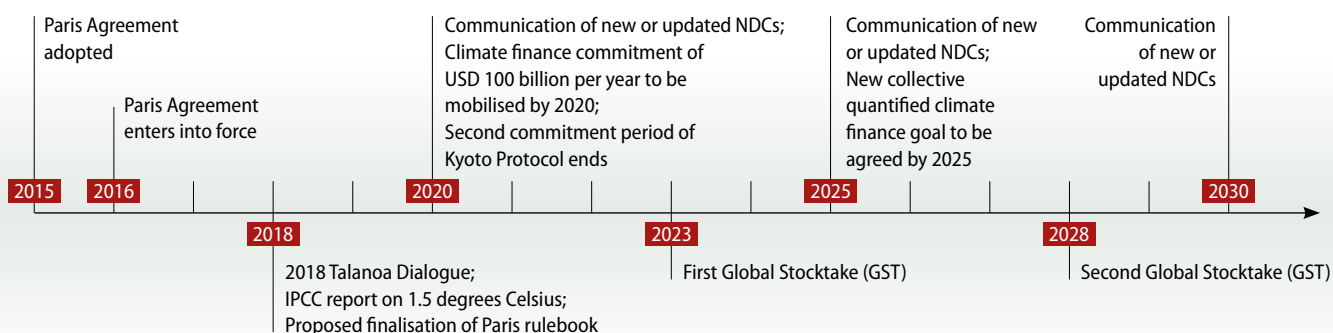
provides a neutral, non-negotiating platform for experts from a wide range of countries and other organisations to facilitate a dialogue and improve understanding around the technical issues feeding into the UNFCCC process. It has an excellent track record of providing technical input, which has positively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

Timeline of key events related to climate negotiations



considered descriptive rather than strictly quantitative. Many OECD DAC members use this data as a starting point for their financial reporting to the UNFCCC.

The OECD-led Research Collaborative on Tracking Private Climate Finance aims to develop and assess data and methods for estimating publicly mobilised private finance for climate action in developing countries. The OECD DAC and the Research Collaborative, in co-operation with public finance providers, have made significant progress on developing methods and collecting data for measuring the direct mobilisation

of private finance by public climate finance. 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.

These developments have in particular made it possible for the OECD to produce first assessments of progress made by developed countries towards the goal of mobilising USD 100 billion a year by 2020 for climate action in developing countries.

KEY PUBLICATIONS

CCXG

Garrett, J. and S. Moarif (2018), "Reporting on capacity-building and technology support under the Paris Agreement: Issues and options for guidance", *OECD/IEA Climate Change Expert Group Papers*, OECD Publishing, Paris.

Hood, C. and C. Soo (2017), "Accounting for mitigation targets in Nationally Determined Contributions under the Paris Agreement", *OECD/IEA Climate Change Expert Group Papers*, No. 2017/05, OECD Publishing, Paris, <https://doi.org/10.1787/63937a2b-en>.
Link for downloadable CCXG papers on several aspects of the Paris Agreement: <http://dx.doi.org/10.1787/2227779X>

Climate finance

Benn, J., C. Sangaré and T. Hos (2017), "Amounts Mobilised from the Private Sector by Official Development Finance Interventions: Guarantees, syndicated loans, shares in collective investment vehicles, direct investment in companies, credit lines", *OECD Development Co-operation Working Papers*, No. 36, OECD Publishing, Paris, <https://doi.org/10.1787/8135abde-en>.

McNicol, 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>

CONTACTS

Climate Change Expert Group:

Jane Ellis – Jane.Ellis@oecd.org

Research Collaborative on Tracking Private Climate Finance:

Raphaël Jachnik – Raphael.Jachnik@oecd.org

Development Assistance Committee:

Nicolina Lamhauge – Nicolina.Lamhauge@oecd.org and
Giorgio Gaulberti – Giorgio.Gaulberti@oecd.org

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 are increasingly removing fossil fuel subsidies for consumers. Several large emerging economies – notably Mexico, India, and Indonesia – have eliminated all or most of their consumer price support for transport fuels. Several member economies of the Gulf Cooperation Council have started bringing their domestic fuel prices into line with international prices. However, 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.

Taxes or emissions trading systems should result in carbon prices that reflect the social cost of carbon emissions, estimated very conservatively at EUR 30/tCO₂. OECD's report *Effective Carbon Rates 2018: Pricing Carbon Emissions Through Taxes and Emissions Trading* shows that across 42 OECD and G20 countries carbon prices are less than a quarter of that level. Across countries this carbon pricing gap ranged from 27% to 100% in 2015. The lower the gap, the more effective and widespread is the price signal across the economy, providing incentives to different actors to reduce emissions and to innovate.

The OECD paper “The Joint Impact of the European Union Emissions Trading System (ETS) on Carbon Emissions and Economic Performance” (2018) empirically estimates

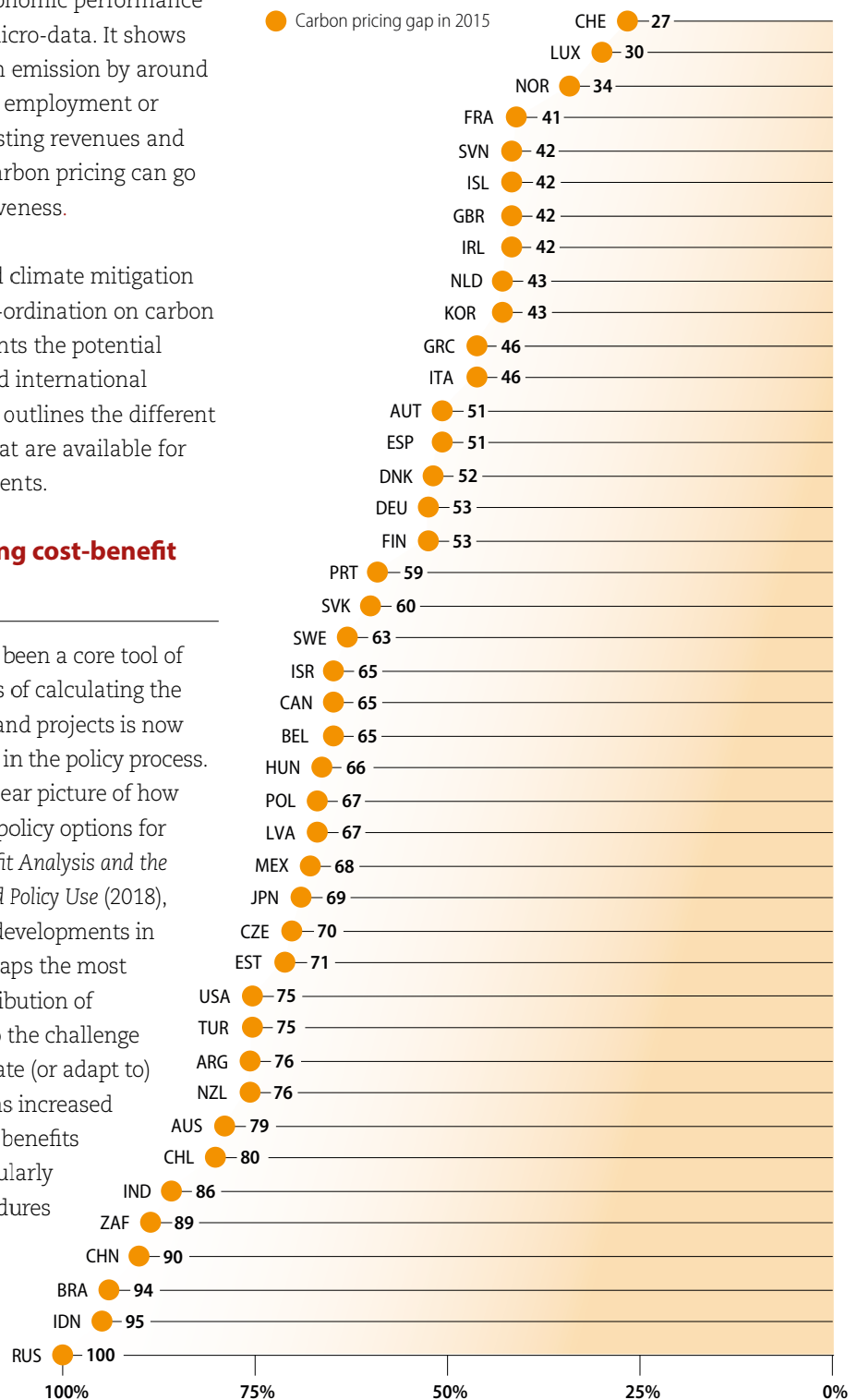
the impact of the EU ETS, Europe's main climate change policy, on carbon emissions and economic performance of regulated companies based on micro-data. It shows that the EU ETS has reduced carbon emission by around 10% but had no negative impact on employment or profits of regulated firms while boosting revenues and investment. It demonstrates that carbon pricing can go hand in hand with firms' competitiveness.

"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 coordination 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.

The carbon pricing gap¹ varies widely across countries



Source: OECD (2018), *Effective Carbon Rates 2018: Pricing Carbon Emissions Through Taxes and Emissions Trading*, <http://oe.cd/ECR2018>.

1. The carbon pricing gap shows the extent to which countries price carbon emissions below the benchmark value by measuring the difference between the benchmark and the actual rate for every percentile, and summing all positive differences. The gap is measured as a percentage. If the ECR on all emissions was at least as high as the benchmark value, the gap would be zero, and if the ECR was zero throughout, the gap would be 100%. The benchmark value is EUR 30, which is a low-end estimate of carbon costs today.



Decarbonising transport

Change to our transport systems is key if we are to meet the goals of the Paris Agreement: the sector represents 28% of worldwide energy demand and 23% of energy-related CO₂ emissions. It relies on oil for 92% of its energy demand and accounts for 65% of global oil energy demand. Moreover, transport has seen faster emission growth than any other sector. With transport demand set to double by 2050, CO₂ emission from transport activity will increase by 60% over the next three decades.

To support countries and companies to translate climate ambitions into actions and reach their transport-related climate objectives, the International Transport Forum (ITF) at the OECD launched the Decarbonising Transport initiative in 2016. The initiative supports decision makers in government and industry with tools for selecting CO₂ mitigation measures that deliver on their commitments, whether they are NDCs, sectoral targets or corporate goals.

Specifically, the Decarbonising Transport initiative:

- Builds a catalogue of CO₂ mitigation measures that work;
- Provides targeted analytical assistance for countries and partners to identify effective climate actions;
- Gathers and shares evidence for best practices that will accelerate the transition to carbon-free mobility;

- Shapes the climate change debate by building a global policy dialogue on commonly acceptable pathways to carbon-neutral transport and by bringing the transport perspective to the table.

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 looks into the role that the extractive sector – often the single largest CO₂ emitter and energy user particularly in resource-rich developing countries – can play in the transition towards a low-carbon future. Supporting the transition to a low-carbon future in resource-dependent countries requires structural transformation of both local economies and extractive industries towards a more sustainable and greener production system. The Policy Dialogue is supporting emerging and developing countries' efforts towards a just 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.

KEY PUBLICATIONS

Alova, G. (2018), "Integrating renewables in mining: Review of business models and policy implications", *OECD Development Policy Papers*, No. 14, OECD Publishing, Paris, <https://doi.org/10.1787/5bbcdeac-en>.

ITF (2018), "Decarbonising Maritime Transport: Pathways to zero-carbon shipping by 2035", *International Transport Forum Policy Papers*, No. 47, OECD Publishing, Paris, <https://doi.org/10.1787/b1a7632c-en>.

ITF (2018), "Transport CO₂ and the Paris Climate Agreement: Reviewing the Impact of Nationally Determined Contributions", *International Transport Forum Policy Papers*, No. 50, OECD Publishing, Paris, <https://doi.org/10.1787/23513b77-en>.

Mirabile, M. and Calder, J. (2018), "Clean Power for a Cool Planet: Electricity Infrastructure Plans and the Paris Agreement", *OECD Trade and Environment Working Papers*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264305304-en>.

OECD (2018), *Cost-Benefit Analysis and the Environment: Further Developments and Policy Use*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264085169-en>.

OECD (2018), *Effective Carbon Rates 2018: Pricing Carbon Emissions Through Taxes and Emissions Trading*, OECD Publishing, Paris, <http://oe.cd/ECR2018>.

OECD (2018), *OECD Companion to the Inventory of Support Measures for Fossil Fuels*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264286061-en>.

OECD (2015), *Aligning Policies for a Low-carbon Economy*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264233294-en>

Röttgers, D. and Anderson, B. (2018), "Power struggle: decarbonising the electricity sector", *OECD Trade and Environment Working Papers*, OECD Publishing, Paris.

KEY WEBSITES

Fossil Fuel Support – www.oecd.org/site/tadffss/

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/epr>

CONTACTS

Overall:

Simon Buckle – Simon.Buckle@oecd.org

Low-emissions development pathways and well-being:

Aimee Aguila Jaber – Aimee.AguilarJaber@oecd.org

Effective Carbon Rates:

Kurt Van Dender – Kurt.VanDender@oecd.org

Economic Cost of Climate Change:

Rob Dellink – Rob.Dellink@oecd.org

Fossil Fuel Subsidies:

Nathalie Girouard – Nathalie.Girouard@oecd.org

Transport and Mobility:

Wei-Shiuen Ng – Wei-Shiuen.Ng@itf-oecd.org

Stephen Perkins – Stephen.Perkins@itf-oecd.org

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

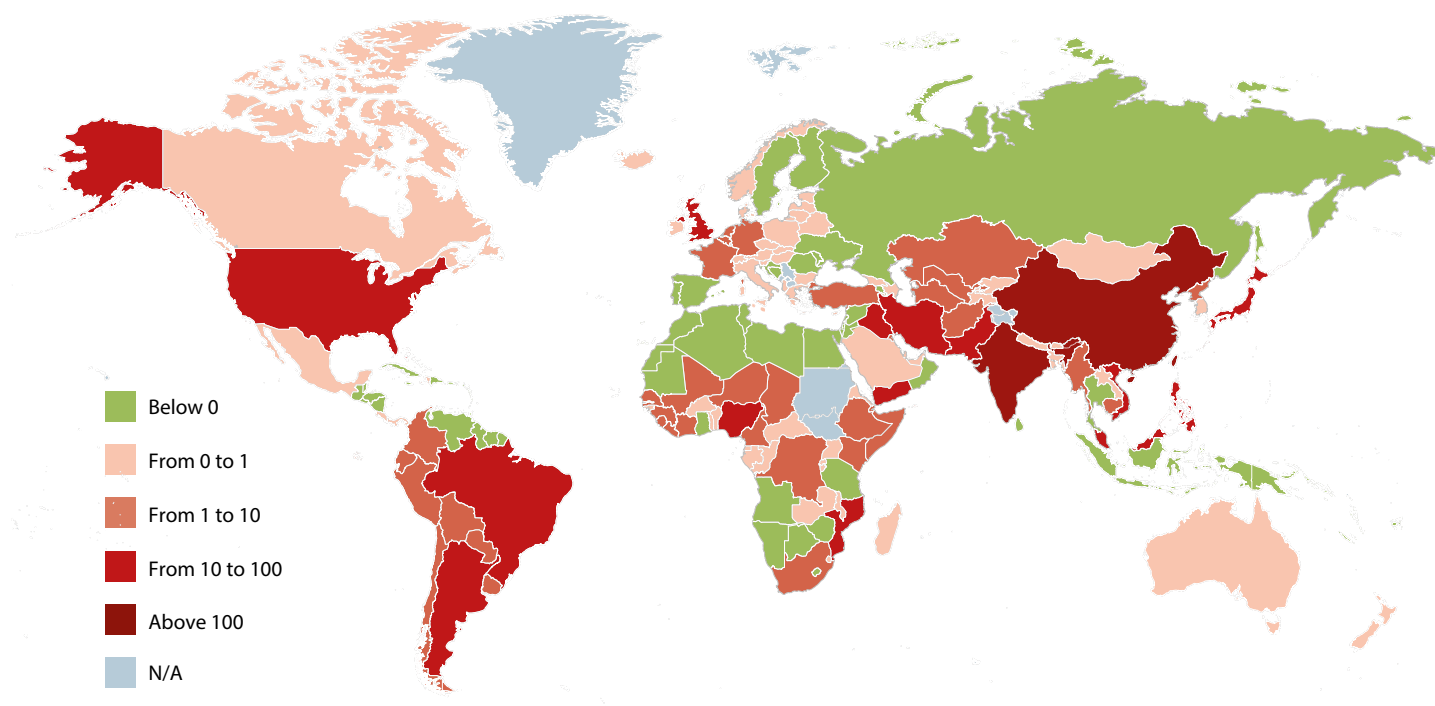
The characteristics of risks are increasingly difficult to predict over long time-horizons. Proportionate, flexible and iterative approaches are required to manage these risks. The policy response should improve knowledge about the risks from climate change through national assessments and use these 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.



Climate change costs from urban floods by 2080

(Billions of USD, 2005 PPP exchange rates)



Source: OECD (2015), *The Economic Consequences of Climate Change*, <http://dx.doi.org/10.1787/9789264235410-en>.

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.

- Across OECD countries and beyond, climate-related impacts already account for the majority of disaster damages. Climate change will continue to change the risk landscape, requiring a shift towards resilience measures that account for the implications of new climate extremes. The OECD *Recommendation on the Governance of Critical Risks* provides a guidance for countries to adopt governance models to better manage climate-related disasters across sectoral policies. OECD's *Reviews of Risk Management Policies* survey countries' approaches to reducing climate-related risks and offers hands-on guidance for boosting resilience. Recent reviews offer insights from Colombia, Kazakhstan and Morocco. The OECD's work on cities and climate, such as the report on *Preventing the Flooding of the Seine in the Paris-Ile de France Region*, presents pathways to strengthening urban resilience to climate-related risks.
- 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, adequate and cost-effective infrastructure underpins 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 future. "Climate-Resilient Infrastructure: Getting the Policies Right" (2017) provides a framework for action aimed at national policymakers in OECD countries to help them ensure new and existing infrastructure is resilient to climate change.
- Developing countries are disproportionately affected by extreme weather events. Effective policies are needed to reduce the accumulation of risk, combined with instruments and tools to help retain, share or



transfer financial losses if an extreme event occurs. These tools and instruments, collectively known as financial protection, can help cope with the impacts of climate-related disasters, reduce costs of recovery and reconstruction, and encourage risk reduction. “Climate Change Adaptation and Financial Protection: Synthesis of Key Findings from Colombia and Senegal” (2017) identifies priorities for development co-operation providers in supporting financial protection against climate risks. The OECD is examining the role of development co-operation in supporting partner countries in managing climate risks and building resilience.

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.

KEY PUBLICATIONS

Campillo, G., M. Mullan and L. Vallejo (2017), “Climate Change Adaptation and Financial Protection: Synthesis of Key Findings from Colombia and Senegal”, *OECD Environment Working Papers*, No. 120, OECD Publishing, Paris, <https://doi.org/10.1787/0b3dc22a-en>.

Gamper, C., et al. (2017), “Managing disaster-related contingent liabilities in public finance frameworks”, *OECD Working Papers on Public Governance*, No. 27, OECD Publishing, Paris, <https://doi.org/10.1787/a6e0265a-en>.

OECD (forthcoming), *Responding to Rising Seas: Comparing OECD Countries’ Approaches to Coastal Adaptation*, OECD Publishing, Paris.

OECD (forthcoming), “Resilient Infrastructure for a Changing Climate”, OECD Publishing, Paris.

OECD (2018), *Assessing the Real Cost of Disasters: The Need for Better Evidence*, OECD Reviews of Risk Management Policies, OECD Publishing, Paris, <https://doi.org/10.1787/9789264298798-en>.

OECD (2018), “Innovative Approaches to Building Resilient Coastal Infrastructure”, *OECD Environment Policy Papers*, No. 13, OECD Publishing, Paris, <https://doi.org/10.1787/9c8a13a0-en>.

Vallejo, L. and M. Mullan (2017), “Climate-resilient infrastructure: Getting the policies right”, *OECD Environment Working Papers*, No. 121, OECD Publishing, Paris, <https://doi.org/10.1787/02f74d61-en>.

KEY WEBSITES

Adaptation – www.oecd.org/environment/cc/adaptation.htm

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

Water – www.oecd.org/water/

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

CONTACTS

Michael Mullan – Michael.Mullan@oecd.org

Nicolina Lamhauge – Nicolina.Lamhauge@oecd.org

Charles Baubion – Charles.Baubion@oecd.org

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 OECD 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

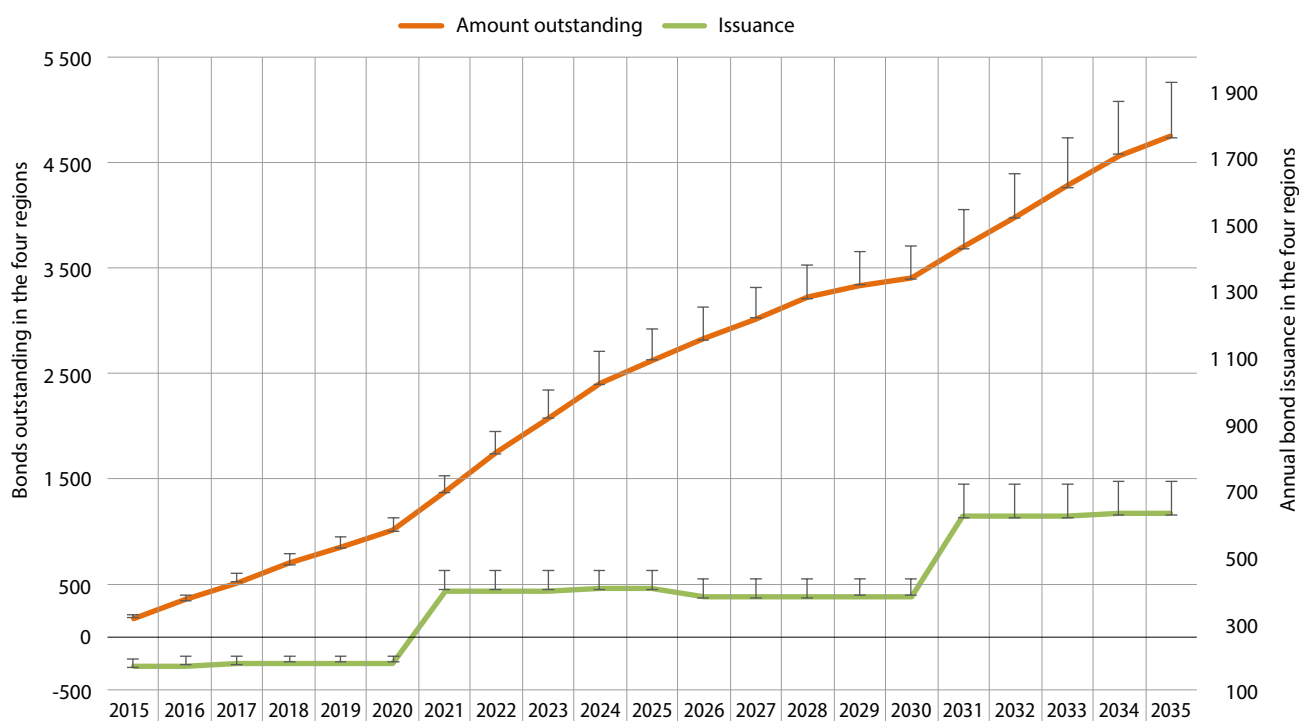
the continued importance of state-owned enterprises (SOEs) both for renewable and fossil-fuel-based electricity generation. They point to an opportunity for governments to use their ownership of SOEs to accelerate the low-carbon transition. Beyond core climate policies and a strong enabling environment, 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. Ongoing work is exploring the role of green investment banks in fostering investment opportunities and sustaining new markets.

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.





Through their budgeting processes, policies and fiscal incentives, governments play a central role in directing financial flows and influencing climate-related behaviours of citizens, financiers and businesses. What governments put a price on and what they choose to support financially can provide the signals needed to leverage and shift private sector investments towards low-emission and resilient investments. However, between 2010 and 2015, fossil fuel subsidies amounted to between USD 373 and USD 617 billion annually across 76 economies, which collectively contribute 94% of global carbon dioxide emissions (OECD, 2018). In contrast, the amount that governments spend on biodiversity is estimated at about USD 50 billion per year, approximately one tenth of spending on fossil fuels. Meanwhile, the potential of carbon pricing is far from being realised (see “Moving to Low-Emissions Pathways” on page 7 of this brochure).

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.

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

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

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 new OECD report, *Making Blended Finance Work for the SDGs* is 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.

With a focus on green investment in developing countries, a working paper entitled “Engaging the Private Sector for Green Growth and Climate Action” (2017) takes stock of the role of development finance in mobilising the private sector. New work on “Development banks and development finance institutions: scaling up green investment in developing countries” will have a complementary focus on enabling institutions, highlighting the critical and changing role of development banks as well as national, regional, bilateral and multilateral development finance institutions in promoting sustainable infrastructure in developing countries.

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 Sharda Multi-Purpose Water Infrastructure in Kazakhstan. The OECD’s new Programme on Clean Energy Finance and Investment Mobilisation, funded by the Danish government, will help five emerging economies in Latin America and Asia to strengthen their domestic frameworks for finance and investment in renewable power and energy efficiency. The five-year programme will be delivered in close collaboration with governments and other relevant stakeholders.

Tracking the consistency of finance flows with climate objectives

The OECD-led Research Collaborative on Tracking Private Climate Finance together with Trade & Industrial Policy Strategies (TIPS), in collaboration with the South African National Treasury and Department of Environmental Affairs, has jointly led a case study on “Estimating Publicly-Mobilised Private Finance for Climate Action” (2017).

Beyond only looking at finance that contributes to climate action, there is a need to more broadly assess the consistency of finance flows with climate mitigation and adaptation objectives (as outlined for instance in the Article 2.1 of the Paris Agreement). This requires some degree of finance tracking, both in terms of public and private actors at a global scale. Against this

backdrop, the Research Collaborative has initiated scoping and data mapping work, which may inform both the Global Stocktake under the UNFCCC (see “International climate negotiations” on pages 4-5), as well as domestic policies towards making finance flows more consistent. Further, a forthcoming report will examine the alignment of development co-operation with the objectives of the Paris Agreement.

KEY PUBLICATIONS

Ang, G., D. Röttgers and P. Burli (2017), “The empirics of enabling investment and innovation in renewable energy”, *OECD Environment Working Papers*, No. 123, OECD Publishing, Paris, <http://dx.doi.org/10.1787/67d221b8-en>.

Crishna Morgado, N. and B. Lasfargues (2017), “Engaging the Private Sector for Green Growth and Climate Action: An Overview of Development Co-Operation Efforts”, *OECD Development Co-operation Working Papers*, No. 34, OECD Publishing, Paris, <https://doi.org/10.1787/85b52daf-en>.

OECD (2018), *Developing Robust Project Pipelines for Low-Carbon Infrastructure, Green Finance and Investment*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264307827-en>.

OECD (2018), *Inventory of Energy Subsidies in the EU's Eastern Partnership Countries, Green Finance and Investment*, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264284319-en>

OECD (2017), *Mobilising Bond Markets for a Low-Carbon Transition, Green Finance and Investment*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264272323-en>.

KEY WEBSITES

Centre on Green Finance and Investment – www.oecd.org/cgfi/
Green Budgeting – www.oecd.org/environment/green-budgeting
OECD Blended Finance – www.oecd.org/dac/financing-sustainable-development/development-finance-topics/blended-finance.htm

CONTACTS

Green Finance and Investment:

Robert Youngman – Robert.Youngman@oecd.org

GREEN Action Task Force:

Kumi Kitamori – Kumi.Kitamori@oecd.org

Private Finance for Sustainable Development:

Paul Horrocks – Paul.Horrocks@oecd.org

Paris Collaborative on Green Budgeting:

Juliane Jansen – Juliane.Jansen@oecd.org

Tracking Climate Finance:

Raphael Jachnik – Raphael.Jachnik@oecd.org



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.

Land use, including agriculture and forestry, is also critical for meeting climate goals under the Paris Agreement, with 24% of global greenhouse gas emissions stemming from agriculture, forestry and land use change. Effective climate change mitigation and 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 are inextricable, offering 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 adaption strategies, can also 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 also 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

In most regions, climate change is expected to negatively affect both crop and livestock production systems, although some countries may actually benefit from changing conditions, at least at lower levels of warming. The changing climate will also add to resource problems, such as water scarcity, pollution, and soil degradation. Agriculture also contributes to a significant share of the GHG emissions – 17% directly through agricultural activities and an additional 7-14% 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. Both of these gases have a significantly higher global warming potential than carbon dioxide, but are shorter-lived in the atmosphere.

Self-initiated efforts by farmers to adapt to climate change – while decreasing the GHG footprint of agriculture – are unlikely to be sufficient, given uncertainties surrounding future projections of weather patterns and extreme weather events. The share of

agriculture in global emissions, the need for further global mitigation efforts, and continued projected agricultural emissions growth in many countries underline the necessity of stronger, more effective policies. Reforms are needed to correct misaligned incentives and redirect policy efforts to specific investments that explicitly target climate and sustainability objectives.

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

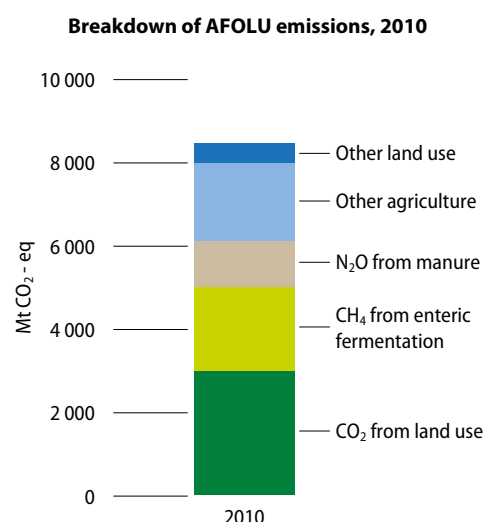
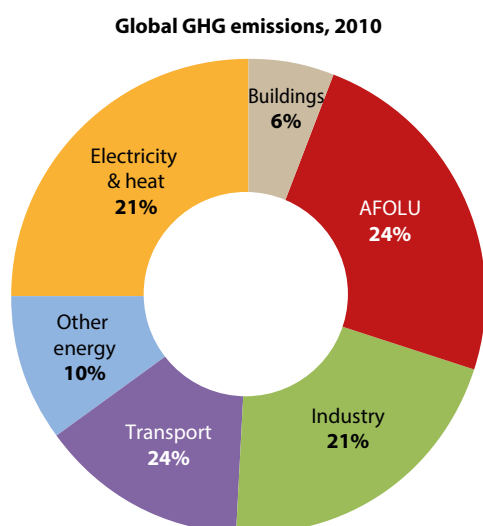
As highlighted in OECD/IEA/NEA/ITF (2015), *Aligning Policies for the Low-Carbon Economy*, sustainable land-management practices – reduced deforestation, restoring degraded land, better agricultural practices and increased carbon sequestration in soils and forests – could make a large contribution to the global climate change effort while delivering the productivity improvement needed to respond to growing food demands. The economic potential of options for reducing agricultural GHG emissions is highly dependent on their cost-effectiveness. The paper “Cost-effectiveness of greenhouse gas mitigation measures for agriculture” reviews the literature and discusses barriers to their adoption. The paper “Overcoming barriers to the adoption of climate-friendly practices in agriculture” examines options to deliver both mitigation and adaptation benefits.

Sustainable land-management practices can also improve the resilience of our economies to a changing climate by protecting ecosystems. OECD analysis on *Land use and ecosystem services in agriculture* (2017) illustrates that market and agricultural policy drivers have significant impact on ecosystem services and

that there is room for improving the design of the policy mix in OECD countries to address the provision of ecosystem services linked to agriculture. Overall, achieving sustainable land use will require an integrated approach which breaks down the silos between climate change, agriculture, food security, forestry and biodiversity policies. The synthesis report “Synergies and trade-offs between adaptation, mitigation and agricultural productivity” (2017) highlights that many agricultural policy instruments send inconsistent signals across the three objectives of adaptation, mitigation and productivity enhancement. More coherent policy frameworks will therefore be needed to address the

multiple and overlapping challenges. On-going OECD work on *Land use, climate mitigation, ecosystems and food: aligning policies in the land use sector* 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 a focus on those that have high GHG emissions from the land use sector, or have made progress in reducing these. Another strand of on-going OECD work on *Deepening the sustainable productivity framework by strengthening policy coherence* examines the coherence of government policies in enhancing productivity growth and several environmental sustainability dimensions.

Greenhouse gas emissions by sector (2010)



Source: Adapted from IPCC (2014) and FAOSTAT (2017). Prepared for OECD (forthcoming), *Land Use, Climate Mitigation, Ecosystems and Food*.

KEY PUBLICATIONS

Blandford, D. and K. Hassapoyannes (2018), “The role of agriculture in global GHG mitigation”, *OECD Food, Agriculture and Fisheries Papers*, No. 112, OECD Publishing, Paris, <https://doi.org/10.1787/da017ae2-en>.

Lankoski, J., A. Ignaciuk and F. Jésus (2018), “Synergies and trade-offs between adaptation, mitigation and agricultural productivity: A synthesis report”, *OECD Food, Agriculture and Fisheries Papers*, No. 110, OECD Publishing, Paris, <https://doi.org/10.1787/07dcb05c-en>.

OECD (2018), *Managing Weather-Related Disasters in Southeast Asian Agriculture*, OECD Studies on Water, OECD Publishing, Paris, <https://doi.org/10.1787/9789264123533-en>.

OECD (2016), *Mitigating Droughts and Floods in Agriculture: Policy Lessons and Approaches*, OECD Studies on Water, OECD Publishing, Paris, <https://doi.org/10.1787/9789264246744-en>.

KEY WEBSITES

Biodiversity – www.oecd.org/env/resources/biodiversity

REDD – www.oecd.org/cc/redd

Agriculture and Climate Change – www.oecd.org/tad/sustainable-agriculture/agriculture-andclimate-change

CONTACTS

Katia Karousakis – Katia.Karousakis@oecd.org

Jane Ellis – Jane.Ellis@oecd.org

Frank van Tongeren – Frank.VanTongeren@oecd.org

Franck Jesus – Franck.Jesus@oecd.org

Ben Henderson – Ben.Henderson@oecd.org

Guillaume Gruère – Guillaume.Gruere@oecd.org

Jussi Lankoski – Jussi.Lankoski@oecd.org



Cities and climate change

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 local 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 to better support cities and regions to meet their climate financing needs.

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 local 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 of national climate mitigation and adaptation

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/>.



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 coordination 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 coordination 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

Spatial Planning Instruments and the Environment (SPINE) is an ongoing OECD project to assess the environmental effectiveness and economic efficiency of spatially-related policy instruments, such as those focusing on land-use and urban transport. SPINE examines the urban form in OECD countries to identify how the organization of built environment affects the energy needs of modern cities, their dependency on private modes of transportation and, in turn, their CO₂ footprint. The above work is carried out through city case studies and cross-country comparative analyses.

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 involve, but are not limited to: road pricing, parking fees, incentives for the adoption of electric vehicles, zero-emission zones, density regulations and property taxation. Case studies are currently underway for a series of cities, including Auckland and Santiago with full-blown results expected in 2019.

In parallel, SPINE has undertaken the largest comparative analysis for the evolution of urban sprawl ever attempted. Using data from satellite images, urban sprawl indicators were constructed for 1156 OECD urban areas for different years (1975, 1990, 2000, 2014). An important finding of the study is that many cities continue to sprawl in ways not reflected in their average population density. In the future, these cities may be trapped in car dependency, as the provision of public transport will be more expensive.

KEY PUBLICATIONS

Delivering inclusive climate action in cities

OECD (2018), *Financing climate objectives in cities and regions to deliver sustainable and inclusive growth*, *Financing Climate Futures Case Studies*, OECD Publishing, Paris, <http://oe.cd/climate-futures>

OECD (2018), *Inclusive Growth in Seoul, Korea*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264290198-en>.

OECD (2016), *Making Cities Work for All: Data and Actions for Inclusive Growth*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264263260-en>.

OECD (2015), *All on Board: Making Inclusive Growth Happen*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264218512-en>.

Building resilient cities

OECD (2018), *Building Resilient Cities: An Assessment of Disaster Risk Management Policies in Southeast Asia*, OECD Publishing, Paris, www.oecd.org/publications/building-resilient-cities-9789264305397-en.htm.

Improving policy alignment and governance at the local level

OECD (forthcoming), *Delivering the Paris Agreement Through a Whole-of-Government Approach*, OECD Publishing, Paris.

Managing water in cities

OECD (2016), OECD Council Recommendation on Water, www.oecd.org/environment/resources/Council-Recommendation-on-water.pdf.

OECD (2015), *Water and Cities: Ensuring Sustainable Futures*, OECD Studies on Water, OECD Publishing, Paris, <https://doi.org/10.1787/9789264230149-en>.

OECD (2013), *Water and Climate Change Adaptation: Policies to Navigate Uncharted Waters*, OECD Studies on Water, OECD Publishing, Paris, <https://doi.org/10.1787/9789264200449-en>.

Strengthening Spatial Planning

OECD (2018), *Rethinking Urban Sprawl: Moving Towards Sustainable Cities*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264189881-en>.

KEY WEBSITES

Greening Cities, Communities and Regions – www.oecd.org/regional/greening-cities-regions/

Seoul Implementation Agenda – www.oecd-inclusive.com/champion-mayors-doc/seoul-implementation-agenda.pdf

OECD Case Study of Inclusive Growth in Seoul – www.oecd-inclusive.com/champion-mayors-doc/seoul-policy-highlights.pdf

Champion Mayors Platform – www.oecd-inclusive.com/champion-mayors/

Roundtable on Financing Water – www.oecd.org/environment/resources/roundtableonfinancingwater.htm

SPINE – www.oecd.org/env/tools-evaluation/spine-spatial-planning-instruments-and-the-environment.htm

CONTACTS

Inclusive climate action in cities:

Aziza Akhmouch – Aziza.Akhmouch@oecd.org
Virginie Marchal – Virginie.Marchal@oecd.org

Building resilient cities:

Tadashi Matsumoto – Tadashi.Matsumoto@oecd.org

Improving governance and policy alignment at the local level:

Tadashi Matsumoto – Tadashi.Matsumoto@oecd.org
Oriana Romano – Oriana.Romano@oecd.org

Water and cities:

Xavier Leflaive – Xavier.Leflaive@oecd.org

SPINE project:

Walid Oueslati – Walid.Oueslati@oecd.org

Subnational climate finance:

Dorothee Allain-Dupré – Dorothee.Allain-Dupre@oecd.org



FURTHER READING

Intergovernmental Panel on Climate Change (IPCC)

IPCC (2018), *Global Warming of 1.5 °C: an IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*, www.ipcc.ch/report/sr15/

Climate action and the economy

IEA (2017), Chapters 1 and 2 in *Perspectives for the Energy Transition: Investment Needs for a Low-Carbon Energy System*, International Energy Agency/OECD Publishing, Paris, www.energiawende2017.com/wp-content/uploads/2017/03/Perspectives-for-the-Energy-Transition_WEB.pdf.

NEA (2018), *The Full Costs of Electricity Provision*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264303119-en>.

OECD (2015), *Aligning Policies for a Low-carbon Economy*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264233294-en>.

International climate negotiations

Moarif, S. (2017), "Information needed for the clarity, transparency and understanding (CTU) of mitigation contributions", *OECD/IEA Climate Change Expert Group Papers*, No. 2017/01, OECD Publishing, Paris, <http://dx.doi.org/10.1787/2227779X>.

OECD (2017), *OECD DAC Rio Markers for Climate: Handbook*, OECD, Paris, www.oecd.org/dac/environment-development/Revised%20climate%20marker%20handbook_FINAL.pdf.

Vaidyula, M. and J. Ellis (2017), "Information needs for the 2018 facilitative dialogue: issues and options", *OECD/IEA Climate Change Expert Group Papers*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/2227779X>.

Vallejo, L., S. Moarif and A. Halimanjaya (2017), "Enhancing mitigation and finance reporting", *OECD/IEA Climate Change Expert Group Papers*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/2227779X>.

Moving to low-emissions pathways

OECD (forthcoming), *Business Models for the Circular Economy: Opportunities and Challenges from a Policy Perspective*, OECD Publishing, Paris.

OECD (2015), *Climate Change Mitigation: Policies and Progress*, OECD Publishing, Paris.
<http://dx.doi.org/10.1787/9789264238787-en>

OECD (2015), *The Economic Consequences of Climate Change*, OECD Publishing, Paris.
<http://dx.doi.org/10.1787/9789264235410-en>

Dellink, R., et al. (2017), "International trade consequences of climate change", *OECD Trade and Environment Working Papers*, No. 2017/01, OECD Publishing, Paris,
<http://dx.doi.org/10.1787/9f446180-en>.

Green finance and investment

OECD (2018), *Mobilising Finance for Climate Action in Georgia*, Green Finance and Investment, OECD Publishing, Paris, <https://doi.org/10.1787/9789264289727-en>.

OECD (2018), *Strengthening Sharda Multi-Purpose Water Infrastructure in Kazakhstan*, OECD Studies on Water, OECD Publishing, Paris,
<https://doi.org/10.1787/9789264289628-en>.

Climate resilience and adaptation

Kato, T. and J. Ellis (2016), "Communicating progress in national and global adaptation to climate change", *OECD/IEA Climate Change Expert Group Papers*, No. 2016/01, OECD Publishing, Paris,
<http://dx.doi.org/10.1787/5jlww009v1hj-en>.

OECD (2018), *Preventing the Flooding of the Seine in the Paris-Ile de France Region: Progress Made and Future Challenges*, OECD Publishing, Paris,
<https://doi.org/10.1787/9789264289932-en>.

OECD (2017), *OECD Review of Risk Management Policies Morocco*, OECD Publishing, Paris,
<https://doi.org/10.1787/9789264276482-en>.

OECD (2015), *Climate Change Risks and Adaptation: Linking Policy and Economics*, OECD Publishing, Paris,
<http://dx.doi.org/10.1787/9789264234611-en>.

OECD (2015), *National Climate Change Adaptation: Emerging Practices in Monitoring and Evaluation*, OECD Publishing, Paris,
<https://doi.org/10.1787/9789264229679-en>.

Land-use, ecosystems and agriculture

Hardelin, J. and J. Lankoski (2018), "Land use and ecosystem services", *OECD Food, Agriculture and Fisheries Papers*, No. 114, OECD Publishing, Paris,
<https://doi.org/10.1787/c7ec938e-en>.

OECD (2018), *Facilitating the Reform of Economic Instruments for Water Management in Georgia*, OECD Studies on Water, OECD Publishing, Paris.
<https://doi.org/10.1787/9789264281776-en>.

OECD (2017), *The Land-Water-Energy Nexus: Biophysical and Economic Consequences*, OECD Publishing, Paris,
<http://dx.doi.org/10.1787/9789264279360-en>.

OECD (2016), *Biodiversity Offsets: Effective Design and Implementation*, OECD Publishing, Paris,
<https://doi.org/10.1787/9789264222519-en>.

OECD reports on the governance of land-use
www.oecd.org/gov/governance-of-land-use.htm

Cities and climate change


Cárdenas Rodríguez, M., L. Dupont-Courtade and W. Oueslati (2015), "Air Pollution and Urban Structure Linkages: Evidence from European Cities", *OECD Environment Working Papers*, No. 96, OECD Publishing, Paris,
<https://doi.org/10.1787/5jrp6w9xlbq6-en>.



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



For more information:

 oe.cd/climate-action

 [@OECD_ENV](https://twitter.com/OECD_ENV)