AWARENESS AND ENGAGEMENT OF BUSINESS AND CITIZENS TO KEEP GLOBAL WARMING BELOW 1.5°C

A roadmap towards decarbonisation.

Venice International University

Table of contents

About this report

"Awareness and engagement of business and citizens to keep global warming below 1.5°C. A roadmap towards decarbonisation" investigates the role of stakeholders in the transition towards the decarbonisation of the global economy and society, with a focus on business and final consumers. The report has been developed by a research team of the Venice International University. We wish to thank the following experts, who agreed to participate in the interviews developed for this report:

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The contribution of the following experts is kindly acknowledged:
Giulia Belardelli (HuffPost), Michael Bergoo (United Nations Sustainable Development Solutions Network Switzerland), Stefano Carattini (London School of Economics), Daniel Crossley (Food Ethics Council), Nuttavikhom Phanthuwongpakdee (Thailand Research Fund and Thammasat University), Maria Cristina Rulli (Politecnico di Milano), Chiara Trabacchi (IDB Invest).

Please cite as:
Antonelli M., Mannino I., Fornetti A., 2019. "Awareness and engagement of business and citizens to keep global warming below 1.5°C. The roadmap towards decarbonisation", Venice International University, VIU Papers 13.19.

The report and the interview programme were developed by Marta Antonelli. The report was edited by Ilda Mannino and Alessandra Fornetti of Venice International University. The infographics were drawn by no.parking.

February 2019

Introduction

BUILDING MOMENTUM FOR CLIMATE ACTION

Climate change is "the defining issue of our time – and we are at a defining moment", said the Secretary-General of the United Nations António Guterres at the High-Level Event on Climate Change held in New York on September 26th, 2018, to urge strong and courageous leadership to "take the bold decisions needed to put our economies and societies on the path of low-carbon growth and climate-resilience", as well as the engagement in climate action of all actors in society – governments, cities, investors, the private sector, civil society and citizens[1]. "The commitments made so far by Parties to the Paris Agreement", continues Gutters, are "just one-third of what is needed. We need to do more, and we need to do it quicker: we need more ambition and accelerated action by 2020. If we do not reverse the current trend of emissions by 2020, it may be impossible to meet the 1.5-degree goal".

The urgency of climate action was also stressed by the Intergovernmental Panel on Climate Change (IPCC)[2] that, with more than 6,000 scientific references and the contribution of thousands of experts, called for "rapid, far-reaching and unprecedented changes in all aspects of society" to keep global warming below 1.5°C degrees, relative to pre-industrial levels, so as to significantly reduce the risks and impacts of climate change. As the world experiences record-breaking temperatures, the adverse impacts of climate change act as a multiplier of societal threats which include competition over land and water resources, biodiversity loss and ecosystem degradation, food crises and malnutrition, population displacement and migrations, conflicts and social unrest.

1 United Nations Secretary-General. Remarks at High-level Event on Climate Change, 26 September 2018. Retrieved on December 18, 2018: https://www.un.org/sg/en/content/sg/speeches/2018-09-26/remarks-high-level-event-climate-change

2 Intergovernmental Panel on Climate Change [IPCC] 2018. Summary for Policymakers. In: 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 [V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, T. Waterfield (eds.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp. Retrieved on December 18, 2018: https://www.ipcc.ch/sr15/

Climate change affects the business landscape and represents a fundamental risk (from the impact on the security of supplies, asset values as well as in business operations) that needs to be addressed through effective adaptation and mitigation strategies to avert the most damaging and irreversible consequences. "Going towards a full decarbonisation by changing the paradigm from a linear economy to a circular economy is urgent and necessary to avoid an environmental breakdown", says Prof Riccardo Valentini, Member of the IPCC and Nobel Prize for Peace in 2008.

THE PARIS AGREEMENT

The Paris Agreement is a "landmark agreement to combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low carbon future", aiming "to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius" by requiring "all Parties to put forward their best efforts through "nationally determined contributions" (NDCs) and to strengthen these efforts in the years ahead. This includes requirements that all Parties report regularly on their emissions and on their implementation efforts. There will also be a global stocktake every 5 years to assess the collective progress towards achieving the purpose of the agreement and to inform further individual actions by Parties".

Source: UNFCC[3]

Business opportunities can also thrive from climate action for companies willing to innovate. These new business approaches need to be scaled up to radically transform the global economy and build a decarbonised society. Against this context, citizens as consumers are fundamental actors of change. They can orient business practices by modifying their behaviour to support environmental objectives through "greener" purchasing choices that reward responsible business behaviour.

We can also see beacons of hope in government action around the world. The Chinese government has developed environmental targets in its current 5-year plan; France has committed to ban the use of coal for generating power beyond 2020 and introduced a law to ban food waste in supermarkets; Costa Rica will be the first plastic-free and carbon-free country in the world by 2021. These are important steps towards the decarbonisation of the economy, which need to be coupled with a shift in the way products are designed, produced, consumed, and disposed against the principles of sustainability. A few examples of approaches going in this direction are presented in this report.

3 https://unfccc.int/process-and-meetings/the-paris-agreement/what-is-the-paris-agreement

The transition to a decarbonised economy and society requires systemic change to permeate all actors in society – from policy-makers and institutions, to investors, business and citizens. This transition is pivotal to achieve the 17 Sustainable Development Goals (SDGs) of the United Nations to transform the world we live in and ensure peace and prosperity to all countries in the world by the year 2030[4].

THE SUSTAINABLE DEVELOPMENT GOALS

The United Nations (UN) 17 Sustainable Development Goals (SDGs) were endorsed by 193 countries in September 2015 as a universal agenda to shift the world onto a sustainable and resilient path.

They represent the blueprint to achieve a better and more sustainable future for all. They address the global challenges we face, including those related to poverty, inequality, climate, environmental degradation, prosperity, and peace and justice. The Goals interconnect and, in order to leave no one behind, it is important that we achieve each Goal and target by 2030.

Source: UN[5]

AIMS, METHODOLOGY AND STRUCTURE OF THE REPORT

The present report aims to investigate the role, awareness and engagement of business and citizens in climate action. Chapter 1 provides a background analysis on the scope and impacts of climate change, international agreements and the pathways for decarbonisation. Chapter 2 and 3 analyse the role of business and citizens and outlines some initiatives and best practices, and present the findings of an expert consultation, conducted with 16 actors from academia, think tanks, international organisations and the media.

The analysis developed in this report builds on both primary and secondary data collection. A comprehensive review of the scientific and grey literature on climate change and related topics was conducted with a multidisciplinary approach. An interview programme was developed through semi-structured interviews with 13 representatives of academia, media, business and civil society organisations.

4 United Nations. Transforming our world: the 2030 Agenda for Sustainable Development. 2015. Retrieved on January 11th, 2019: https//:sustainabledevelopment.un.org

5 Retrieved on January 20th, 2019: www.un.org

The interviews were held between November 2018 and January 2019. An expert consultation was also carried out with the purpose of exploring their perceptions on the awareness and engagement of business and citizens with climate action. The consultation was developed through an online questionnaire, including both closed-ended and open-ended questions, sent to 16 actors among scholars, journalists, policy experts and representatives from international organisations and businesses in December 2018. Building on an analysis of the state-of-the-art and the gaps identified, the questionnaire investigated experts' views on the following topics:

- **Business:** level of awareness and engagement; what is needed to increase business engagement with climate action; which business sectors are most impacted and most active in climate action.
- **Citizens:** level of awareness and engagement; areas of improvement in climate-related communication to the general public; what is needed to increase public engagement with climate action.

CHAPTER 1.

Climate change in the Anthropocene

CLIMATE CHANGE AND ITS IMPACTS

The Earth has entered a new geological epoch: the Anthropocene, an era characterised by the unprecedented rate and scale of global impacts of human influence on climatic and ecological Earth systems[6,7]. Climate change is a key defining issue of the Anthropocene and represents a major threat to natural systems, economies and societies (Box "Understanding Climate Change"). It has far-reaching implications in terms of peace and security, prosperity and the well-being of all countries in the world, including an integral influence on sustainable development, i.e. "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" as the Brutland Report put it[8].

Greenhouse Gas (GHG) emissions have been growing since 1750, starting to peak in the 1950s, and still continue to increase. Today, the aggregate warming effect of carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) are the highest in over 800,000 years and are largely responsible for the global warming observed over the past 150 years[9]. Human influence on climate has been recognised as the main cause of the observed warming of the climate system since the 1950s, resulting in profound alterations to human and natural systems, with unprecedented impacts on vulnerable populations and communities[10]. Population growth, global economic development, and changing lifestyles are among the main drivers of natural resource use and contributors to the increase in GHG emissions.

Electricity and heat production are the largest sources of GHG emissions (accounting for 25% of 2010 global GHG emissions), followed by agriculture, forestry and other land use (24%), industry (21%) and transportation (14%)[11].

6 Steffen et al. 2007 The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature? Ambio, 36, 8.

7 Crutzen, Paul J. (2002) 'Geology of Mankind', Nature, 415, p. 23

8 WCED, 1987. Our Common Future. World Commission on Environment and Development (WCED), Geneva, Switzerland, 383 pp.doi:10.2307/2621529.

9 Meinschausen et al 2017. Historical greenhouse gas concentrations for climate modelling (CMIP6). Geosci. Model Dev., 10, 2057-2116. https://doi.org/10.5194/gmd-10-2057-2017

10 Boden, T.A., Marland, G., and Andres, R.J. (2017). National CO_2 Emissions from Fossil-Fuel Burning, Cement Manufacture, and Gas Flaring: 1751-2014, Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, doi 10.3334/CDIAC/00001_V2017.

11 Intergovernmental Panel on Climate Change [IPCC] 2014. IPCC, 2014: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Retrieved on December 10th, 2018: https://www.ipcc.ch/report/ar5/wg3/

GHG emissions vary significantly at the country level and are still growing in many countries. In 2014, the top three CO_2 emitters were China (30%), the United States (15%) and the European Union (9%), accounting together for more than half of total emissions at the global level[12]. According to the European Investment Bank[13], the number of climate legislation measures in 2017 were 29 in the EU, 4 in China and 8 in the USA. In the same year, the new investments in renewable energy in China stands at 109.7 billion euros, compared to 35.4 billion euros in the EU and 35.1 billion euros in the USA.

"According to a recent study of the Asian Development Bank, GREENHOUSE GASES (GHG) EMISSIONS in Southeast Asia are considerably lower compared to advanced economies, but between 1990 and 2010 carbon dioxide emissions increased faster in Southeast Asia than anywhere else in the world. The region is increasingly reliant on coal and other fossil fuels, despite the increase in average temperatures observed every decade since 1960, and the increase in frequency of typhoons and floods in Vietnam and other countries", says Monica Hornung Cattan, Director of Programmes at Global Initiatives, headquartered in Singapore, and "governments are increasingly aware that climate action needs the concerted action of all actors in society". As Masagos Zulkifli, the Minister of Environment and Water Resources of Singapore, put it at the launch of Singapore's Year of Climate Action, "We feel it is important to raise the level of national consciousness around the need to take individual and collective action to fight climate change[14].

In the European Union (EU), the commitment to reduce GHG emissions include the 2020 Climate and Energy Package outlining the approach to achieve a 20% reduction of total emissions compared with 1990 levels by 2020, the 2030 Climate and Energy Framework[15], setting a 40% reduction by 2030 and the long-term vision for a climate neutral economy to be achieved by 2050 to keep the warming of climate systems to 1.5°C, in line with the Paris Agreement adopted in November 2018[16,17]. In the period 1990-2016, the EU GHG emissions decreased in the majority of sectors (especially energy use from manufacturing industries and construction, electricity and heat production, and residential combustion), with the exception of domestic and international transports. It has been estimated, however, that the EU can reduce GHG emissions by 32% by the year 2030, therefore falling short the 40% target reduction (compared with 1990 levels).

12 Intergovernmental Panel on Climate Change [IPCC] 2018. Summary for Policymakers. In: 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 [V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, T. Waterfield (eds.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp. Retrieved on December 18th, 2018: https://www.ipcc.ch/sr15/

13 European Investment Bank, EIB climate survey. Retrieved on January 12th, 2019, from www.eib.org

14 https://www.straitstimes.com/singapore/environment/climate-change-many-think-they-cant-make-a-difference

15 EU 2018. Total greenhouse gas emission trends and projections. Retrieved on December 18th, 2018: https://www.eea.europa.eu

16 EU 2018. 2020 climate & energy package. Retrieved on December 18th, 2018: https://ec.europa.eu/clima/policies/strategies/2020_en

17 EU 2018. 2050 long term strategy. Retrieved on December 18th, 2018: https://ec.europa.eu/clima/policies/strategies/2050_en

UNDERSTANDING CLIMATE CHANGE

- Global warming is an increase in combined surface air and sea surface temperatures averaged over the globe and over a 30-year period. Human activities have caused approximately 1.0°C of global warming above pre-industrial levels in 2017, increasing at 0.2°C per decade. Global warming is likely to reach 1.5°C between the years 2030-2052, if it continues to increase at the current rate.
- Warming of climate system is unequivocal and will persist for centuries to millennia; impacts on natural and human systems have already been observed. They include an increase in mean temperature, hot extremes in most inhabited regions, heavy precipitation, as well as drought and precipitation deficits.
- Limiting global warming to 1.5°C compared to 2°C is fundamental as it can reduce the impacts on terrestrial, freshwater and coastal ecosystems and on their ecosystem services, as well as on health, livelihoods, food security, water supply, human security, and economic growth.
- In order to avoid overshoot and reliance on future large-scale deployment of carbon dioxide removal, global CO_2 emissions need to start declining well before the year 2030.
- Climate change can strongly affect sustainable development and equity. If present trends persist, climate change is expected to reduce the likelihood of achieving the 17 Sustainable Development Goals (SDGs). Conversely, strategies that keep the warming of climate systems at 1.5°C can increase the likelihood of meeting the SDGs. Climate change mitigation and adaptation need to be integrated with sustainable development and aligned with the targets of the SDGs.

Source: IPCC 2018, "Summary for policy makers"

The impacts of climate change are increasingly complex and have far-reaching consequences. They include not only ocean acidification and warming, declining biodiversity and fishery stocks, loss of habitats, deforestation, toxins in rivers and soils, waste in oceans and on land, but also severe impacts on human health.

According to the World Health Organization (WHO), 9 out of 10 people in the world live in places where the air-quality guidelines are not met, increasing the burden of disease from stroke, heart disease, lung cancer, and both chronic and acute respiratory diseases[18]. The impact of climate change is expected to be costly for public health and to affect disproportionately the most vulnerable people in societies,

18 World Health Organization [WHO] 2018. Ambient (outdoor) air quality and health. Retrieved on December 18, 2018: https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health

also in terms of food insecurity that according to the Food and Agriculture Organisation of the United Nations (FAO), in 2017, affecting over 820 million people in the world[19]. "The nutrition situation is worsening, socio-economic disparities are increasing, and food production contributes to, and is affected by, climate change. The persistence of silo approaches – in particular, the persisting gap between food and agriculture on the one hand and health on the other – generates an inconsistency in policies and regulatory frameworks, resulting in increased vulnerability of the poorest sections of society, including infectious diseases, and further environmental degradation" says Florence Egal, food and nutrition expert and former FAO nutrition officer.

Climate change is arguably the main threat the global economy and society is facing. According to the 2019 Global Risk Report of the World Economic Forum[20], extreme weather events are the top global risk in terms of likelihood, followed by failure of adaptation and mitigation strategies and natural disasters. Since 2011, climate-related risks (including water crises, flooding, biodiversity loss, greenhouse gas emissions etc.) are among the top 5 global risks, both in terms of likelihood and impact. Insurance and re-insurance models predict that with the current climate, natural variability affecting both the frequency and severity of extreme weather events will be the main factor affecting annual expected losses.

The United Nations (UN) 17 Sustainable Development Goals (SDGs) are all related to climate – from the eradication of poverty and hunger (SDG 1 and 2), to affordable and clean energy (SDG 7), sustainable cities and communities (SDG11), sustainable production and consumption (SDG12). Climate change is expected to decrease the likelihood of achieving the SDGs by the year 2030[21], unless urgent action is undertaken to build resilience and adaptive capacity to climate hazards and disasters; to integrate climate-related strategies and measures into international, national and municipal policies; to increase responsible business behaviour; to promote more sustainable consumption patterns and lifestyles by increasing awareness and engagement of citizens. "The global response to 1.5°C warming is a systemic change that builds on transitions in industrial systems, land and ecosystems, energy and material use, cities and infrastructures, consumption and lifestyles", according to Prof. Valentini of the IPCC. "A switch from a linear economy to a circular economy, where products are designed and crafted in a restorative way, consumables are made of biological materials, and energy is fully renewable, is highly needed. Adopting a circular "culture" can bring efficiency, innovation and profit opportunities to business, as well as vitality to labour markets".

19 FAO, 2018. State of Food Security and Nutrition in the World. Retrieved on January 5, 2018: www.fao.org

20 World Economic Forum 2019. The Global Risks Report 2019. 14th Edition. Retrieved on January 17, 2019: http://www3.weforum.org

21 Intergovernmental Panel on Climate Change [IPCC] 2018. Summary for Policymakers. In: 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 [V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, T. Waterfield (eds.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp. Retrieved on December 18, 2018: https://www.ipcc.ch/sr15/

CHAPTER 2.

The role of business

BUSINESS: AN OVERVIEW OF CHALLENGES AND INITIATIVES

During the 2018 Responsible Business Forum on Sustainable Development organised by Global Initiatives and the United Nations Development Programme (UNDP) held in Singapore in October of 2018, Achim Steiner, the UNDP Administrator, stressed in front of an audience of over 800 business leaders that "humanity has probably passed the point of no return"[22], in order to urge them to take bold leadership to accelerate climate action. "The markets of tomorrow will judge you on how you respond now", he said. "The potential of business engagement in climate change mitigation and adaptation still needs to be fully unlocked", says Hornung Cattan ofGlobal Initiatives. "Among the most engaged business sectors there are certainly renewable energy, electric vehicles, waste management and climate-resilient agriculture, but climate action needs to permeate business activities more broadly and much faster to build a climate-neutral economy".

Responsible corporate behaviour is much needed in all sectors to tackle climate change for the benefit of business, citizens and the planet. Companies can take a stand in climate action by taking a number of measures, which include emission reduction targets, climate mitigation strategies, investments in innovation and new technologies, measurement of progress through environmental foot-printing, reporting, as well as adopting carbon pricing as a tool within the company. In the words of Georg Kell, the Founding Director of the United Nations (UN) Global Compact and Chairperson of the Sustainability Council, advising the Board of Management of the Volkswagen Group, "decarbonisation is today a top strategic management, not an efficiency add-on activity". Importantly, "companies can play a fundamental role in advancing climate change responses by innovating and re-orientating their business to boost the social value of their products", highlights Prof Valentini of the IPCC, "as this can be effective also from a return standpoint, as shown by the successful example of Raspberry Pi, a series of cheap single-board computers produced with the aim of promoting computer science teaching in developing countries. It started with an educational purpose and it is now one of the best-selling computer brands in the world".

There are a number of businesses that have integrated climate action into their strategies and operations. 845 companies from all sectors – from energy and materials to health care and telecommunication services – are part of "We Mean Business", a coalition aimed at mobilising business action to accelerate the transition to a low-carbon economy. The coalition is led by seven non-profit organisations – including BSR (Business for Social Responsibility)[23], CDP[24], Ceres and the World Business Council for Sustainable

22 https://www.eco-business.com/news/how-will-you-respond-to-the-ipccs-urgent-climate-warning/

23 BSR is a nonprofit organization working with over 250 member companies with offices in Asia, Europe, and North America.

24 CDP is an international organisation with regional offices and local partners located in 50 countries.

Development (WBCSD). The "Science-based targets" initiative –a collaboration between CDP, the United Nations Global Compact (UNGC), World Resources Institute (WRI), and the World Wide Fund for Nature (WWF) – is one of the "We Mean Business Coalition" commitments and aims at establishing science-based target setting as the standard business practice by the year 2020. An analysis developed by CDP on a sample of 1073 companies, accounting for 12% of global direct GHG emissions [25] revealed a 20% increase in the number of companies offering low-carbon products and services since last year (for a total of 75% of the companies analysed in the sample) as well as in the number of companies showing a commitment to renewable energy (including Unilever and BT commitment to 100% renewable energy sourcing by the year 2030) and carbon pricing. CDP reports that a growing number of companies, 32% of the sample, are setting their own internal price on carbon and another 18% plan to implement a price on carbon by 2020, a measure that has the potential to drive a shift in energy procurement. "Carbon pricing (with a high enough minimum price) is probably the most effective way forward and has to gain prominence in political agendas", underlines Georg Kell of the Sustainability Council. "About 40 carbon pricing initiatives are currently in place, but we need to phase out subsidies on fossil fuel consumption, estimated at 1 trillion USD, as well as to put a price on externalities", he continues.

Climate-smart initiatives and good practice can be spotted in different sectors. **Textiles**, the largest application of which is clothing (60% of total textiles used), is a sector in the spotlight. Production has doubled over the past 15 years[26] driven by so-called "fast fashion" phenomenon and a decrease in clothes utilisation, with more than half of what is produced is disposed of in less than a year[27]. The value lost annually by the industry is estimated to be USD 500 billion, coupled with 1.2 billion tonnes of GHG emissions per year – higher than all the emissions from international flights and marine shipping globally[28]. Big brands such as Nike, H&M, Burberry, and Gap Inc., and Stella McCartney have started to address the problem. They are all members of the Make Fashion Circular initiative, launched in 2017 by Ellen MacArthur Foundation, to lay out a new vision for the textile industry based on the principles of the circular economy so that clothes last longer and are worn more. This is particularly important as the clothing system is still fundamentally linear, with a continuous growth in production (it has almost doubled over the past 15 years), and the "fast fashion" phenomenon. A number of global movements are arising to promote a new vision to radically change the "way our clothes are sourced, produced and consumed, so that our clothing is made in a safe, clean and fair way", such as the Fashion Revolution movement[29].

25 CDP. Picking up the pace. Retrieved on January 19th, 2019: https://www.cdp.net/en/research/global-reports/tracking-climate-progress-2017

26 Ellen MacArthur Foundation. A New Textiles Economy: Redesigning Fashion's Future. Retrieved on January 16th, 2019: http://ellenmacarthurfoundation.org

27 McKinsey & Company. 2016. Style that's sustainable: A new fast- fashion formula. Retrieved on January 5th, 2019: https://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/style-thats-sustainable-a-new-fast-fashion-formula

28 Ellen MacArthur Foundation. A New Textiles Economy: Redesigning Fashion's Future. Retrieved on January 16th, 2019: http://ellenmacarthurfoundation.org

29 https://www.fashionrevolution.org/about/

In the **technology sector**, Google has incorporated the principles of the circular economy into their mission statement and reached 100% renewable energy use in 2017, embedding the principles of the circular economy "Maintain, Refurbish, Reuse and Recycle" in the way they manage the hardware inside their data centres to transform its operational model to be a restorative and regenerative system by design[30]. "The engagement of a technology giant like Google paves the way in incorporating sustainability into the company's ethos, not just for their employees but also for consumers", points out Hornung Cattan of Global Initiatives. "The potential to support climate action by enabling users to innovate and create realms of data and technology that would otherwise have been too complex or expensive to obtain is huge. New source tools such as the Environmental Insights Explorer, a carbon-emission calculator for small cities, and Earth Engine, a free up-to-date monitoring tool for tropical forests, are good examples", she continues.

A sector that is experiencing a "radical transformation" is the **automotive sector**, according to Georg Kell of the Sustainability Council: "Until two or three years ago, the engagement of the car industry with climate action was quite slow, but now it is clear that the twin forces of digitalization and climate change make it possible to take bold action and switch to e-mobility and sustainable transport services. As soon as the infrastructures will be in place the transformation will be unstoppable and will also push for renewable energy. This process has the potential to start a virtuous circle".

In the **secondary sector**, City Development Limited (CDL) is an excellent example of how companies can continuously innovate and incorporate sustainability into their mission value. "Ever since an establishing CSR-centric vision in 1995, CDL has been actively expanding on its existing policies to embrace circular economy ideals and steadily integrating and creating projects that either mitigate the impacts or directly reduce the contributing factors of Climate Change. From the development of Singapore Sustainability Academy to launching the first green bond listed by a Singaporean company, such initiatives have spearheaded climate change efforts led by businesses in Singapore", says Hornung Cattan.

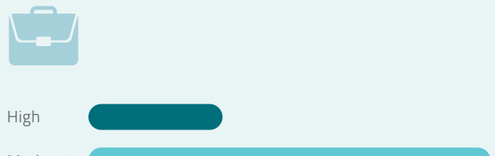
Food production is among the biggest drivers of global environmental change, accounting for a substantial share of GHG emissions, water use, biodiversity loss etc. Global targets for a sustainable and healthy food system that contributes to achieving the SDGs includes zero carbon emission production as well as major dietary shifts[31]. "More responsible business practices that have the potential to drive an acceleration towards a climate-neutral economy can be found in the food sector", says Prof Carlo Alberto Pratesi, Professor of Innovation, Sustainability and Marketing at the Roma Tre University. "Unilever and Carlsberg, for example, can be considered as sustainability champions, as well as Barilla". The former has been recognised by CDP as a "supplier engagement leader; the latter has committed to eliminating carbon emission and halving water usage in breweries by 2030 and to use only renewable electricity by 2022. "The largest potential probably lies in food retailers", continues Prof Pratesi. "In the UK, Marks & Spencer is selling 90 lines of loose fruit and vegetables free of all plastic packaging and has removed best before date labels to reduce food waste".

30 Google. Circular Economy at Work. 2016. Retrieved on January 5th, 2019: https://www.ellenmacarthurfoundation.org

31 Willet et al. 2019. Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. The Lancet Commissions. http://dx.doi.org/10.1016/S0140-6736(18)31788-4

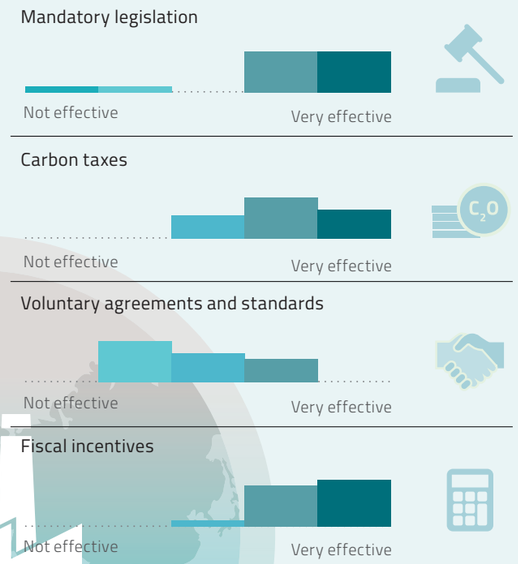
Climate change awareness: **a focus on business**

How would you generally define **business awareness** on climate change?

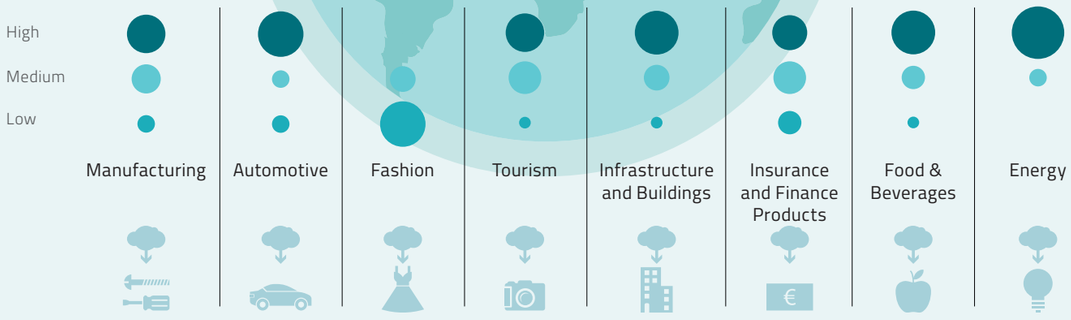


How would you generally define **business engagement** in climate action?

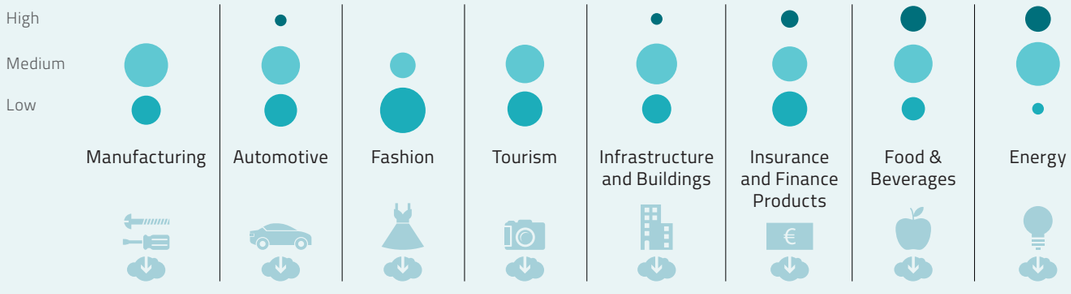
What is needed **to increase business engagement** on climate action?



To what extent are these business **sectors impacted** by climate change?



To what extent are these **sectors engaged** in climate action?



"Undertaking climate action is pivotal to manage supply security risks", highlights Luca Ruini, Vice-President, Sustainability and Energy at Barilla Supply Chain. "In 2010, we launched the Barilla Sustainable Farming (BSF) project in Italy, aimed at introducing more sustainable farming practices in durum wheat cultivation, such as crop rotation in substitution of monoculture, and the use of an innovative web-based Decision Support System developed by a university spin-off which enables a sharp reduction in the amount of fertilizers and agrochemicals. The project resulted in an increase in yields, a reduction of the environmental impacts (-10%), and in a saving of net costs for farmers (-10%). The BSF works as a climate change adaptation tool for farmers. Today, 30% of the durum wheat we use to produce pasta in Italy (about 220 thousand tonnes) is harvested according to this sustainable farming principles and the project has been launched also in Greece and Turkey".

"Food systems are currently among the biggest contributors of climate change but can also be an integral part of the solution if they embrace a circular economy approach", says Emma Chow, Project Manager of the Cities and Circular Economy for Food, Ellen MacArthur Foundation. "Examples of circular economy approaches that can contribute to progress towards climate change mitigation goals include creating new bio-materials and bio-energy, providing inputs for agriculture, designing new products as well as making the most of food by designing out waste and using by-products". A brand-new report from the Ellen MacArthur Foundation points out that the benefits that can arise from cities promoting a circular economy approach to food could generate benefits worth US$ 2.7 trillion annually in 2050 and lead to annual emissions savings up to 4.3 billion tonnes of CO_2 equivalent, saving an amount of arable land from degradation equivalent to an area larger than that of England[32]. The start-up landscape also provides examples of innovative businesses in the sector. Eaternity, based in Zurich, has developed a solution that enables caterers and restaurants to account for their environmental impacts, including the carbon footprint. Winnow, operating across EU, US and Asia, provides chefs with a smart weighting meter technology to track food waste; Too Good To Go, already in 9 countries, is an app that helps stores in selling surplus food.

EXPERT CONSULTATION

According to the 16 experts responding to the consultation, business awareness on climate change can be defined as "moderate" (75% of respondents), as well as their engagement (69%). The most effective measures to increase business engagement on climate change, according to respondents, include mandatory legislation, carbon taxes, fiscal incentives. The impacts on climate change are expected to be "high" for manufacturing, automotive, tourism, infrastructure and buildings, energy, food and beverages.

← The full findings are shown on page 18

32 Ellen MacArthur Foundation, Cities and Circular Economy for Food. 2019. Available online: http://www.ellenmacarthurfoundation.org/publications

"The **packaging industry** has been working on sustainability since the early 90s and is probably one of the sectors which is most ready to take full advantage of sustainability-driven innovation", says Massimo Marino, Co-founder and Administrator of Life Cycle Engineering (LCE). For instance, The Italian Packaging Consortium (Consorzio Nazionale Imballaggi, Conai) has developed, in collaboration with LCE, an EcoTool that aims to evaluate the environmental efficiency of packaging through Life Cycle Assessment Analysis. The results of the analyses are expressed in terms of reduction in CO_2 emissions, energy consumption and water consumption). "We are working with Conai and the Polytechnic University of Milan to develop a circular economy indicator that will be deployed to account for the environmental impact of packaging in the 2019 EcoTool".

The pathways for accelerating change towards decarbonisation include broader use of new technologies and greater multi-stakeholder cooperation and dialogue.

Andrea Renda, CEPS and College of Europe, highlights that "Technology alone cannot overcome global climate change challenges, but without technology it is unlikely that they will be tackled, especially in a context where global and national governance are struggling to take bold leadership in climate action. With 1 trillion connected devices expected in a few years from now, the Internet of Things will emerge as a new 'element' of the Anthropocene, and bring huge opportunities to all sectors, from manufacturing to energy, logistics, avionics and automotive".

"Greater dialogue and collaboration between stakeholders can enable the acceleration towards a climate-neutral society. Adopting a multi-stakeholder partnership can enable dialogue, collaboration and cross-fertilization of all actors, from investors to suppliers, partners and consumers along the value chain, as well as the government", highlights Hornung Cattan of Global Initiatives. "Punggol New Town, Singapore's first Eco-Town, is an excellent example of this. Through multiple focus group discussions with local residents, grassroot leaders and town councils, multiple facilities and projects, from cycling paths to car-sharing stations, were created to cultivate a space where the community will continuously be enabled to take up environmentally friendly practices". Taking a multi-stakeholder approach has also been key to analyse the urban food system of the City of Milan, and to develop the Milan Urban Food Policy Pact, signed by 100 cities in 2015 and now comprising 180 municipalities all over the world, by enabling dialogue and collaboration between different segments of societies and within the different actors in the food sector", says Andrea Magarini, Coordinator of the Milan Food Policy.

CHAPTER 3.

The role of citizens

UNDERSTANDING PUBLIC AWARENESS, CONCERNS AND BEHAVIOURS

Tackling climate change requires policy and business engagement, as well as individual action. Given the scope of the challenge, there is an increasing urgency to develop a society-wide response to environmental concerns and climate change, that encompasses people's attitude, behaviour and lifestyles. Increasing knowledge of citizens' beliefs regarding environmental issues and climate change, as well as their attitude towards adaptation and mitigation strategies, is key to find effective responses at the societal level. It has been recognised that the public's understanding has the potential to shape decisions, consumption, lifestyles, as well as voting trends[33].

The urgency of engaging the public has been investigated in the academic literature, especially in terms of the consistency between individual attitudes and behaviour, the societal and human variables influencing behaviours, as well as the institutional influences on citizens' beliefs[34,35,36]. Four main factors have been shown to have an impact on pro-environmental behaviour: specific consumer beliefs (e.g. judgement about products); perceived behavioural barriers (i.e. the extent to which the individual perceives his/her own action as impactful on climate change); action-related knowledge (i.e. which human action contribute to climate change) rather than factual knowledge (i.e. knowing what is climate change); and personal norms (i.e. feeling a moral obligation to climate-friendly behaviour)[37].

Research has also shown that personal values play a key role in shaping public engagement with climate change, for example the willingness to engage in sustainable behaviour or the level of concern about climate-related risks[38]. Among the most prominent factors that can act as a motivation for a substantial change in behaviour, the perceived social injustice of climate change impacts has been shown to be stronger than the concern for the environment for its own sake[39]. More generally, the factors that can be considered as predictive of climate change behaviour are mainly altruistic values, as opposed to self-enhancing values[40].

33 Bartels, W. L., Furman, C. A., Diehl, D. C., Royce, F. S., Dourte, D. R., Ortiz, B. V, & Jones, J. W., 2013: Warming up to climate change: a participatory approach to engaging with agricultural stakeholders in the Southeast US. Regional Environmental Change, 13(1), 45-55.

34 Steg L, Vlek C. Encouraging pro-environmental behaviour: an integrative review and research agenda. J Environ Psychol 2009, 29:309–317.

35 Schultz PW, Nolan J, Cialdini R, Goldstein N, Griskevicius V. The constructive, destructive, and reconstructive power of social norms. Psychol Sci 2007, 18:429–434..

36 Corner et al. 2014. Public engagement with climate change: the role of human values. WIREs Climate Change. Doi: 10.1002/wcc.269

37 Tanner C. and Kast S.W., 2003. Promoting Sustainable Consumption: Determinants of Green Purchases by Swiss Consumers. Psychology and Marketing, 20(10), 883-902.

38 Corner et al. 2014. Public engagement with climate change: the role of human values. WIREs Climate Change. Doi: 10.1002/wcc.269

39 Howell R. It's not (just) "the environment, stupid!" Values, motivations, and routes to engagement of people adopting lower-carbon lifestyles. Glob Environ Chang 2013, 23:281–290.

40 Corner et al. 2014. Public engagement with climate change: the role of human values. WIREs Climate Change. Doi: 10.1002/wcc.269

A recent global survey of the European Investment Bank[41], launched ahead of the climate conference COP24 in Katowice, explored the sentiments, opinions on the economic potentials and the expectations in terms of its mitigation and adaptation measures of over 25,000 citizens in the European Union, the United States and China. The survey, the first of its kind, revealed that Europeans are generally more concerned or alarmed about climate change (78%) than in the USA (63%) and China (65%). Southern Europeans are also relatively more concerned that Northern Europeans on climate change impacts and believe they are mostly caused by human activities (e.g. 62% in Italy and 61% Spain, against 45% in France, 36% in the Netherlands and 30% in Estonia). Italians are the most alarmed in the EU. Over 80% of respondents describe themselves as "concerned"; 67% see climate change as a threat to humanity (against 59% for the EU average). Deniers of climate change are mainly found in the USA (14% of respondents), followed by the EU (7%) and China (3%).

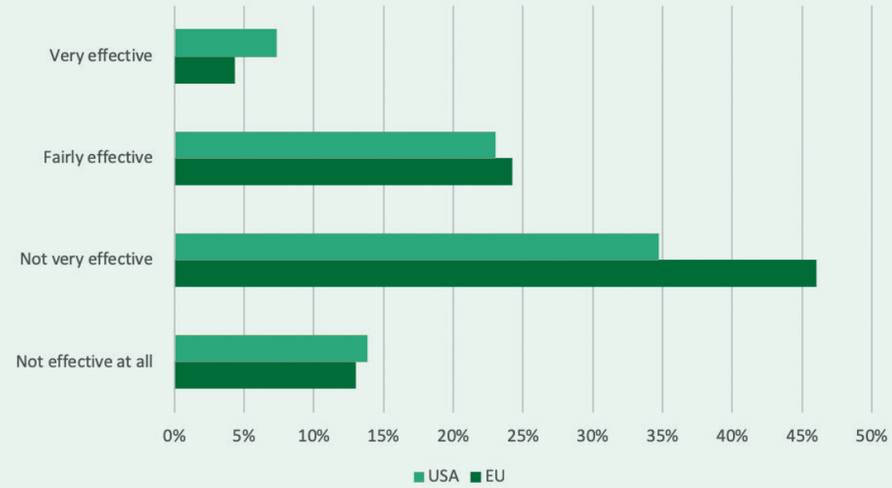
In terms of awareness, the survey highlights that the millennial generation (18-34-year-olds) is more aware that climate change is mostly anthropic (58% of respondents, against 55% for 35-54 year-olds, and 44% in 55+ year-olds). Interestingly, the survey reveals public awareness on the role they can play as citizens (Figure 1). Citizens are the most important actors according to 31% of respondents in the EU, 27% in China, 24% in the USA; followed by international organisations (23% in the EU, 40% in China, 25% in the USA) and national governments (21% in the EU, 7% in China and 10% in the USA).

Figure 1. **Which actor should play the biggest role in tackling climate change?**

Source: Author's elaboration from European Investment Bank (2019)

The survey also explores public opinion about the effectiveness of the behaviour of the average citizen in the EU and the USA (Figure 2)[42]. The findings reveal that the largest majority of respondents find these measures "not very effective" (46% in EU and 35% in the USA), or "fairly effective" (both below 25%). The climate-smart resolutions for the following 12 months include recycling, waste reduction, changes in food shopping, as well as use of energy and mobility (Figure 3).

Figure 2. **Effectiveness of individual action**

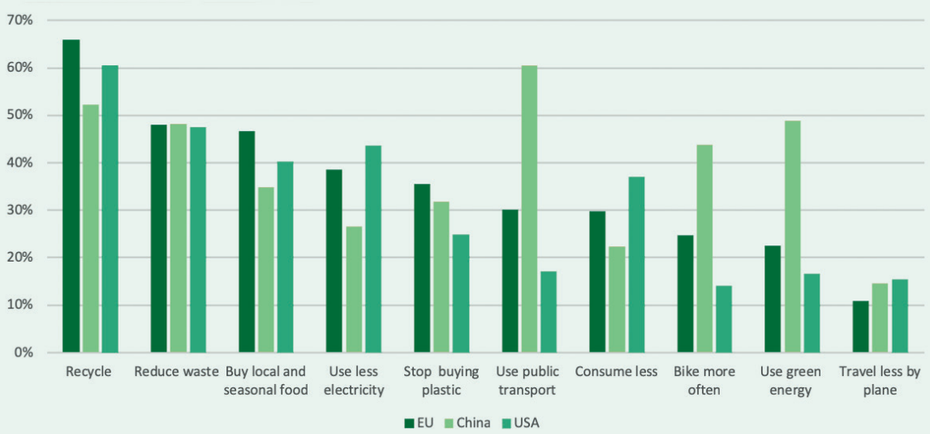


Source: Author's elaboration from European Investment Bank (2019)

41 European Investment Bank, EIB climate survey. Retrieved on January 12th, 2019, from www.eib.org

42 Data not available for China.

Figure 3. **Personal measures to tackle climate change over the next 12 months**



Source: Author's elaboration from European Investment Bank (2019)

"In Asia, the awareness of citizens with regard to climate change is certainly growing as its consequences are more visible and governments are expected to find effective responses to address it", says Hornung Cattan of Global Initiatives. A survey recently developed by the China Centre for Climate Change Communication (China4C) on a sample of over 4,000 respondents reveals that 94.4% of the respondents think that climate change is happening, 75.2% believe they have already experienced its impacts, and nearly 80% are worried about it. 90% of the respondents declare their support of the government's climate mitigation and adaptation actions, such as the promotion of energy-saving products, the development of clean energy and the control of fossil fuel consumption[43].

Against this context, in an age of post-truth and fake news, communication can play a key role in influencing climate change perception and engagement. "Today, the main challenge is to bridge the values of certain groups of individuals with pro-environmental values and try to avoid one-way messages that may lead to polarized views and result in an opposition between attitudinal groups of people", highlights Prof Pratesi. "Media can effectively fill the knowledge gap about climate change by providing scientifically sound and robust information to citizens, also taking full advantage of a broad range of digital media that make communication easier and faster", confirms Serena Giacomin, President of the Italian Climate Network (ICN), "as well as support to school teachers to bring climate and environmental disciplines in their curricula. This is at the core of the School Project of ICN, which has reached about 5,000 students in over 40 schools in 28 cities in Italy since 2013"[44]. The importance of incorporating climate change-related education in schools is also highlighted by Anna Ruggerini, Operations Director of the Barilla Center for Food & Nutrition Foundation. "Educators have a pivotal role in building a truly global citizenship that help us achieve the SDGs by the year 2030. We, the Food and our Planet, developed in the framework of a collaboration with the Italian Ministry for Education and Research, is a programme that aims to provide teachers, from primary school to high school, with science-based content for their teaching update as well as digital tools they can use to nurture and inspire future generations"[45].

A number of individual actions have been recognised as pivotal in relation to decarbonisation, including change in dietary habits and the use of energy and material inputs. "People are generally aware of climate change and that much of the climactic disruption we are experiencing is related to anthropogenic activities", says Prof Pratesi, Roma Tre University. "However, due the complexity of the phenomenon and the difficulties in building a sound narrative around it, by both companies and the media, they still do not fully appreciate their role as key actors of change and the potential to mitigate current trends through a shift in consumption and lifestyles". The transition in consumption and lifestyles is also highlighted by Prof Valentini of the IPCC: "Consumption patterns need to fully embrace the circular economy approach to reduce our contribution to climate change. As consumers, this means first and foremost phasing out waste". "Scientists are also important actors for increasing public awareness on climate change, but they are faced with probably the toughest communication challenge of our time, i.e. building a coherent and evidence-based narrative on such a complex phenomenon that makes its scope clear, as well as the impact on people's daily life", points out Marco Moro, the Editorial Director of Edizioni Ambiente.

"Cities play a key role in the transitions towards a healthy, sustainable and more prosperous society, especially taking into account that close to 70% of the world's population will live in urban contexts by 2050", highlights Desirée Bernhardt, Manager of the C40 Low-Carbon Districts Forum. Founded in 2005, C40 Cities is a global network of cities committed to taking bold climate action and deliver on the Paris Agreement at the local level. Today, the organization connects over 90 of the world's leading municipalities, representing over 700 million people and one quarter of the global economy. "Cities are at the frontline of the climate debate today. All of the cities in the C40 are committed to bold climate actions and are aware of the urgency of accelerating change to improve the quality of life for their citizens. This is also a strong message to national and global governance. Cities are leading the way". The actions and initiatives undertaken by cities within C40, since 2011, to reduce emissions and adapt to climate change are over 10,000. "Connecting cities and facilitating knowledge transfers, both in terms of barriers and successes, is at the core of C40 to really foster and catalyse the best solutions for a healthier and more equitable future", she continues.

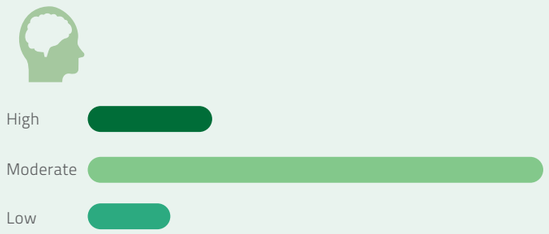
43 China4C. i.weather.com.cn/images/cn/in- dex/dtpsc/2017/11/07/Cli- mate_Change_in_the_Chi- nese_Mind_2017_English_Version.pdf

44 Italian Climate Network. Progetto Scuole. Retrieved on January 17th, 2019: http://www.italiaclima.org/attivita/con-le-scuole/

45 BCFN, Noi, il Cibo, il nostro Pianeta. Retrieved on January 19th, 2019: http://www.educazionedigitale.it/noiilciboilpianeta/

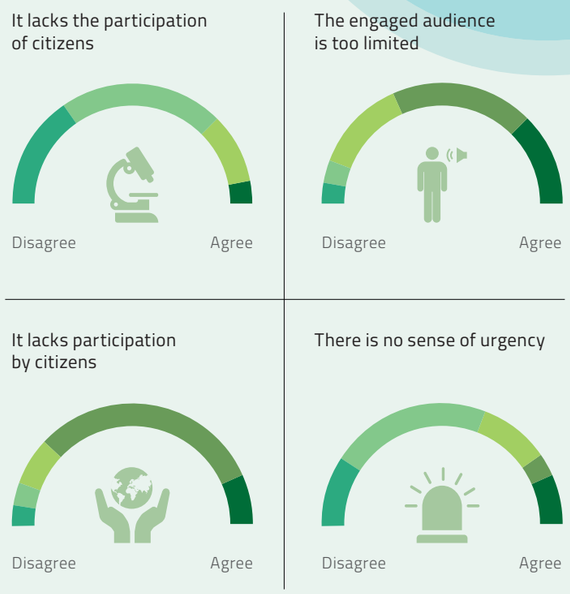
Climate change awareness: **a focus on citizens**

How would you generally define **citizens' awareness** on climate change?

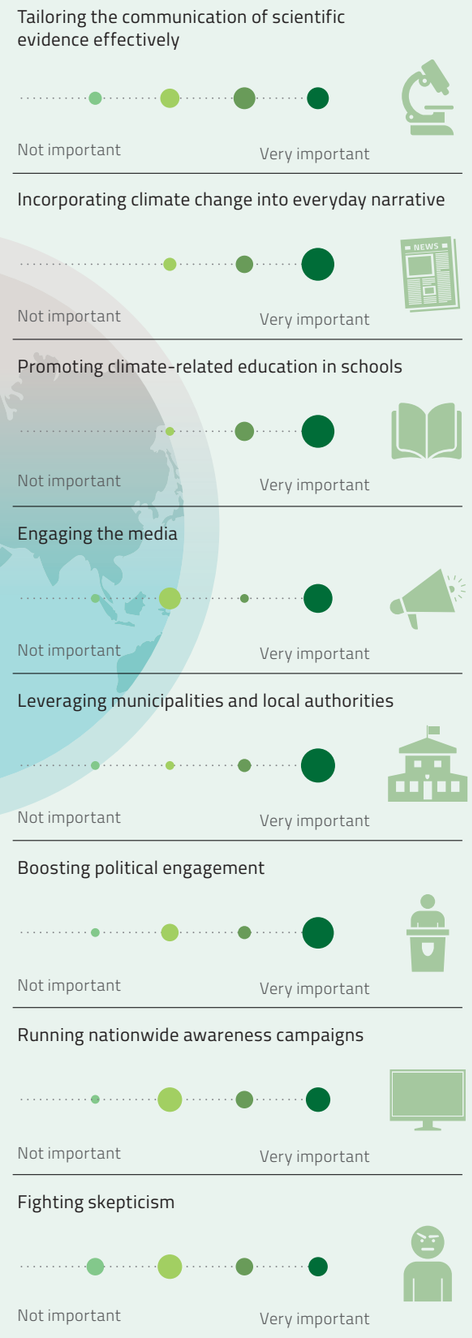


How would you generally define citizens' engagement in climate action?

To what extent do you agree or disagree with these statements about **the communication on climate change** to citizens?



What is needed to increase the **engagement of citizens** in climate action?



Against this context, the role of digital technologies should also be highlighted. "The changes triggered by digital technology can have a substantial impact on the way individual consumers manage and approach their consumption behaviour and decisions. One good example is the use of blockchain to enable more transparent and reliable decision making by end users when deciding which product to purchase and consume. Besides blockchain, AI can also empower end users in many ways. These range from purely technological solutions to behavioural assistance in consumption decisions", points out Andrea Renda, Senior Research Fellow and Head of Global Governance, Regulation, Innovation and the Digital Economy, CEPS and College of Europe.

EXPERT CONSULTATION

The expert consultation revealed that citizens' awareness of climate action has been defined as "moderate" by the majority of respondents (69%). Their engagement in climate action was defined as "moderate" according to 56% of respondents, and "low" for 44%. Interestingly, none of the respondents reported public engagement as being "high". Experts were asked to evaluate a few statements about climate change communication to citizens. Agreement was found on the lack of participation of citizens and the limited audience engaged with the topic. The most important actions suggested to improve public engagement with climate action include incorporating climate change into everyday narrative, engaging the media, promoting climate-related education in schools, boosting political engagement as well as leveraging on municipalities and local authorities.

← The full findings are shown on page 26

Conclusions

Climate change has been termed the defining issue of our time and requires bold leadership and action from all stakeholders in society to shift towards a low-carbon and resilient society. This transition is a pre-requisite for achieving the 17 Sustainable Development Goals defined in the 2030 Agenda of the United Nations to build peace, prosperity and inclusiveness in the world.

Against this context, the present report has provided a preliminary analysis of the awareness and engagement of business and citizens on climate action. The projects, initiatives and good practices across different sectors have been reviewed, including textiles, the technology sector, the automotive sector, the secondary sector, food production and manufacturing. Key interviews conducted to delve into the challenges and opportunities faced by businesses highlighted the importance of multi-stakeholder dialogue and collaboration, the need to embrace a circular economy approach – from product design to consumption and disposal – as well as the potential of adopting measures such as carbon taxes, fiscal incentives and mandatory legislation.

It has been highlighted that there is an increasing urgency to develop a society-wide response to environmental concerns and climate change, which not only involves businesses, governments and institutions, but that also encompasses people's attitudes, behaviours and lifestyles. Although public awareness on climate change and environmental issues is increasing, there is much need to prompt more sustainable behaviour through communication, education and training, as well as the engagement of local actors that have a direct influence on citizens.

Future research directions include a more comprehensive analysis of public behaviour and consumption patterns vis-à-vis the awareness on the societal challenges that the world is facing and that lie in the necessity to rethink the human-environment relationships in the Anthropocene.

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