THE **NEW** CLIMATE **ECONOMY**

The Global Commission on the Economy and Climate

Photo: REUTERS/Rupak De Chowdhuri.

UNLOCKING THE INCLUSIVE GROWTH STORY OF THE 21ST CENTURY:

ACCELERATING CLIMATE ACTION IN URGENT TIMES

Key Findings and Executive Summary

Key Findings

- We are on the cusp of a new economic era: one where growth is driven by the interaction between rapid technological innovation, sustainable infrastructure investment, and increased resource productivity. This is the only growth story of the 21st century. It will result in efficient, liveable cities; low-carbon, smart and resilient infrastructure; and the restoration of degraded lands while protecting valuable forests. We can have growth that is strong, sustainable, balanced, and inclusive.
- Over the last decade, we have seen amazing technological and market progress driving the shift to a new climate economy. We are seeing real results in terms of new jobs, economic savings, competitiveness and market opportunities, and improved wellbeing for people worldwide. And this progress in the real economy has been delivered on the back of often weak or even contradictory policies in countries. How much more could be achieved in the coming years with clear, consistent policy signals?

- In 2014, the Global Commission on the Economy and Climate concluded that ambitious climate action does not need to cost much more than business-as-usual growth. The evidence today shows that climate action is even more attractive than we imagined then. This remarkable new growth opportunity is now hiding in plain sight.
- Yet we are not making progress anywhere near fast enough. While many private sector players are stepping-up, policy-makers in most countries still have the hand-brake on. We are now at a fork in the road.
- The next 10-15 years are a unique 'use it or lose it' moment in economic history. We expect to invest about US$90 trillion in infrastructure to 2030, more than the total current stock. Ensuring that this infrastructure is sustainable will be a critical determinant of future growth and prosperity. The next 10-15 years are also essential in terms of climate: unless we make a decisive shift, by 2030 we will pass the point by which we can keep global average temperature rise to well below 2°C.
- We know that we are grossly under-estimating the benefits of this new growth story. Current economic models are deeply inadequate in capturing the opportunities of such a transformational shift, or the grave dangers of climate inaction. We need a new class of economic models that can capture the powerful dynamics at play, including technological advances, preservation of essential natural capital, and the full health benefits of cleaner air and a safer climate including the containment of pandemic diseases.
- While recognising the shortcomings of current economic models, analysis produced for this Report found that bold action could yield a direct economic gain of US$26 trillion through to 2030 compared with business-as-usual. And this is likely to be a conservative estimate.
- Making such a shift would also limit dangerous climate change. With each passing year, the risks of unabated climate change mount. The last 19 years included 18 of the warmest years on record, worsening food and water security risks and increasing the frequency and severity of hazards such as wildfires. Disasters triggered by weather- and climate-related hazards were responsible for thousands of deaths and US$320 billion in losses in 2017. Climate change will lead to more frequent and more extreme events like these, including floods, droughts, and heat waves. It is increasingly our 'new normal'.

Photo: Visty Banaji.

- The challenge now is to accelerate the transition to a better, more inclusive, new climate economy in five key economic systems: energy, cities, food and land use, water, and industry.

- We have a remarkable window of opportunity to do so now, given the major structural changes the world faces, notably rapid urbanisation, increasing globalisation, shifts to service-based economies, and increasing automation. The opportunities are great, but so too is the potential for stranded assets, stranded communities, and stranded workers. The transition to a low-carbon, resilient economy is just one part of this broader transformation, which – if managed well – has the potential to deliver more equitable and prosperous growth. Ensuring an inclusive transition is essential: women, for example, will play a critical role in delivering the promise of this new growth era.

- **The next 2-3 years are a critical window** when many of the policy and investment decisions that shape the next 10-15 years will be taken. Priorities for urgent action are:

- **Pricing carbon and moving toward mandatory disclosure of climate-related financial risks, as part of a broader policy package.** Carbon pricing is now in place or planned in 70 countries or jurisdictions, but in most places the price levels are too low to drive transformational change. Deepening and widening carbon pricing is essential, as is implementing effective reform of distorting fossil fuel subsidies. Implementing the recommendations of the Task Force on Climate-Related Financial Disclosure (TCFD) on a broad scale will enable radical transparency for investors to better understand the risks of current investments and the opportunities of shifting toward low-carbon, resilient alternatives.

- **Accelerating investment in sustainable infrastructure, supported by clear national and sub-national strategies and programmes**. This is a central driver of the new growth approach. It requires integrating climate action and sustainability at the heart of growth strategies, investment plans, and institutional structures to facilitate the flow of public and private finance. It includes investing in the natural infrastructure that underpins our economy, such as forests and wetlands. Multilateral development banks (MDBs) and other development finance institutions (DFIs) play a key role and should double their investment in infrastructure and ensure it is sustainable, coupled with better leveraging of private finance. Essential actions include making infrastructure an asset class and ensuring it incorporates sustainability criteria.

- **Harnessing the power of the private sector, including to unleash innovation and advance supply chain transparency**. Many companies and investors are already demonstrating leadership, and others are ready to align this agenda with the right policy signals. Regulations and incentives that hamper the shift to a low-carbon and more circular economy should be reformed, such as subsidies, tax breaks, and regulations that encourage unsustainable activities. A big push on innovation, in particular through international partnerships and financing to tackle challenges beyond energy, is needed. For example, a combination of new monitoring techniques, strategic partnerships, the right incentives, and corporate leadership is helping to develop deforestation-free supply chains for key commodities.

- **Ensuring a people-centred approach, such that the gains are shared equitably and the transition is just**. Active, targeted regeneration can support economic diversification and the delivery of quality jobs. In developing economies, the low-carbon transition provides an opportunity to leap-frog the inefficient and polluting models of the past, with falling costs of renewables and other technologies making it even cheaper. As a priority, all governments should establish zero-emission Energy Transition Plans, working with energy companies, trade unions, and civil society to ensure a just transition for workers and communities.

- Accelerating action will require decisive leadership, strong collaboration, and finance. Finance ministers and DFIs play a critical role in guiding investments in the short-term to meet the long-term needs of society, and in setting the right policy and institutional conditions to unlock much-needed private capital at scale.

- The train is fast leaving the station. Leaders are already seizing the exciting economic and market opportunities of the new growth approach. The laggards are not only missing out on these opportunities but are also putting us all at greater risk. Over US$26 trillion and a more sustainable planet are on offer, if we all get on board. The time to do so is now.

Figure A

The Global Benefits of a Decisive Shift to a Low-carbon Economy when Compared with Business-as-usual.

Note: The results cited for the US$26 trillion in direct economic benefits are cumulative for the 2018-2030 period, whereas the other data points reported are for the year 2030.

Source: Garrido, L., Fazekas, D., Pollitt, H., Smith, A., McGregor, M., and Westphal, M., 2018. Forthcoming. *Major Opportunities for Growth and Climate Action: A Technical Note.* A New Climate Economy contributing paper. To be available at: http://newclimateeconomy.net content/technical-notes-and-fact-sheets.

Report Summary

We are entering a new era of economic growth. This approach can deliver growth that is strong, sustainable, balanced, and inclusive. It is driven by the interaction between rapid technological innovation, sustainable infrastructure investment, and increased resource productivity.

- At the heart of this new approach to growth are liveable, compact cities which have an economic dynamism that can attract creative talent, companies, and capital while higher densities enable cheaper service delivery and avoid costly urban sprawl. Powering the new growth will be affordable, clean, energy systems which are more productive and can expand energy access to the more than a billion people that currently lack it, replicating and amplifying the impact of mobile telephony on equitable growth. Agriculture and forests can become a third engine of economic growth, delivering greater food security, more nutritious food, greater rural prosperity and more equitable growth, strengthened resilience, and valuable ecosystem services. Industrial sectors, now waking up to the potential of the circular economy, will radically cut the demand for energy-intensive primary materials, driving up both material productivity and cutting waste.

"This new growth approach will deliver higher productivity, more resilient economies and greater social inclusion."

- This new growth approach will deliver higher productivity, more resilient economies and greater social inclusion. The poorest do not benefit from the current low-productivity agriculture nor from landslides resulting from deforestation. They do not benefit from inefficient cities where daily commutes often take hours a day, exposed to highly-polluted air. The poor are those most exposed to the impacts of climate change, with just one bad weather season having the potential to push low-income families below the poverty line.
- This new approach is the only economic growth path that is sustainable. It is the growth story of the 21st century.

"This is our 'use it or lose it' moment: the decisions we take over the next 2-3 years will determine our growth and climate future."

In 2014, the flagship report of the Global Commission on Economy and Climate conclusively showed that higher quality growth can be combined with strong climate action.

- The evidence today of the potential economic benefits are even greater than before; and the downside risks of inaction on climate change are even more stark.
- Leading companies and investors are already getting behind this new approach, creating a new competitive race. So too are ambitious policy-makers.
- The decisions we take over the next 2-3 years are crucial because of the urgency of a changing climate and the unique window of unprecedented structural changes already underway. The world is expected to invest about US$90 trillion on infrastructure in the period up to 2030, more than the entire current stock today. Much of this investment will be programmed in the next few years.
- This is our 'use it or lose it' moment. Investing the US$90 trillion to build the right infrastructure now will deliver a new era of economic growth. Investing it wisely will help drive innovation, deliver public health benefits, create a host of new jobs and go a long way to tackling the risks of runaway climate change. Getting it wrong, on the other hand, will lock us into a high-polluting, low productivity, and deeply unequal future. For example, the multi-trillion-dollar Belt and Road Initiative will have a significant impact on the shape and sustainability of growth in the over 70 countries in Asia, Africa, and Europe it spans.

The core proposition of the Global Commission is simple. We can build a better, more people-centred, more resilient growth model by accelerating structural transformation in five key economic systems:

"The world now adds more renewable power capacity annually than from all fossil fuels combined."

- **Clean energy systems**: The decarbonisation of power systems combined with decentralised and digitally-enabled electrification technologies can provide access to modern energy services for the

Photo: Flickr/Kzoop.

billion people who currently lack it; strengthen energy security and reduce exposure to energy price volatility globally; build overall system resilience to increasing natural hazards (especially in vulnerable, small island states); and cut the costs of outdoor air pollution worldwide. The clean energy transition is well underway, driven by market forces and plummeting costs of renewable and storage technologies. The world now adds more renewable power capacity annually than from all fossil fuels combined.[5]

"Coordinated, compact, and connected cities could result in US$17 trillion in economic savings by 2050."

- **Smarter urban development**: Better urban planning and strategic infrastructure investment, particularly the expansion of public and non-motorised transport networks, can overcome bottlenecks to economic growth – such as congestion and air pollution – for more liveable cities. More compact, connected, and coordinated cities are worth up to US$17 trillion in economic savings by 2050[6] and will stimulate economic growth by improving access to jobs and housing. They can strengthen resilience to physical climate risks and could deliver up to 3.7 gigatons per year of CO_2e savings over the next 15 years, just shy of the total emissions of the European Union (EU) today.[7] Integrated national urban policy frameworks can guide sustainable and inclusive urban development.[8]
- **Sustainable land use:** The shift to more sustainable forms of agriculture combined with

5 Frankfurt School (FS)-United Nations Environment Programme (UNEP) Centre and Bloomberg New Energy Finance (BNEF), 2018. *Global Trends in Renewable Energy Investment 2018*. FS-UNEP, Frankfurt and UNEP, Nairobi. Available at: http://fs-unep-centre.org/sites/default/files/publications/gtr2018v2.pdf.

6 Gouldson, A., Colenbrander, S., Sudmant, A., Godfrey, N., Millward-Hopkins, J., Fang, W., and Zhao, X., 2015. *Accelerating Low-Carbon Development in the World's Cities*. New Climate Economy, London and Washington, DC. Available at: http://newclimateeconomy.report/2015/wp-content/uploads/sites/3/2015/09/NCE2015_workingpaper_cities_final_web.pdf.

7 CAIT emissions data. Climate Watch, 2017. World Resources Institute, Washington, DC. Available at: www.climatewatchdata.org.

8 Organisation for Economic Co-operation and Development (OECD), 2018. Rethinking Urban Sprawl: Moving Towards Sustainable Cities. OECD Publishing, Paris. Available at: http://dx.doi.org/10.1787/9789264189881-en.

"Sustainable agriculture and forest protection together could deliver over US$2 trillion each year in economic benefits."

strong forest protection could deliver over US$2 trillion per year of economic benefits;[9] generate millions of jobs, mainly in the developing world; improve food security including by reducing food loss and waste (a third of all food produced is lost or wasted along the food chain[10]); and deliver over a third of the climate change solution.[11] At the same time, restoration of natural capital, especially our forests, degraded lands, and coastal zones, will strengthen our defences and boost adaptation to climate impacts, from more extreme weather patterns to sea-level rise.

"Today, 2.1 billion live without readily available, safe water supplies."

- **Wise water management**: Today, 2.1 billion live without readily available, safe water supplies at home, and 4.5 billion live without safely managed sanitation.[12] Water will also be where climate change impacts will be felt most keenly. Water scarce regions, notably the Middle East, the Sahel, Central Africa, and East Asia could see gross domestic product (GDP) declines of as much as 6% by 2050 as a result of climate change, spurring migration and sparking conflict.[13] There are enormous opportunities to curb these impacts by using water better, whether though deployment of improved technology (from drip irrigation to remote sensors to water-efficient crops), planning and governance, use of water prices with targeted support to the poor, or by investing in public infrastructure. Today, poorly managed and often under-priced water results in the over-use and misallocation of resources across the economy. Addressing the water-energy-food nexus will be critical, particularly in increasingly water-stressed regions.
- **A circular industrial economy:** From 1970 to 2010, annual global extraction of materials grew from almost 22 to 70 billion tonnes.[14] Each year, at least eight million tonnes of plastics leak into the ocean, contributing to a major new challenge for the 21st Century.[15] Microplastics have been discovered in 114 aquatic species, many of which end up in our dinners.[16] This challenge, however, is not just a social or environmental issue; it is also economic. Today, 95% of plastic packaging material value—as much as US$120 billion annually—is lost after first use.[17] Policies which encourage more circular, efficient use of materials (especially metals, petrochemicals and construction materials) could enhance global economic activity, as well as reduce waste and pollution. Shifting to a circular industrial economy, combined with increasing efficiency and electrification, including for hard-to-abate sectors and heavy transport, could decouple economic growth from material use and drive decarbonisation of industrial activities.

"95% of plastic packaging material value—US$120 billion annually—is lost after first use."

Transitioning to this low-carbon, sustainable growth path could deliver a direct economic gain of US$26 trillion through to 2030 compared to business-as-usual, according to analysis for this Report.

9 AlphaBeta, 2016. Valuing the SDG prize in Food and Agriculture: Unlocking business opportunities to accelerate sustainable and inclusive growth. Business and Sustainable Development Commission (BSDC) contributing paper. Available at: http://businesscommission.org/our-work/valuing-the-sdg-prize-in-food-and-agriculture.

10 Champions 12.3, 2017. *The Business Case for Reducing Food Loss and Waste.* Available at: https://champions123.org/the-business-case-for-reducing-food-loss-and-waste/.

11 Griscom, B.W., 2017. Natural climate solutions. *Proceedings of the National Academy of Sciences of the United States of America.* DOI: 10.1073/pnas.1710465114.

12 World Health Organization (WHO) and United Nations Children's Fund (UNICEF), 2017. *Progress on Drinking Water, Sanitation and Hygiene: 2017 Update and SDG Baselines*. WHO, Geneva, and UNICEF, New York. Available at: https://www.unicef.org/publications/index_96611.html.

13 World Bank, 2016. *High and Dry: Climate Change, Water, and the Economy*. World Bank, Washington, DC. Available at: http://www.worldbank.org/en/topic/water/publication/high-and-dry-climate-change-water-and-the-economy.

14 Heinz, S., Fischer-Kowalski, M., West, J., Giljum, S., Dittrich, M., Eisenmenger, N., Geschke, A., Krausmann, F., Gierlinger, S., Hosking, K., Lenzen, M., Tanikawa, H., Miatoo, A., and Fishman, T., 2016. *Global Material Flows and Resource Productivity*. UNEP, Nairobi. Available at: https://wedocs.unep.org/bitstream/handle/20.500.11822/21557/global_material_flows_full_report_english.pdf?sequence=1&isAllowed=y.

15 Jambeck, J., Geyer, R., Wilcox, C., Siegler, T., Perryman, M., Andrady, A., Narayan, R., and Law, K., 2015. Plastic waste inputs from land into the ocean. *Science, 347*(6223), 768-771. DOI: 10.1126/science.1260352; Science Ocean Conservancy, 2018. Fighting for Trash Free Seas. Ocean Conservancy, Washington, DC. Available at: https://oceanconservancy.org/trash-free-seas/plastics-in-the-ocean/.

16 Gall, S., and Thompson, R., 2015. The impact of debris on marine life. *Marine Pollution Bulletin, 92*. Available at: https://www.sciencedirect.com/science/article/pii/S0025326X14008571.

17 World Economic Forum (WEF), 2016. *The New Plastics Economy: Rethinking the future of plastics.* WEF, Geneva. Available at: http://www3.weforum.org/docs/WEF_The_New_Plastics_Economy.pdf.

Photo: Flickr/Neil Palmer/CIAT.

"Low-carbon growth could deliver economic benefits of US$26 trillion to 2030—and this is a conservative estimate."

- The Report also finds that taking ambitious climate action could generate over 65 million new low-carbon jobs in 2030, equivalent to today's entire workforces of the UK and Egypt combined, as well as avoid over 700,000 premature deaths from air pollution compared with business-as-usual.
- Subsidy reform and carbon pricing alone could generate an estimated US$2.8 trillion in government revenues per year in 2030 – more than the total GDP of India today – much needed funds that can be used to invest in public priorities.
- Given the limitations of modelling exercises, it is likely that the benefits of a climate-compatible transition are much greater than even these estimates suggest.[18] Such modelling exercises generally cannot capture the magnitude and dynamism of the economic and financial opportunities of climate action, or to adequately reflect the risks of climate change in baseline growth scenarios. For example, even the best energy analysts in the world have consistently under-estimated the potential penetration of renewable energy year-after-year, and it is likely that the same errors are now being repeated with electric vehicle (EV) penetration.

This transition would also avoid the high risks of a changing climate. The scientific evidence is ever more alarming. The human and economic toll of inaction is rising.

- Concentrations of greenhouse gases (GHGs) continue to reach new records and are now at the highest level in millennia.[19] The last 19 years

18 London School of Economics, (LSE), 2018. Economic models significantly underestimate climate change risks. LSE, London. Available at: https://academic.oup.com/reep/advance-article/doi/10.1093/reep/rey005/5025082.

19 Blunden, J., Arndt, D.S., and Hartfield, G. (Eds.), 2018. State of the Climate in 2017. *Bulletin of the Amererican Meteorological Society*, *99*(8), Si–S332. DOI:10.1175/2018BAMSStateoftheClimate.1.

contained 18 of the warmest years on record globally.[20]

- The impacts of climate change, such as sea-level rise and more frequent and more intense extreme weather events, are now obvious across the world and are increasingly becoming the 'new normal'. We face the possibility of crossing tipping points beyond which very severe consequences become unstoppable and irreversible.[21] Many of these involve feedback loops, increasing the risk of major discontinuities and runaway climate change. Forecasts from climate scientists are now observed or even exceeded, including accelerating sea-level rise, Arctic summer melt, ocean circulation disruption, and increasing extreme weather events, such as floods and heatwaves.

"Business-as-usual growth could mean over 140 million climate migrants by 2050."

- The United Nations Environment Programme warns that "it is clear that if the emissions gap is not closed by 2030, it is extremely unlikely that the goal of holding global warming to well below 2°C can still be reached".[22] Without further strong and rapid reductions in emissions, we will not be able to avoid the risks of dangerous climate change.
- Globally, in 2017, disasters triggered by weather- and climate-related hazards led to a staggering US$320 billion loss.[23] Also in 2017, devastating floods in South Asia took over 1,200 lives, while communities in the Caribbean are still struggling to recover from the unprecedented hurricane season.
- The risks of adverse health outcomes will also increase under unabated climate change, due to more intense heatwaves, floods, droughts, a greater risk of food and water-borne diseases, and more rapid spread of pathogens.[24]
- Business-as-usual growth could mean over 140 million climate migrants by 2050, according to the World Bank.[25] While much of the movement may be internal, this is still more than double the total number of all refugees today and will further exacerbate the likelihood of conflict.
- Climate change is not the only risk of our current growth trajectory. Outdoor air pollution, largely from fossil fuel combustion, is estimated to result in over 4.2 million premature deaths annually.[26] The costs of congestion are growing, with recent International Monetary Fund (IMF) estimates suggesting a cost of over US$350 billion per year, based on lost productivity and health impacts.[27] It is estimated to cost as much as 5% or more of GDP in Beijing, Sao Paulo, and Bangkok.[28]

We have seen some incredible progress in implementing a new climate economy in the last few years. The new growth approach is now hiding in plain sight.

- Countries from China to Uganda, from Indonesia to Sweden, and from the United Kingdom to India are working to realise the benefits of integrating low-carbon and sustainable development objectives into their economic and budget planning processes.

20 National Oceanic and Atmospheric Administration (NOAA), 2018. NOAA'S Greenhouse Gas Index up 41 Percent since 1990. NOAA, Silver Spring, MD. Available at: https://research.noaa.gov/article/ArtMID/587/ArticleID/2359/NOAA%E2%80%99s-greenhouse-gas-index-up-41-percent-since-1990.

21 Brauch, H.G., Spring, U.O., Grin, J., and Scheffran, J. (eds.), 2016. *Handbook on Sustainability Transition and Sustainable Peace*. Springer International Publishing. Available at: https://link.springer.com/content/pdf/10.1007%2F978-3-319-43884-9.pdf; Steffen, W. et al., 2018. Trajectories of the Earth System in the Anthropocene. *Proceedings of the National Academy of Sciences of the United States of America*. DOI: 10.1073/pnas.1810141115.

22 UNEP, 2018. *The Emissions Gap Report*. UNEP, Nairobi. Available at: http://wedocs.unep.org/bitstream/handle/20.500.11822/22070/EGR_2017.pdf?sequence=1&isAllowed=y.

23 Low, P., 2018. Hurricanes cause record losses in 2017 – The year in figures. Munich RE, Munich. Available at: https://www.munichre.com/topics-online/en/2018/01/2017-year-in-figures.

24 Whitmee, S., Haines, A., et.al., 2018. Safeguarding Human Health in the Anthropocene Epoch: Report of the Rockefeller Foundation–Lancet Commission on Planetary Health. *The Lancet*, *386*(10007). Available at: https://www.sciencedirect.com/science/article/pii/S0140673615609011?via%3Dihub.

25 World Bank, 2018. *Groundswell: Preparing for Internal Climate Migration*. World Bank, Washington, DC. Available at: https://openknowledge.worldbank.org/handle/10986/29461.

26 WHO, 2016. WHO's Ambient Air Quality Database. Available at: http://www.who.int/phe/health_topics/outdoorair/databases/cities/en/.

27 Coady, D., Parry, I., Sear, L., and Shang, B., 2015. *How Large Are Global Energy Subsidies?* International Monetary Fund (IMF), Washington, DC. Available at: http://www.imf.org/external/pubs/ft/wp/2015/wp15105.pdf.

28 Gouldson, A., Sudmant, A., Khreis, H., and Papargyropoulou, E., 2018. *The Economic and Social-Benefits of Low-Carbon Cities: A Systematic Review of the Evidence*. Coalition for Urban Transitions, London. Available at: https://newclimateeconomy.report/workingpapers/wp-content/uploads/sites/5/2018/06/CUT2018_CCCEP_final_rev060718.pdf.

- Investment in sustainable infrastructure is now recognised as a central driver of growth and the delivery of the Sustainable Development Goals and the Paris Agreement. The G20 adopted "strong, sustainable, balanced, and inclusive growth" as its goal. Major development finance institutions (DFIs) are shifting their capital towards sustainable investments.

"Renewable energy auctions are coming in at prices under US$ 3 cents per kilowatt hour, out-competing fossil fuels in many places."

- The central importance of cities as engines of economic growth is now received wisdom. However, maximising the economic benefits of urban growth depends on coherent land use, housing, and transport planning. The difference among countries is pronounced: For every 1% increase in urban population, for example, per capita GDP increases by 10% in China, 4% in Indonesia, and 13% in India.[29] Mayors are showing international leadership on climate action, poverty reduction and local economic development, fostering innovative solutions from Bus Rapid Transit (BRT) systems to participatory budgeting that can be replicated at scale with support from national governments. The role of mayors as the CEOs of cities has transformed over the past decade, with cities actively competing for talent and capital based on their green credentials.

- Progress on low-carbon and energy-efficient technologies, especially in the energy sector but also in mobility, buildings, and agriculture, has been much faster than predicted. Auctions for long-term power contracts are generating unsubsidised bids from renewable energy producers at prices under US$3 cents per kilowatt hour, out-competing fossil fuel alternatives in more and more locations.[30] Companies shifting to hydrofluorocarbon (HFC)-free refrigerants in line with the Montreal Protocol have reported energy-efficiency improvements of up to 40%, as well as electricity cost savings and emissions reductions.[31] The costs of energy storage and of the software for energy demand management are also plunging. Major car companies are declaring the end of the internal combustion engine is in sight as EVs take a strong position in the market. Increasing digitalisation and electrification of the economy, including for transport and industry, are also opening up new opportunities to radically reduce emissions and increase efficiency.

- Leading energy companies, investors, and market analysts view peak demand for coal, oil, and gas over the next 20 years (starting with coal in the next 5-10 years) as entirely plausible. This has led to a major shift in capital allocation within the energy sector in just the last few years and an alliance of over 60 governments, businesses, and organisations signing up to "Powering Past Coal". Around US$280 billion was invested in new renewable energy generation in 2017, continuing a six-year trend of outstripping global fossil fuel generation investments.[32]

"Restoring 160 million hectares of degraded land, could be an US$84 billion boost per year."

- Closing the forest frontier is an increasingly urgent priority for countries and companies. Since 2010, over 470 companies have made commitments to eliminate deforestation from their supply chains, covering, for example, approximately 65% of global palm oil production.[33] A number of countries are now making notable progress: For example, Indonesia's recent reductions in deforestation in 2017, including in areas of peat forests,[34] have coincided with strong economic growth rates.[35] The resto-

29 World Bank, 2016. *Indonesia's Urban Story.* World Bank, Washington, DC. Available at: http://www.worldbank.org/en/news/feature/2016/06/14/indonesia-urban-story.

30 International Renewable Energy Agency (IRENA), 2018. *Renewable Power Generation Costs in 2017.* IRENA, Abu Dhabi. Available at: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Jan/IRENA_2017_Power_Costs_2018.pdf.

31 Borgford-Parnell, N., Beaugrand, M., Andersen, S.O., and Zaelke, D., 2015. *Phasing Down the Use of Hydrofluorocarbons (HFCs).* Contributing paper for *Seizing the Global Opportunity: Partnerships for Better Growth and a Better Climate.* New Climate Economy, London and Washington, DC. Available at: http://newclimateeconomy.report/misc/working-papers/.

32 FS-UNEP Centre and BNEF, 2018. Global Trends in Renewable Energy Investment 2018.

33 Tropical Forest Alliance 2020 (TFA 2020), 2018. *The Sprint to 2020: TFA 2020 Annual Report 2018.* Geneva, Switzerland. Available at: https://www.tfa2020.org/wp-content/uploads/2018/06/TFA-2020-Annual-Report-2018.pdf.

34 Weisse, M. and Goldman, E.D., 2018. 2017 Was the Second-Worst Year on Record for Tropical Tree Cover Loss. World Resources Institute, Washington, DC. Available at: http://www.wri.org/blog/2018/06/2017-was-second-worst-year-record-tropical-tree-cover-loss.

35 World Bank, 2018. *Indonesia Economic Quarterly: Towards inclusive growth.* World Bank, Washington, DC. Available at: http://documents.worldbank.org/curated/en/155961522078565468/pdf/124591-WP-PUBLIC-mar-27-IEQMarENG.pdf.

"Financial firms responsible for over US$86 trillion in assets have committed to disclose climate-related financial risks."

ration of 160 million hectares of degraded land, as committed under the Bonn Challenge, could be a major win for the economy of up to US$84 billion per year.[36] Meanwhile, ensuring tenure security for indigenous forestland in the Amazon could generate as much as US$10,000 per hectare in ecosystem benefits.[37] While successfully tackling the double burden of obesity and malnutrition globally could save trillions of dollars each year.[38]

- Capital markets have woken up to the opportunity of this new growth approach, and the risks of business-as-usual growth. More than 160 financial firms responsible for over US$86 trillion in assets have committed to support the recommendations of the TCFD.[39] This is creating greater transparency around the extent to which companies and investors are exposed to climate-related financial risk and how they are managing these. Green bond issuance in 2018 is expected to reach US$250 billion, with some calls for a target of US$1 trillion in new green bonds by 2020.[40]

36 The Bonn Challenge, 2018. The Bonn Challenge. Available at: http://www.bonnchallenge.org/; Liagre, L., 2015. *Sustainable financing for forest and landscape restoration: Opportunities, challenges and the way forward.* Food and Agriculture Organization of the United Nations (FAO) and United Nations Convention to Combat Desertification, Rome. Available at: http://www.fao.org/3/a-i5174e.pdf.

37 Ding, H., Veit, P.G., Blackman, A., Gray, E., Reytar, K., Altamirano, J.C., and Hodgdon, B., 2016. *The Economic Case for Securing Indigenous Land Rights in the Amazon.* World Resources Institute, Washington. DC. Available at: https://www.wri.org/sites/default/files/Climate_Benefits_Tenure_Costs_Executive_Summary.pdf. These benefits are estimated to range between $679 and 1,530 billion (or $4,559–10,274/ha) for the next 20 years, calculated in net present value resulting from indigenous forestland tenure security investments.

38 FAO, 2013. *The State of Food and Agriculture 2013*. FAO, Rome. Available at: http://www.fao.org/docrep/018/i3300e/i3300e.pdf.

39 Bloomberg Professional Services, 2018. *Deciphering the Task Force on Climate-related Financial Disclosures (TCFD).* Bloomberg, New York. Available at: https://www.bloomberg.com/professional/blog/deciphering-task-force-climate-related-financial-disclosures-tcfd.

40 Moody's Investors Service, 2018. *Green Bonds: Key Numbers and Trends*. Moody's, New York. Available at: https://www.moodys.com/sites/products/ProductAttachments/MIS_Green_Bonds_2018_key_trends.pdf; Whiley, A., 2016. COP22 Green Bond Directions: Green finance for

Photo: James Anderson/WRI.

- Leading companies are seizing the opportunities of this new approach: over 450 companies across all major sectors have committed to setting science-based targets in line with the Paris Agreement, with more than 120 targets already established.[41]

But, overall, we are still not making progress fast enough toward a new climate economy. The policy hand-brake is still on. Policy-makers are not taking sufficiently bold action to escape the legacy economic systems.

- National climate pledges to support the Paris Agreement, while a profoundly important first step, fall far short of what is needed to keep global average temperature rise to well under 2°C. Policies and subsidies continue to prop up the old, polluting, and socially unequal economy at the expense of new cleaner, more inclusive growth. In some cases, captured by vested interests, governments are going in the wrong direction.

- Fossil fuels as a share of final energy consumption remains stubbornly around 80% – roughly the same percentage as at the beginning of the 1990s. And this status quo is supported by fossil fuel subsidies and tax breaks, amounting to an estimated US$373 billion in 2015 according to the OECD and IEA.[42]

- Carbon taxes or emissions trading systems are now in place or planned in 70 jurisdictions worldwide, covering one-fifth of global emissions.[43] Half of all carbon prices from these policies are less than US$10 per tonne CO2e – far short of what is needed to drive transformational change.[44]

"Estimates suggest US$12 trillion stranded fossil fuel assets possible by 2035."

- Progress on protecting forests, while encouraging in the first half of this decade and continuing in some major forest-rich countries, has now slipped back globally with almost 16 million hectares of tree cover loss in the tropics in just 2017, an area the size of Bangladesh.[45] Agriculture subsidies amount to about US$620 billion per year. Far too often these benefit large producers at the expense of small farmers and support food production that is bad for the climate.[46]

Seizing the economic benefits of low-carbon and resilient growth will only be possible if we act boldly over the next 2-3 years.

- Mixed policy signals and hedging is slowing the momentum driving the new growth approach. It also triggers market uncertainty and increases stranded asset risk. Economic decision-makers, especially in the policy world, now need to step up.

- The cost of hedging – taking action, but too slowly and with mixed signals to the market – is rising. Estimates suggest that mixed signals could lead to US$12 trillion of stranded fossil fuel assets by 2035.[47] By comparison, the bail-out for the stranded mortgage assets, which triggered the 2008 financial crisis and put over 200 million people in poverty,[48] was US$250 billion.[49]

- Even with these inconsistent and contradictory policy signals, amazing technological and market

mitigation and adaptation. USD 1 trillion by 2020 target. Climate Bonds latest report prepared for COP. Climate Bonds Initiative (CBI), London. Available at: https://www.climatebonds.net/files/files/COP22_Directions_WEB.pdf.

41 Science-Based Targets, 2018. *Companies Taking Action. Science-Based Targets*. Available at: https://sciencebasedtargets.org/companies-taking-action/.

42 OECD, 2018. *OECD Companion to the Inventory of Support Measures for Fossil Fuels 2018*. OECD Publishing, Paris. Available at: https://read.oecd-ilibrary.org/energy/oecd-companion-to-the-inventory-of-support-measures-for-fossil-fuels-2018_9789264286061-en#page4.

43 World Bank, 2018. *Carbon Pricing Dashboard*. World Bank, Washington, DC. Available at: https://carbonpricingdashboard.worldbank.org/.

44 World Bank, 2018. *State and Trends of Carbon Pricing 2018*. World Bank, Washington, DC. Available at: https://openknowledge.worldbank.org/bitstream/handle/10986/29687/9781464812927.pdf?sequence=5&isAllowed=y; Carbon Pricing Leadership Coalition (CPLC), 2017. *Report of the High-Level Commission on Carbon Prices*. World Bank, Washington, DC. Available at: https://www.carbonpricingleadership.org/report-of-the-highlevel-commission-on-carbon-prices/.

45 Weisse, M., and Goldman, E.D., 2018. *2017 Was the Second-Worst Year on Record for Tropical Tree Cover Loss*. World Resources Institute, Washington, DC. Available at: http://www.wri.org/blog/2018/06/2017-was-second-worst-year-record-tropical-tree-cover-loss.

46 OECD, 2018. *Agricultural Policy Monitoring and Evaluation*. OECD, Paris. Available at: https://www.oecd-ilibrary.org/agriculture-and-food/agricultural-policy-monitoring-and-evaluation-2018_agr_pol-2018-en.

47 Mercure, J.-F., Pollitt, H., Viñuales, J.E., Edwards, N.R., Holden, P.B., Chewpreecha, U., Salas, P., Sognnaes, I., Lam, A., and Knobloch, F., 2018. Macroeconomic impact of stranded fossil fuel assets. *Nature Climate Change*, *8*, 588-593. Available at: https://www.nature.com/articles/s41558-018-0182-1.

48 World Bank, 2009. Crisis Hitting Poor Hard in Developing World, World Bank says. World Bank, Washington, DC. Available at: http://web.worldbank.org/archive/website01057/WEB/0__CO-91.HTM.

49 Robertson, D., 2011. *So That's Operational Risk! (How operational risk in mortgage-backed securities almost destroyed the world's financial markets and what we can do about it)*. Policy Analysis Division of the Office of the Comptroller of the Currency, Washington, DC. Available at: https://www.occ.treas.gov/publications/publications-by-type/occ-working-papers/2012-2009/wp2011-1.pdf.

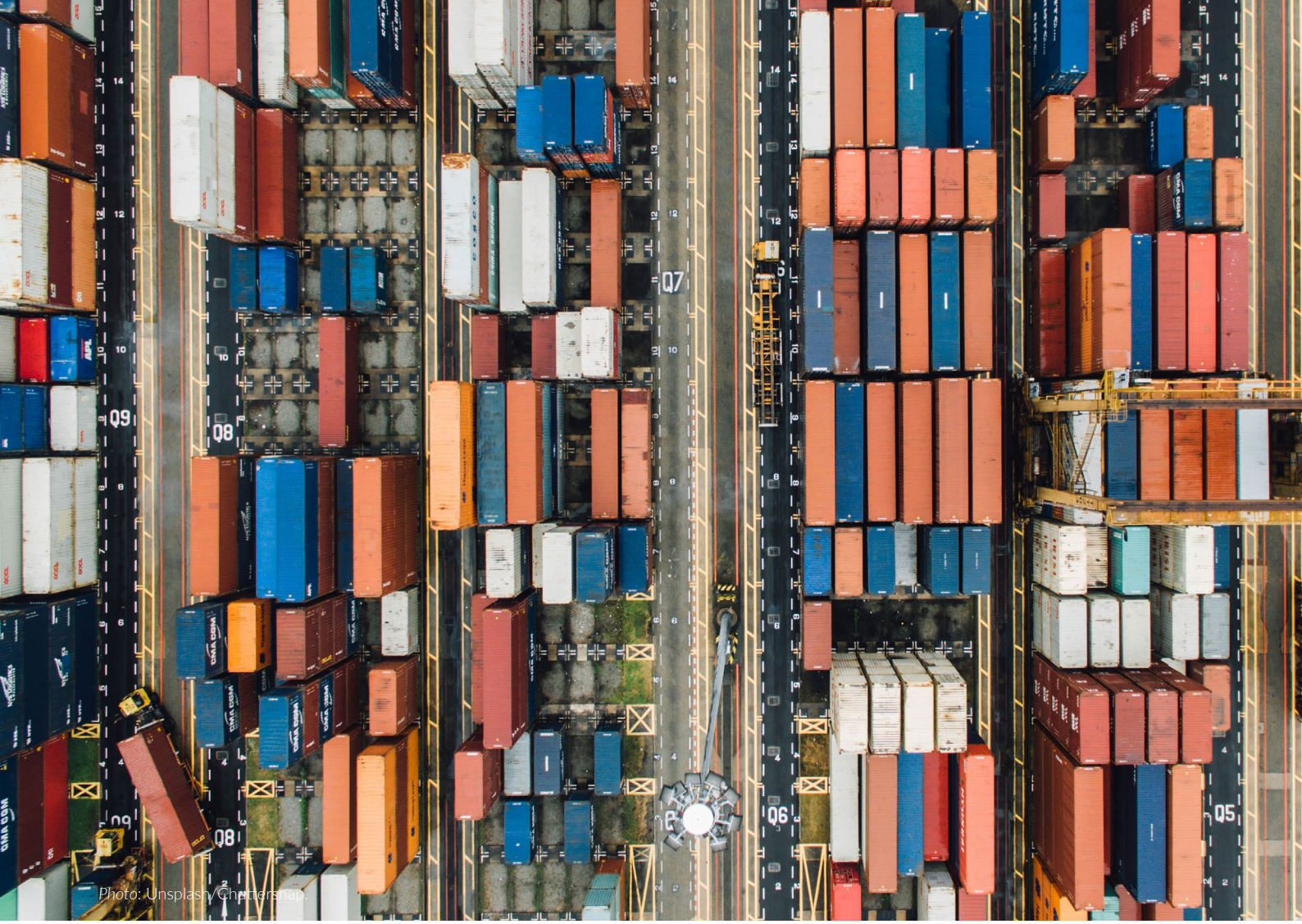

Photo: Unsplash/Chuttersnap.

progress has been seen in the last few years, well beyond what most of the traditional economic models projected. How much more can be achieved in the coming years with clear, consistent policy signals?

We have now run out of time for incremental steps, generic proposals, or statements of broad principle. To capture the net economic benefits of US$26 trillion through to 2030 and shift the world economy onto a more stable climate pathway, the Global Commission calls upon economic decision-makers in the public and private sectors to take the following actions immediately:

- **First, governments should put a price on carbon and move toward mandatory climate risk disclosure for major investors and companies.** Implemented together, these two actions would provide the strongest, clearest signal to market participants that policy-makers are committed to a new growth approach. They are important elements of the broader policy package to tackle climate change, including appropriate standards and regulations (e.g. on energy and fuel efficiency), investment in research and development (R&D), green public procurement, and labelling and information-based incentives.
  - The major economies, led by the G20, should put a price on carbon of at least US$40-80 by 2020, with a predictable pricing pathway to around US$50-100 by 2030, as recommended by the High-Level Commission on Carbon Pricing.[50]
  - All major economies should phase-out fossil fuel subsidies and harmful agricultural subsidies and tax-breaks by 2025, with others doing so as soon as possible, and use some of the revenues saved to provide better-targeted support to tackle energy poverty and ensure more sustainable food and land use systems.
  - Lessons gained from successful carbon pricing and subsidy reforms in countries around the world should be utilised to help design reforms in order to address concerns about potential

50 CPLC, 2017. *Report of the High-Level Commission on Carbon Prices.*

Photo: Dennis Schroeder/DOE.

distributional and competitiveness impacts, as well as the challenges around vested interests.

- As recommended by the Global Commission in 2016, companies and investors should be required, as a matter of good corporate practice, to disclose their climate-related financial risks and how their business strategy is compatible with the Paris Agreement, following the TCFD recommendations.

- **Second, all economies should place much greater emphasis on investing in sustainable infrastructure as a central driver of the new growth approach.**

  - The first step is not about the money. Rather, it is to build stronger leadership and technical capacity to shape robust growth strategies, investment plans, and institutional structures that can align with sectoral policies and facilitate the flow of private investment to sustainable infrastructure. This includes better designed buildings, transport, energy and water systems, and cities but also investments in the natural infrastructure that underpins our economy, such as the forests and wetlands that purify water and provide valuable flood control.

  - MDBs and other DFIs need to double their collective investment in infrastructure and make sure it is sustainable, aiming to invest at least US$100 billion per year by 2020. DFIs should also aim to more than double their mobilisation of private sector investment, including from institutional investors. This will entail working closely with governments and private investors to unlock investment and scale up blended finance, as well as ensure a continued strong capital basis for the MDBs. This would include greater use of risk mitigation instruments and structures and country-led sector infrastructure plans and investment platforms. More broadly, the DFIs can play a critical role in accelerating this new growth approach, but their portfolio-wide activities will need to be aligned to support the sustainability transition.

- Together with major private financial institutions, the G20 should continue its work on infrastructure as an asset class, on incorporating sustainability criteria into its core definitions, and on developing the tools needed to both support implementation and deepen the pools of green finance. A deeper recognition of the value of natural infrastructure, and efforts to attract the finance to maintain and restore it, is needed.
- Global and national-level platforms that pool expertise in project preparation for sustainable infrastructure investment should be scaled-up and replicated.
- Developed countries should fulfil their commitment to mobilise US$100 billion per year in climate finance from public and private sources for developing countries by 2020, and the climate finance architecture must be strengthened to utilise these resources for maximum impact and leverage.

- **Third, the full power of the private sector and innovation needs to be harnessed.** Many companies and investors are already demonstrating leadership, and others are ready to align around this agenda with the right policy signals.
  - By 2020, all Fortune 500 companies should have science-based targets that align with the Paris Agreement. Shifting their brand and marketing to products that are climate positive will engage consumers as active agents of the solution. For only the top ten global retail companies, this could translate into almost US$4 billion each day of purchasing power moving toward the low-carbon economy.[51]
  - Companies and investors are ready to advance on this agenda, but they cannot get there on their own. Current regulations, incentives and tax mechanisms are a major barrier to implementing a low-carbon and more circular economy. For example, they slow-down the penetration of new building materials in construction activity. In agriculture, they subsidise the application of too much mineral fertiliser, diverting innovation activity away from more sustainable forms of farming. They make it cost-competitive to deploy single-use forms of plastic packaging, contributing to the plastics crisis we are now seeing in the oceans. They make it hard to design products in a way that maximises component reuse. Along with getting carbon pricing right, we also need to tackle a host of other policies which are protecting the old inefficient, polluting economy.
  - A big push on innovation is needed, with at least US$50 billion of new capital by 2020 committed to breakthrough climate challenges beyond the energy sector. Today's progress on renewable energy, energy storage and low-carbon mobility is not an accident. It is at least in part the outcome of decades of investment by governments, universities, foundations and the private sector in mission-driven innovation. Recent technological developments (and new partnerships) have, for example, helped to advance the radical transparency and accountability necessary to achieve deforestation-free supply chains, although there is more to be done to achieve these in practice.
  - We need to put in place and capitalise private-public partnerships in each major sector to pilot, scale and share learning around the deployment of new low-carbon and climate-resilient technologies. We have plenty of examples about how to do this well (and badly). What is currently lacking is sufficient political and business leadership.

- **Fourth, a people-centred approach is needed to ensure lasting, equitable growth and a just transition.** It is good economics and good politics.
  - If managed well, the low-carbon transition offers the potential for new opportunities and more equitable growth. Active, targeted regeneration can support economic diversification and the delivery of quality jobs. In developing and emerging economies, the low-carbon transition provides an opportunity to leap-frog the inefficient and polluting models of the past.
  - All governments should establish clear Energy Transition Plans to reach net-zero energy systems, and work with energy companies, trade unions, and civil society to ensure a just transition for workers and communities. Successfully diversifying local economies as we shift away from coal and eventually other fossil

51 Deloitte, 2018. *Global Powers of Retailing 2018: Transformative change, reinvigorated commerce*. Deloitte, New York. Available at: https://www2.deloitte.com/content/dam/Deloitte/at/Documents/about-deloitte/global-powers-of-retailing-2018.pdf.

Photo: Flickr/World Bank.

fuels will require multi-stakeholder dialogue, strategic assistance, re-training, and targeted social protection.

- Diversification and regeneration funds should be targeted to affected areas. There are multiple examples of areas previously reliant on industrial or mining activities that are now seeing new growth as a direct result of repurposing the assets, networks and capabilities of the old economy.[52] Better food and land use systems can deliver vital jobs, better incomes, and more inclusive growth to disadvantaged rural communities. Businesses, universities and city governments can work with national governments, workers, and civil society to help revitalise and ensure prosperous communities.
- Women will play a critical role in delivering this agenda in an inclusive and people-centred way. In countries where more women participate in political life, parliaments are more likely to set aside protected lands and ratify international environmental treaties, while ensuring their full participation in the economy could, by some estimates, boost global GDP by as much as US$28 trillion per year by 2025.[53]

This Report is a roadmap for how we can accelerate action to turn better growth and a better climate into reality. We can eliminate extreme poverty, prevent dangerous climate change, and improve the lives and livelihoods of millions. But only if we set out to do so decisively now. This is not just about avoiding a future we do not want. It is about creating the future that we do want.

52 Smith, S., 2017. *Just Transition: A Report for the OECD*. International Trade Union Confederation (ITUC), Brussels. Available at: http://www.oecd.org/environment/cc/g20-climate/collapsecontents/Just-Transition-Centre-report-just-transition.pdf.

53 United Nations Development Programme (UNDP), 2011. Human Development Report. *Sustainability and Equity: A Better Future for All.* 63-65. UNDP, New York. Available at: http://www.un.org/womenwatch/feature/ruralwomen/facts-figures.html#footnote39; McKinsey Global Institute, 2015. *The Power of Parity: How Advancing Women's Equality Can Add $12 Trillion To Global Growth*. McKinsey Global Institute, Shanghai et al. Available at: https://www.mckinsey.com/~/media/McKinsey/Global%20Themes/Employment%20and%20Growth/How%20advancing%20womens%20equality%20can%20add%2012%20trillion%20to%20global%20growth/MGI%20Power%20of%20parity_Full%20report_September%202015.ashx.