

Climate Action: Time for implementation

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OECD Secretary-General

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It is a privilege to address one of the world's leading universities. The Munk School of Global Affairs shares a commitment with my own organisation, the OECD: a commitment to improve the world's public policies and governance.

I want to focus on the urgent and systemic issue of climate change, which is more than just an environmental problem. Just two days ago, the 2017 Lancet Countdown report was released, showing that climate change is already a critical public health issue, one disproportionately affecting the most vulnerable as well as those least responsible for anthropogenic warming.¹ Climate change is the result of our fossil-fuel entangled global economy. The World Meteorological Organisation (WMO) announced just a couple of days

ago that atmospheric carbon dioxide concentrations continue to rise rapidly, and that their rate of growth in 2016 was 50% above the 10-year average before that. Concentrations of CO₂ are now 145% of pre-industrial (before 1750) levels, the highest in 800,000 years.²

Powerful interests continue to resist the transition towards a low-carbon economy, even as the old model is dying. Now is the time to accelerate our efforts. Our response today will define our collective future for generations to come.

This is the third in a series of climate lectures that I have given over the years. The first, in 2013, highlighted that emissions to the atmosphere from the combustion of fossil fuels need to be completely eliminated in the second half of this century. The concept of zero net emissions that I promoted was controversial then; it is widely accepted now. Indeed, carbon dioxide emissions may even need to become negative on a net basis to achieve our goals.

My second lecture in 2015 focused on the most urgent threat to climate policy: the scale of new investment in unabated coal-fired electricity generation still being planned. Coal power is no longer cheap given rapid advances in renewables and the heavy costs of air pollution. It is also the least effective way of using the small carbon budget remaining consistent with a well-below 2 degrees Celcius target.³

I am extremely pleased to be giving my third climate change lecture in Canada. Prime Minister Trudeau's election in October 2015 and his progressive climate agenda was part of the political sea-change that contributed to the success of the COP21 meeting in Paris. In her recent interview with the Financial Times, Environment Minister McKenna demonstrated a commitment to tackling climate change and a keen awareness of the transitional challenges that Canada faces, as well as of the economic opportunities for jobs and growth that investment in clean technology will create.⁴

The OECD has just completed an Environmental Performance Review of Canada, which will be launched later this year. Canada certainly faces major challenges in overcoming its own carbon entanglement: it is the fourth largest emitter of greenhouse gases in the OECD⁵, with continuously rising fossil fuel use for transport, and through the development of oil sands. We have seen progress, but not yet a decisive downturn in emissions. More positively, four provinces have already implemented a carbon pricing mechanism and the new Pan-Canadian Framework on Clean Growth and Climate Change includes a Canada-wide carbon pricing by 2018. However, there is no cause for complacency. The Canadian Environment Commissioner's recent perspective⁶ is a salutary reminder that plans need to be turned into action. And action needs to be accelerated and amplified, not just in Canada but globally.

Strong climate action is not a threat to, but the foundation of our future economic well-being. Our recent report, "Investing in Climate, Investing in Growth", produced for Germany during its G20

Presidency, emphasises that countries can achieve strong and inclusive economic growth while reorienting their economies towards development pathways with low greenhouse gas emissions and high resilience to the effects of climate change.

The “inclusive” part of this statement is not an optional extra; it is essential, both nationally and internationally. Alberta’s Climate Leadership Plan, which pledges to phase out pollution from coal-fired electricity generation by 2030, is a promising example of how governments can engineer that transition in a ‘just’ way by providing support to affected communities. Another example is Canada’s commitment to work with Indigenous communities, which are among the most vulnerable to climate change due to their remote locations and reliance on functioning ecosystems that are changing faster than virtually anywhere else on the planet.⁷ This is an area where we are already working together with the Canadian authorities.

The tragedy of the national horizon

A few months after my second speech, a well-known Canadian, the Bank of England Governor, Mark Carney, highlighted the costs we impose on future generations because of the short-term horizons of current decision-makers in government and business.⁸ Not only did Governor Carney diagnose the problem of the “tragedy of the horizon” and the transition risks associated with the move to a low-emissions development pathway, he also proposed a solution. As chair of the Financial Stability Board, he established the industry-led task force that calls for voluntary climate-related financial disclosures to help investors, lenders and insurance underwriters better evaluate and price climate risks. It now needs to be acted on by businesses, governments and regulators as a matter of urgency.

However, there are other, equally fundamental barriers to overcome. Chief amongst these is what might be termed the “tragedy of the national horizon”, an insistence on fashioning policies designed to address climate change primarily, if not exclusively, from a national perspective. Yet greenhouse gases emitted anywhere in the world have impacts globally. Narrow national agendas are fundamentally inadequate to deal with global climate disruption.

Economically efficient action on climate requires countries to set their emission reduction efforts based on the marginal benefits of avoided climate damages globally — the so-called “social cost of carbon”. The US EPA, however, is now proposing a far smaller, purely national measure of climate damages as the basis for its decisions.⁹ The roll back of environmental legislation¹⁰ risks reversing many years of progress on curbing damaging air pollution as well as climate change, and further entrenching unsustainable economic activity. The key to future prosperity lies in new technologies and business models, and in new approaches to regulations, not in going back to the old ones.

The tragedy of the time horizon and that of the national horizon are mutually reinforcing. Short-termism and a narrow focus on national interests undermine effective action on emissions and limit the provision of resources to help the poorest and most vulnerable to cope with the climate impacts we already face and which will become increasingly severe. As well as deepening current patterns of poverty and inequality, inaction by the current generation further mortgages the future prospects of our children, grandchildren.

We are in a race against time. Without vision, ambition and resolve, more countries may yet retreat further into their national bunkers. The outcome would be a downwards spiral of increasing human, fiscal, financial and environmental insecurity. We would all suffer in such a bleak scenario.

A far more positive future still lies within our grasp, however. We have the means and the ingenuity to make a decisive transition to an inclusive, low-emissions, climate-resilient development pathway that benefits developed and developing countries alike. We need to combine pro-growth structural reforms

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with coherent climate policy and ensure that they are aligned with other sustainable development goals.¹¹

In the Paris Agreement of December 2015, we now have an international legal instrument that could measure up to the scale and urgency of the climate challenge.

The Intergovernmental Panel on Climate Change (IPCC) was crucial in providing the authoritative scientific assessment that persuaded countries of the urgency of the challenge. Countries can no longer credibly argue that better evidence is needed before we take action to mitigate climate change. Leaders and governments have a responsibility to respond to that evidence and implement the policies needed to address this unprecedented global challenge.

The OECD was pleased to have played a positive role, both through the OECD-IEA Climate Change Expert Group as well as by providing greater transparency about developed countries' progress in meeting their commitment to mobilise USD 100 billion a year for climate action in developing countries by 2020.

The Paris Agreement

The Paris Agreement differs fundamentally from previous climate agreements. Contributions to emissions reductions beyond 2020 are set out in the so-called nationally determined contributions or NDCs. Already 190 countries have pledged contributions to 2025 or beyond¹², and these represent more than 96 percent of global emissions as of 2016¹³. Climate finance commitments by developed countries will play a vital role in facilitating higher levels of mitigation in emerging and developing countries. The Agreement has three main aims:

- To limit the rise in global temperatures to well-below 2 degrees with an aspirational goal of 1.5 degrees;
- To foster resilience and increase the ability to adapt; and
- To make finance flows compatible with a low-emissions, climate-resilient development pathway.

The first opportunity to take stock of countries' collective mitigation efforts will be the Facilitative Dialogue to be held in 2018. It will also inform the preparation of subsequent NDCs, and could potentially influence updated, more ambitious versions of the current NDCs. Every five years thereafter, global stocktakes will provide further assessments of collective progress towards achieving the purpose of the Paris Agreement, covering mitigation and adaptation as well as issues such as finance, technology and capacity building.

As transparency, trust and confidence builds, the intention and hope is that countries will be more ambitious in the emissions reduction contributions they offer in each successive round of NDCs. As we argued in our "Investing in Climate, Investing in Growth" report, current economic conditions in many countries provide a window of opportunity to boost growth and investment that will drive the transition to a prosperous and inclusive low-emissions, resilient future. Ambitious climate policy is simply good public policy.

We are already seeing progress. With unprecedented speed, the Agreement entered into force ahead of the 22nd Conference of the Parties meeting in Marrakesh, less than a year after its negotiation. And the IEA reported that in 2016 energy-related carbon dioxide emissions were flat for the third year in a row.¹⁴

In October 2016, the Kigali Amendment to the Montreal Protocol¹⁵ was agreed. This provides a timetable and mandate for countries to reduce over time the production and usage of

hydrofluorocarbons, a more ozone-friendly substitute for earlier chemicals used in refrigerators and air conditioning, but which are also powerful greenhouse gases.¹⁶

The Chinese G20 Presidency in 2016 took the lead on critical green finance issues and the OECD was glad to lend its support. And while the full implications of the FSB Task Force's recommendations on disclosure have yet to be seen, some countries, like France, have made climate disclosure mandatory.¹⁷ In June this year at the G20 Leaders' Summit, 19 of the 20 represented reaffirmed their commitment to implementing the Paris Agreement.

President Macron's 12 December climate summit on the two-year anniversary of the Paris Agreement is an important part of the French government's efforts to make the Agreement irreversible. I also hope that the US government might find it possible to reconsider its decision to leave the Agreement at a future moment.

Consequences of the tragedies of the horizons

The success of the Paris Agreement is based on a national pledge and review mechanism, underpinned by collective transparency and review mechanisms. In other words, it is a hybrid of bottom-up and top-down approaches, which risks giving primacy to the "national horizon" if the transparency and review mechanisms prove ineffective. Short-term national self-interest needs to be confronted with both the urgency and severity of the challenge and the inadequacy of our response so far.

The various authors of the Paris Agreement, of course, were not blind to this. That is why the Agreement created a transparency and review framework that allows countries to increase the level of ambition in their emissions reduction over time, while assuming that other countries are also doing their fair share. In that way, it was thought that concerns over free-riding and carbon-leakage could be addressed – at least to some extent.

The dual tragedies of national and time horizons mean that we are starting this journey from a low level of ambition. In particular, they have led to three key challenges that countries must address both individually and through the Paris Agreement's transparency and review provisions if the Agreement's ambitious goals are to be achieved, namely:

- **First**, there is an inevitable and serious shortfall in the aggregate level of pledged emissions reductions. Current NDCs are insufficient to meet the Paris goal of limiting the temperature increase to well below 2 degrees, let alone to 1.5 degrees.¹⁸ Without a rapid and significant acceleration of mitigation action, we are heading for an end of century average increase in the global surface temperature of between 2.6 and 3.1 degrees Celsius under present commitments in the NDCs.¹⁹
- **Second**, even the "well-below 2°C" goal is probably insufficient to avoid major climate impacts.²⁰ Many extreme weather events will become more extreme and frequent, especially those related to extreme heat.²¹ Floods, droughts and wildfires are projected to increase and coastal flooding will be exacerbated both by population growth and the inevitable rise in sea-level.²² Food insecurity will likely be exacerbated,²³ and the complex and poorly understood interactions between climate, migration and social conflict may pose further challenges.²⁴ Most OECD countries have set up transboundary emergency response mechanisms, which can be activated to support a country hit by a disaster or to benefit from emergency support from other countries.²⁵ The world has shown that we are ready to co-operate after such events, but we also need to act more forcefully together to reduce climate risks before disasters occur.
- **Third**, the NDCs reflect different levels of mitigation ambition, in part reflecting diverse country circumstances, and will therefore result in different marginal costs of mitigation across countries.

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The economic efficiency of the Paris Agreement could be significantly improved if the international community could establish a process of convergence of carbon prices across countries, for example through flexible market mechanisms. This is a global challenge that Canada faces at the national level, with different carbon prices applying in different provinces. Full emissions allowance trading internationally could halve the costs of achieving the NDCs.²⁶

There is also the additional challenge of how to encourage and support countries to align their short-term NDCs with the transformational national emissions pathways required by 2050 and beyond. Many countries have not even set a long-term emissions goal. There is clearly a risk that some NDCs may therefore encourage investments that lock countries into a high-levels of future emissions. Unless of course they are willing and able to absorb the costs of stranding those same assets later on.

The IEA recently estimated that over USD 300 billion dollars of coal power generation assets were at risk of becoming stranded by 2030 under a scenario consistent with a 66% chance of keeping global warming below 2 degrees.²⁷ Canada plans to phase out coal-fired power generation not equipped with CCS by 2030. China has already significantly reduced its plans to build new coal-fired power plants, but much more remains in the pipeline both in China and globally. Almost 150 GW of coal power generation are currently under construction in China²⁸, which is broadly equivalent to the current total power capacity in operation in Canada.

A handful of far-sighted countries have formulated strategies for 2050.²⁹ They have taken a view about the scale and pace of transformation that is appropriate to their circumstances and have elaborated a long-run emissions trajectory to achieve this. The European Union has committed to reducing emissions by 80 percent relative to 1990 levels by 2050. And its NDC provides greater granularity on what its Member States should do by 2030 to achieve this.³⁰ However, that is not to say that even countries and regions with such a long-term pathway should not go faster or further. Achieving the scale and pace of reductions required to meet the Paris temperature goal will not be possible unless all large emitting countries step up their efforts.

Increasing ambition: faster and further!

Greater disclosure of climate-related risks is being promoted as one of the key ways to overcome the tragedy of the time horizon, at least in the private sector. And the transparency and review provisions of the Paris Agreement aim to help overcome the tragedy of the national horizon, at least in part and over time. But the challenge is urgent and action cannot wait. So even though we know this is not adequate in the long term, we need to build on national motivations to increase the ambition of action now.

There is a strong argument that, even from a purely national perspective, current NDCs are insufficiently ambitious. I want to highlight three important considerations that countries may not have adequately factored into their emissions contributions:

- **First, countries are linked through intricate trade and global value chains.** Damages elsewhere in the world can impact in ways that countries may not fully understand. Think about the floods in Thailand in 2012 that disrupted global value chains.³¹ Responsible policy and corporate climate-risk disclosure should take adequate account of these inter-linkages, which should in turn encourage greater ambition in national emissions reduction efforts even if they remain constrained by national horizons.
- **Second, the potential for the climate system to throw up nasty surprises such as even more extreme events and possible “tipping points”.** While the precise extent of the contribution of climate change to the recent Atlantic hurricanes will take time to uncover,³² there is already strong evidence that higher sea surface temperatures as a result of climate change increase the intensity

of tropical storms when they develop. And, as the World Meteorological Organization (WMO) Expert Team on Climate Impacts on Tropical Cyclones made clear at the time, the rainfall rates associated with Hurricane Harvey were likely made more intense by climate change.³³ The interaction between climate change and extreme weather events would seem to justify a more precautionary approach than reflected in the current NDCs, even if policy makers remain constrained within their national horizons. And this is even more true in large emitting countries that are also vulnerable to climate impacts, since they will experience more of the global externalities of climate change.

- **Third, purely national incentives to reduce emissions should also be enhanced by the co-benefits of mitigation action**, such as improved health from reduced air pollution and reduced traffic congestion from greater use of public transport. The extent of these problems is now becoming more widely appreciated and will only increase in severity without targeted action. Air pollution in particular can be a substantial and major driver of climate action, since to a large extent, the same economic activities – coal-fired power, transport, agriculture – lead to emissions of greenhouse gases and air pollutants. So controlling those sources, not least through increased energy efficiency, leads to multiple benefits that are local and global, short-term and long-term. Linking action on air pollution and climate is a particularly powerful way of overcoming the tragedies of national and time horizons.

Rapid technological development and, for developing countries, the availability of climate finance and other support will also enable governments to justify more ambitious action even within a purely national horizon. The pace of innovation and technological advance in particular is creating a powerful competitive dynamic. The ambition is staggering:

- The Swedish government wants to make its domestic vehicle fleet independent of fossil fuel by 2030.³⁴ France aims to end the sale of gasoline and diesel cars by 2040 and become carbon neutral by 2050.³⁵ According to the IEA, 750,000 electric vehicles were sold in 2016, raising the global stock to two million out of a total of 77.31 million total cars.³⁶
- The UK is drastically expanding its offshore wind capacity. The UK presently has 30 offshore windfarms generating 5.1 GW of operational capacity with a further 4.5 GW under construction. Offshore wind meets around 5 percent of the annual UK electricity requirements and this is expected to grow to 10 percent by 2020.³⁷
- Developing countries are also taking initiative. The Climate Vulnerable Forum countries³⁸ aim to meet all their energy needs from renewable energy as rapidly as possible.³⁹
- Earlier this year in India, competitive bids from companies to supply renewable-energy power-purchase contracts; clean electricity fell to as little as 3.8 cents a kilowatt-hour, far below the cost of fossil-fuel alternatives.⁴⁰ The record is sharply below the previous bids around 5 cents.⁴¹

We must go beyond the national horizon

Action based on purely national considerations can only take us so far, however. Climate is a global problem and the level of mitigation action in each country should reflect the global, not the national, level of marginal climate damages.

One way in which countries can be helped to partially overcome national horizons is by working in coalitions, sometimes in partnership with sub-national governments and other so-called non-state actors, are also driving action on specific climate issues today and they have the potential to play a bigger role in future. Notable examples of such initiatives include the Friends of Fossil Fuel Subsidy Reform and the Climate and Clean Air Coalition which focuses on maximising the climate and co-benefits of action on non-carbon dioxide greenhouse gases and other pollutants affecting the climate, such as black carbon. Such coalitions may have a significant role in facilitating the implementation of the NDCs.⁴²

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Non-state actors continue to have a vital role to play in helping national governments overcome the barriers to more ambitious and urgent action since their interests are not completely contained within national horizons. Such actors include mainstream business and financial organisations, cities and other sub-national governments, intergovernmental organisations and non-governmental organisations. For example:

- A **business** dependent on global value chains will take a very different view than a national government about future climate impacts in a different region. Think, for example, of Coca-Cola and its boycott by retailers in Southern India due, in part, to concerns that multinationals are exploiting India's scarce water resources.⁴³
- **Insurance companies have to be at the leading edge of action in the financial sector.** They are exposed to climate risks on both sides of their balance sheet – to exit risks from ownership of fossil-intensive assets, and from climate impacts on insured assets. AXA for instance committed in 2015 to divest EUR 500 million from coal and increase its clean energy investment by EUR 3 billion by 2020. As of mid-2015, over 80 insurers and organisations had adopted the UNEP FI Principles for Sustainable Insurance Initiative, including insurance companies representing about USD 14 trillion in assets under management.
- **Pension funds** with long-term liabilities and assets exposed to climate risk are also pioneering efforts to decarbonise their asset portfolios. In 2015, three Danish pension funds (worth 32 billion and covering approximately 5 percent of workers) voted to divest coal, high risk oil, and gas investments.⁴⁴ Some sovereign wealth funds are also moving in this direction.
- **Financial markets are also responding.** Green bond issuance is expected to reach USD 130 billion in 2017, an increase of nearly 50 billion from 2016.⁴⁵ As the market grows, an increasing number of countries are introducing national guidelines relating to eligibility criteria and green definitions. Introducing a taxonomy and a standard at the European level is also on the agenda of the European Union.⁴⁶
- **Cities** are home to more than half of the world's population (54.5% in 2016), consume 70% of the world's energy, and account for a roughly equivalent share of global greenhouse gas emissions.⁴⁷ Given the way in which they concentrate physical, human and financial assets, they are also disproportionately vulnerable to climate impacts. Quality of life, air and infrastructure are critical to their future performance.⁴⁸ Actions by cities will have major consequences for our ability to manage and adapt to climate risks. For example, Paris recently announced a plan to banish all diesel and petrol cars from the city centre by 2030.⁴⁹
- **International organisations** have a critical role to play. Not just in their role as Secretariat to the UN Framework Convention on Climate Change. The Multilateral Development Banks will be critical in efforts to mobilise the trillions of dollars needed in investment to meet the Sustainable Development Goals, which of course includes action on climate change. And private investment will not flow unless there are core climate policies in place and a sound enabling environment. This makes the role of international organisations such as the OECD even more vital. Robust economic and policy analysis and platforms for knowledge exchange and mutual learning between countries will be vital as we move through this transformation.

What governments need to do

Governments remain pivotal, however. The ability and effectiveness of initiatives at regional, city, business and NGO level still depend to a large extent on the actions of central or subnational governments. They can either facilitate and enable efforts, or block them either directly or indirectly.

For example, Michael Bloomberg recounted in his recent book how New York State thwarted his efforts to introduce congestion charging in New York City.⁵⁰

National governments must take the lead and do so with a recognition that they are part of a global effort, looking beyond the national horizon. The range of actions is not rocket-science, but it can be politically daunting. But this is no excuse for not acting. Procrastination will only make the challenges even harder. A first step is to set a challenging but realistic level of ambition. The Nordic countries are a good example. By 2050, Sweden intends to achieve zero net emissions of greenhouse gases⁵¹ and Denmark has committed to a 100% renewable energy supply.⁵² Norway's target is to be carbon-neutral in 2030, depending on the emissions cuts made by others, and by 2050, regardless of others.⁵³

To deliver on these targets, governments need to set carbon prices that increasingly reflect the global, not just the national, social cost of carbon. It is very well understood that carbon pricing can be a powerful, cost-effective tool for aligning incentives and steering producers and households towards low-carbon and growth-oriented behaviour and investments. However, carbon prices have been too low so far. Many carbon dioxide emissions are not priced at all, and over 90% are priced at less than EUR 30 per tonne of CO₂ (which is a conservative estimate at best)⁵⁴. Financial and technological support is needed from developed countries if developing countries are to increase the pace and scale of their action.

Governments must also reform and phase out fossil-fuel subsidies. Fossil-fuel subsidies act as negative carbon price signals and are a drag on the economy and on climate action. Globally, fossil fuel subsidies still amount to around half a trillion dollars a year.⁵⁵ And fossil-fuel subsidies are regressive. They disproportionately benefit those with upper and middle incomes, which ultimately, translates into larger fiscal costs for governments.

Governments should also ensure that wider policy, financial and planning frameworks are aligned with our aspirations for inclusive and climate-compatible growth. Long-term planning in infrastructure is key if we are to avoid further carbon lock-in from the trillions of US Dollars spent annually on infrastructure.⁵⁶ Long-term, low-emission infrastructure investment plans are necessary to mobilise capital from public and private sources. Targeted measures can compensate for any potentially regressive impacts of climate policy on poor households. Past experience of industrial transitions shows that workers and communities relying on GHG-intensive activities should be actively engaged early in planning the transition.

We have seen the tremendous cost reductions in solar and wind technology and the emergence of new business models in transport. But much remains to be done to ensure that we have the full portfolio of technologies needed later this century, in particular on carbon capture and storage and large-scale energy storage. Governments must step up to the mark, as Canada is doing by pioneering carbon capture, utilisation and storage technology, hosting two large-scale facilities in Saskatchewan and Alberta.⁵⁷ Climate change offers enormous economic opportunities now for those that want to take advantage of them. Innovation and intelligent public procurement are already creating new markets and new business models.

Technology is also changing our values and communities. Nations are, in the often quoted words of Benedict Anderson, "imagined communities". But we are also members of nested communities at different scales from families to virtual networks that span the globe. So while we may be citizens of one (or perhaps more) countries, we are increasingly globally connected. Challenges such as climate remind us that we are inhabitants of one shared planet and demand that we go beyond our national horizons.

Ladies and Gentlemen,

Vested interests will continue to resist, but societal and technological transformation is now irreversible. The only question is whether the transition will happen quickly enough. Such a transition should be a just transition, nationally and internationally. Stranded communities are more important than stranded assets. The risk of both increases if action is delayed. Action on issues such as local air pollution will help align short-term, national incentives with climate action over the next decade or two. And advances in technology will continue to enable and drive the transformation. But the pace and scale of the transformation required to meet the Paris goals cannot be achieved without the positive feedbacks between strong government policies and the transformative potential of non-state actors. Developed countries also have to ensure that developing countries have access to the financial, technological and other support needed for them to scale up their own actions.

The vast majority of governments are now committed to both an ambitious global temperature goal and national actions to limit emissions. The Paris Agreement provides new hope that the tragedies of both time and national horizons can be overcome. The Agreement provides the necessary dynamism to ensure that the ambition of action increases over time. Now is the time for governments above all, but also cities, businesses and ordinary citizens, to accelerate and scale up our efforts. As I stated at the outset, our response will define our collective future for generations to come.

Notes

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40. <http://www.independent.co.uk/environment/solar-energy-prices-india-drop-record-low-cheaper-fossil-fuel-power-phelan-aaada-bhadra-plyush-goyal-a7730226.html>
41. <https://www.bloomberg.com/news/articles/2017-06-01/cheaper-solar-in-india-prompts-rethink-for-more-coal-projects>
42. See for example, van Asselt H (2017), *Climate change and trade policy interaction*, OECD Trade and Environment Working Papers 2017/03.
43. <https://www.bloomberg.com/news/articles/2017-03-16/pepsico-coca-cola-fight-patriotism-in-drought-hit-indian-state>
44. <https://www.theguardian.com/environment/2015/may/05/members-of-three-danish-pension-funds-vote-to-divest-from-fossil-fuels>
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48. Subnational investment accounted for 59% of public investment in 2015 in OECD countries and 40% worldwide, OECD/UCLG, 2016
49. Plan Climat. <https://www.ecologique-solidaire.gouv.fr/sites/default/files/2017.07.06%20-%20Plan%20Climat.pdf>. This is an addition to no-car zones in the city, car free days, and fines for drivers who enter the city with a car that is more than twenty years old. Source: <http://www.independent.co.uk/environment/paris-petrol-diesel-car-ban-2030-gas-guzzlers-emissions-air-pollution-evs-france-a7996246.html>, <https://www.standard.co.uk/news/world/paris-to-ban-all-combustion-engine-petrol-diesel-cars-by-2030-a3656821.html>
50. Michael Bloomberg intended to institute a 8 USD charge for cars and 21 USD charge for lorries who entered Manhattan south of 60th Street between 6am and 6pm on weekdays to cut traffic and pollution. However, the state assembly shelved the plan. [<https://www.theguardian.com/politics/2008/apr/08/congestioncharging.pollution>]
51. https://ec.europa.eu/clima/sites/clima/files/strategies/progress/reporting/docs/se_2014_en.pdf
52. <https://cleantechnica.com/2016/03/09/denmark-the-little-country-with-big-renewable-energy-goals/>
53. <http://climateactiontracker.org/countries/norway.html>
54. In 41 countries representing 80% of world energy use. (<https://www.oecd.org/tax/tax-policy/effective-carbon-rates-on-energy.pdf>)
55. IEA (2014), *World Energy Outlook 2014*, International Energy Agency, Paris, <http://dx.doi.org/10.1787/weo-2014-en>.
56. According to “Investing in Climate, Investing in Growth”, OECD (2017) global infrastructure needs amount to around USD 6 trillion even without further action on climate. Achieving the Paris goal might add around 10% to these costs, but would result in significant avoided damages and fuel cost savings.
57. <http://www.newswire.ca/news-releases/quest-carbon-capture-and-storage-project-reaches-significant-one-year-milestone-593380811.html>

