

# CLIMATE CHANGE AND RECESSION

## Eight trends

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### 1. Introduction

The international climate change discussions are struggling to move forward.<sup>1</sup> It is unlikely that there will be binding legal targets for the developed countries in the period 2012-2020.<sup>2</sup> However, the Conference of the Parties in Doha has agreed to negotiate on a post-2012 commitment period with binding targets for the period 2012-2020. Countries are invited to review their commitments in 2014 with a view to raising these. This agreement does not include the US, Canada, Russia, New Zealand and Japan. Another track aims to promote a legally binding regime that is adopted in 2015 and enters into effect in 2020, and covers both developed and developing countries.<sup>3</sup> Although there is progress, this does not amount to legally binding targets that are already effective; and the issue remains very important within the context of the earth system governance challenge. Against this background, this paper addresses the question: Can the current recession, which is expected to last till 2018,<sup>4</sup> help us to buy time by reducing the emissions of GHGs? In order to answer this question, this review paper analyses the extensive literature on the two-way relationship between climate change and the recession.

Climate change poses a major challenge to the achievement of sustainable development particularly in view of the recent global economic crisis. The global economic recession of 2008 – 2009 was marked by recessions in major economies like the United States of America, the United Kingdom, and the Euro-zone. The United States of America and the United Kingdom are

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<sup>1</sup> J. Murray, Breakthroughs continue to elude Bangkok climate talks: Disagreements over future structure of negotiations result in scant progress at latest round of UN talks (Business Green 3 September, 2012) <http://www.businessgreen.com/bg/news/2202384/reports-breakthroughs-continue-to-elude-bangkok-climate-talks> accessed on 20 December 2012.

<sup>2</sup> Ibid.

<sup>3</sup> UNFCCC Draft report of the Conference of the Parties (COP) on its eighteenth session, 26 November - 7 December 2012, Doha, Qatar. FCCC/CP/2012/L.1.

<sup>4</sup> P. Inman, No Recovery until 2018, IMF warns (The Guardian 3 October 2012) [www.guardian.co.uk/business/2012/oct/03/imf-global-economy-warning](http://www.guardian.co.uk/business/2012/oct/03/imf-global-economy-warning) accessed on 13 December, 2012.

on a slow path to economic recovery, while many countries within the Euro-zone like Spain and Greece are currently still experiencing turbulent economic times. However, the International Monetary Fund recently announced that the economic recession would last until 2018.<sup>5</sup> Many of the former East and Central European Countries are still in a transition process and are formally referred to as countries with economies in transition and have a special status within the negotiations.

This review paper examines the two-way relationship between climate change and economic recession. Such understanding is important because the process of climate change does not pause while countries struggle with economic recession or recovery. A preliminary search conducted on Google Scholar produces approximately 94,700 and 14,800 results, for "climate change AND economic recession", and "greenhouse gas emissions AND economic recession", respectively. A similar search on ScienceDirect produced approximately 5,776 and 1,113 results, respectively. Searches conducted on other scientific search engines produced considerably less results. The titles and abstracts of the records produced were first quickly scanned for relevance, starting with the most recent article. Next, containing relevant information in their titles and/or abstracts were reviewed with varying levels of thoroughness based on the substance of the information contained. The inclusion criteria for the publications reviewed was based on identifying trends in the relationship between climate change and economic recession. About 60 publications were finally focused on for this article.

## **2. Understanding the impacts**

### **2.1 Introduction**

#### **2.1.1. What is recession?**

Greater economic integration between countries through trade and financial flows increases the chances of establishing a global business cycle. Two standard methods are applied for dating the peaks and troughs both for national and global business cycles; statistical procedures and judgemental methods. Both methods when applied to the global business cycle show four troughs within the last fifty years, occurring in 1975, 1982, 1991, and 2008. These troughs are

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<sup>5</sup> Ibid.

recognised as periods of global economic recession. Nonetheless, the Great Depression which occurred in the early 1930s, out of intensified recession, is still credited as the most severe downturn in economic activity ever witnessed in advanced economies like the United States, United Kingdom, Germany, and France. Conversely, the sharp declines in economic activity experienced in emerging economies in 1997-98 from which they are still trying to recover, and later advanced economies in 2001 are however not considered global recessions because there was growth in advanced economies and emerging markets were robust, respectively.

There is no official definition of recession, but it is generally used to describe troughs or periods of decline in economic activity. The global economic recession of 2008 – 2009 was marked by recessions in major economies like the United States of America, the United Kingdom, and the Euro-zone. The United States of America and the United Kingdom are on a slow path to economic recovery, while many countries within the Euro-zone like Spain and Greece are currently still experiencing turbulent economic times. However, the International Monetary Fund recently announced that the economic recession would last until 2018.<sup>6</sup> Many of the former East and Central European Countries are still in a transition process and are formally referred to as countries with economies in transition and have a special status within the negotiations.

### 2.1.2 Research focus

Climate change poses a major challenge to the achievement of sustainable development particularly in view of the recent global economic crisis. The current recession overlaps with the 2008-2012 commitment period for the Kyoto Protocol and negotiations for a post-Kyoto agreement. In light of these, many researchers are studying the effect of the recession on global climate change policy.<sup>7</sup> Conversely, some researchers also study the impact of economic activities on greenhouse gas emissions especially because most economies around the world are still heavily reliant on fossil fuels.<sup>8</sup> The major trends in the literature show sometimes

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<sup>6</sup> Ibid.

<sup>7</sup> L. Scruggs and S. Benegal, “Declining Public Concern about Climate Change: Can we blame the recession?” (2012) 22 *Global Environmental Change* 505; R. Y. Shum, “Effects of Economic Recession and Local Weather on Climate Change Attitudes” (2012) 12(1) *Climate Policy* 38-49.

<sup>8</sup> A. Bowen *et al.*, *The Implications of the Economic Slowdown for Greenhouse Gas Emissions and Targets* (2009) Centre for Climate Change Economics and Policy Working Paper No. 11; V. Adreoni and S. Galmarini, “Decoupling Economic Growth from Carbon Dioxide Emissions: A decomposition analysis of Italian energy consumption” (2012) 44(1) *Energy* 682-691; L. Cutlip, and B. D. Fath, “Relationship between Carbon Emissions

contradictory trends in the effect of recession on greenhouse gas emissions, green innovation, and climate and energy policy. The eight trends from the literature review are presented below.

## 2.2 Greenhouse gas (GHG) emissions

### 2.2.1 Recession leads to reduced GHG emissions

Most modern economies rely heavily on fossil fuel, which accounts for 81% of the primary energy mix.<sup>9</sup> The burning of fossil fuels constitutes the single largest source of carbon dioxide (CO<sub>2</sub>) emissions, and approximately 60% of all GHG emissions.<sup>10</sup> In 2004 alone, CO<sub>2</sub> accounted for 77% of all anthropogenic greenhouse gas emissions.<sup>11</sup> As a result of this, there is a strong correlation between a country's level of economic growth, measured by Gross Domestic Product (GDP), and its CO<sub>2</sub> emissions.<sup>12</sup> Remarkably, CO<sub>2</sub> is also the most important GHG, because despite the controversy around the exact atmospheric lifetime, several long-term climate models agree that anthropogenic CO<sub>2</sub> emissions only dissipates over “an enormously long time”, ranging from 5 to 200 years, depending on “the different rates of uptake by different removal processes”.<sup>13</sup> Even future scenarios with remarkable anthropogenic climate change show large increases in global production of fossil fuels, and consequently CO<sub>2</sub> emissions.<sup>14</sup>

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and Economic Development: Case study of six countries” (2012) 14(3) *Environment, Development, and Sustainability* 433-453.

<sup>9</sup> International Energy Agency [IEA], *Special Report: World Energy Outlook 2011. Are we entering a Golden Age of Gas?* (Paris Cedex: IEA 2011) 19.

<sup>10</sup> World Resources Institute (WRI), *Climate Analysis Indicators Tool (CAIT) Version 6.0*. (Washington, DC: WRI 2009). In 2010, fossil fuel combustion accounted for 94.4% of CO<sub>2</sub> emissions in the United States of America. See L.Parker, J.Blodgett, and B. D. Yacobucci, U.S. Global Climate Change Policy: Evolving views on cost, competitiveness, and comprehensiveness (Congressional Research Service, 2011) <http://www.fas.org/sgp/crs/misc/RL30024.pdf> accessed on 26 November 2012.

<sup>11</sup> IPCC, ‘Summary for Policymakers’ in B. Metz and others (eds), *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge and New York: Cambridge University Press 2007).

<sup>12</sup> A. Bowen *et al.*, The Implications of the Economic Slowdown (n 8).

<sup>13</sup> M. Inman, Carbon is Forever (Nature Reports Climate Change, News feature 20 November, 2008) doi:10.1038/climate.2008.122. <http://www.nature.com/climate/2008/0812/full/climate.2008.122.html> (accessed on 17 December 2012).

<sup>14</sup> M. k and X. Tang, “Depletion of fossil fuels and anthropogenic climate change - A review” (2013) 52 *Energy Policy* 797–809.

In the absence of decoupling of economic activities from CO<sub>2</sub> emissions, economic growth and energy intensity remain the largest sources of GHG emissions around the world.<sup>15</sup> This makes limited availability of fossil fuels an important factor in reducing anthropogenic climate change.<sup>16</sup> In the same vein, the trough in economic activity which characterises recession has the potential to reduce GHG emissions. This trend is evident in the aggregate GHG emissions figures for 1990 to 2010, which show a steep decline in emissions immediately after the economic recession of 2008 (see Figure 1). This trend is also reflected in the global figures for CO<sub>2</sub> emission from fossil fuels and cement production for 2008 (8, 748, 000 Mton) to 2009 (8, 626, 351 Mton).<sup>17</sup>

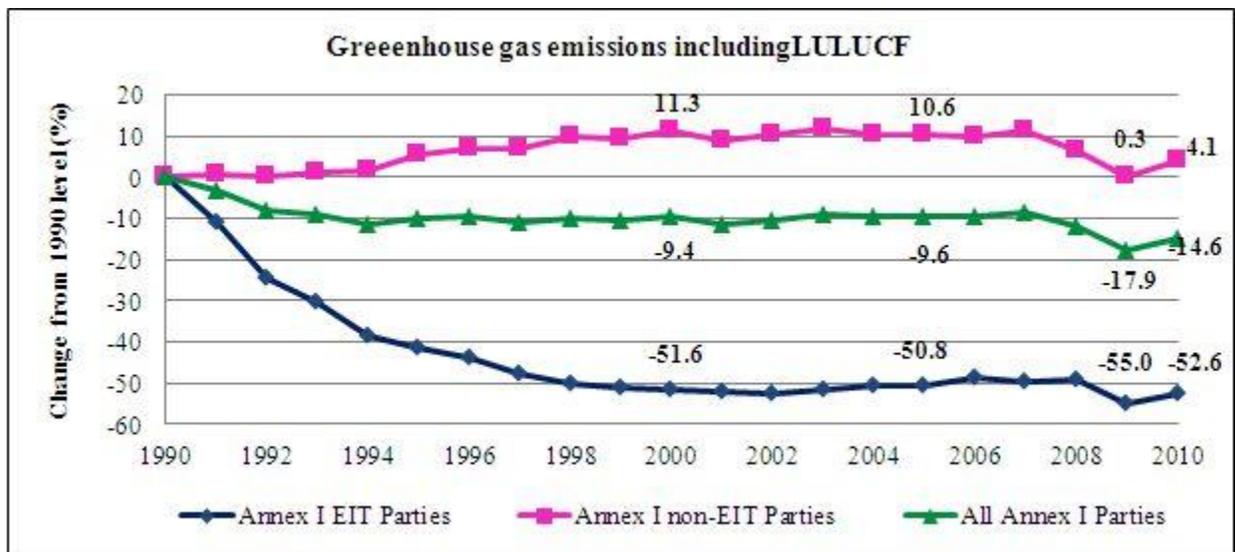


Figure 1 Trends in aggregate GHG emissions, 1990 - 2010 (including Land Use, Land Use Change and Forestry (LULUCF))

Source: GHG data from UNFCCC [http://unfccc.int/ghg\\_data/ghg\\_data\\_unfccc/items/4146.php](http://unfccc.int/ghg_data/ghg_data_unfccc/items/4146.php) (accessed on 12 December, 2012)

In Europe, the economic recession had significant impacts on three drivers of CO<sub>2</sub> emissions in the power sector: electricity demand, carbon prices, and fuel prices. The reduction in demand for

<sup>15</sup> V. Adreoni and S. Galmarini, “Decoupling Economic Growth from Carbon Dioxide Emissions” (n 8); L. Cutlip, and B. D. Fath, “Relationship between Carbon Emissions and Economic Development” (n 8).

<sup>16</sup> M. Höök and X. Tang, “Depletion of Fossil Fuels” (n 14).

<sup>17</sup> T. Boden, *et al.*, Global, Regional, and National Fossil-Fuel CO<sub>2</sub> Emissions. 2011. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., U.S.A. doi 10.3334/CDIAC/00001\_V2011. Remarkably, while the downward trend in greenhouse gas emissions after the economic recession was particularly evident amongst all the North America countries surveyed, a majority of the European and EuroAsian countries, and some Middle Eastern countries, the majority of African, South and Central American, and Asia Pacific countries showed increasing GHG emissions during the same period.

electricity as a result of the recession led to a reduction of about 175 Mton in GHG emissions compared to a business as usual scenario. However, similar reduction in the price of carbon produced a contrary effect of 30Mton increase in GHG emissions compared to a business as usual scenario. The impact of the economic recession on fuel prices also led to lower CO<sub>2</sub> emissions of 17 Mton.<sup>18</sup> At the national level, GHG emissions in the Netherlands fell from 210 billion CO<sub>2</sub>-equivalents in 2010 to 196 billion CO<sub>2</sub>-equivalents in 2011 partly as a result of the economic recession at the end of 2011.<sup>19</sup> Emissions of other GHGs however remained stable.<sup>20</sup>

Although in 2008, Spain exceeded its GHG emission allowance under the Kyoto Protocol by 20.9% a recent study shows a downward trend in this figure as a result of the economic recession, and financial crisis facing the country.<sup>21</sup> The study shows that CO<sub>2</sub> emissions have fallen with lower production and energy demand. Based on an extended input-output model developed in the study, to forecast energy demand and compute CO<sub>2</sub> emissions linked to the consumption of energy goods like gas, coal, and other petroleum products, it was shown that the crisis would contain GHG emissions at - 6.81%. Further reductions to - 9.76% could also be achieved by incorporating environmental policies, new technologies and increases in the price of crude oil in the simulations. Hence, in the worst case scenario the model projects that Spain will only exceed its CO<sub>2</sub> emissions, linked to the combustion of energy goods, by 0.9% in 2012.<sup>22</sup>

Similarly, in Japan, the world's third largest economy, the seventh highest emitter of GHGs emissions and the fifth highest emitter of CO<sub>2</sub>,<sup>23</sup> the recession of 2008 reduced the national GHG

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<sup>18</sup> B. Declercq, *et al.*, "Impact of the economic recession on the European power sector's CO<sub>2</sub> emissions" (2011) 39 *Energy Policy* 1677 – 1686.

<sup>19</sup> K. Olsthoorn and K. Peek, Mild winter and economic crisis curb greenhouse gas emissions (Statistics Netherlands, Web magazine, 28 August 2012) <http://www.cbs.nl/en-GB/menu/themas/natuur-milieu/publicaties/artikelen/archief/2012/2012-3674-wm.htm> accessed on 13 December 2012.

<sup>20</sup> *Ibid.*

<sup>21</sup> J. E. Zafrilla *et al.*, Fulfilling the Kyoto protocol in Spain: A matter of economic crisis or environmental policies? (2012) 51 *Energy Policy* 708 – 719.

<sup>22</sup> *Ibid.*

<sup>23</sup> GoJ, *Japan's Fifth National Communication Under the United Nations Framework Convention on Climate Change* (Tokyo: GoJ 2010); UNFCCC, *Compilation and synthesis of fifth national communications – Executive Summary* (Bonn: UNFCCC 2011).

emissions in 2008 to 1% above 1990 levels.<sup>24</sup> Whereas, previously in 2007, Japan increased its GHG emissions level by 9% above 1990 levels. At the provincial level within Europe and USA, a recent study of GHG emissions reductions in six cities, from 2004 to 2009, also showed lower emissions from trucks in Greater Toronto and New York City, as a result of the economic recession of 2008.<sup>25</sup>

### 2.2.2 Greenhouse gas emissions (GHG) rise despite recession, possibly associated with recovery

Although many developed countries are still experiencing economic recession, the period of economic recovery has been characterized by a rise in GHG emissions compared to when the recession first started. In 2010, global energy consumption figures surpassed the level of economic growth.<sup>26</sup> There has been a rapid rise of energy consumption in emerging economies, and a growth above average in OECD countries.<sup>27</sup> The amount of global CO<sub>2</sub> emissions from fossil fuels and cement production, for instance, increased from 8, 626, 351 Mton in 2009 to 9, 138, 791 Mton in 2010. Similarly, in USA, the reduction in GHG emissions as a result of the economic recession in 2008 was, however, gradually reversed due to economic recovery starting from 2010. The increase in economic activity resulted in higher energy consumption and CO<sub>2</sub> emissions.<sup>28</sup> This is because the economy is still fossil fuel dependent and yet to achieve decoupling of economic growth from energy consumption.<sup>29</sup> By 2010, 94.4 percent of CO<sub>2</sub>

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<sup>24</sup> S. Rudolph and T. Kawakatsu, Tokyo's Greenhouse Gas Emissions Trading Scheme: A model for sustainable megacity carbon markets? (2012) 25 Joint Discussion Paper Series in Economics [http://www.uni-marburg.de/fb02/makro/forschung/magkspapers/25-2012\\_rudolph.pdf](http://www.uni-marburg.de/fb02/makro/forschung/magkspapers/25-2012_rudolph.pdf)

<sup>25</sup> C. Kennedy, *et al.*, "Cities Reducing their Greenhouse Gas Emissions" (2012) 49 *Energy Policy* 774–777.

<sup>26</sup> BP, BP Statistical Review of World Energy. June 2011 [bp.com/statisticalreview](http://www.bp.com/statisticalreview) [http://www.bp.com/assets/bp\\_internet/globalbp/globalbp\\_uk\\_english/reports\\_and\\_publications/statistical\\_energy\\_review\\_2011/STAGING/local\\_assets/pdf/statistical\\_review\\_of\\_world\\_energy\\_full\\_report\\_2011.pdf](http://www.bp.com/assets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2011/STAGING/local_assets/pdf/statistical_review_of_world_energy_full_report_2011.pdf) accessed on 10 December 2012.

<sup>27</sup> Ibid.

<sup>28</sup> Ibid.

<sup>29</sup> Over the years, the United States of America has struggled to integrate its energy policy and greenhouse gas emissions. Due to uncertainty of science and political considerations about the cost, competition, and comprehensiveness, the Republican administration of President George W. Bush abandoned the Kyoto Protocol Process in 2010. However, there is a gradual change noticeable in the outlook of the current administration on issues of the environment, climate change, and the leadership position of the United States of America in the international negotiations. See L. Parker, *et al.*, US Global Climate Change Policy: evolving views on cost, competitiveness, and comprehensiveness (Congressional Research Service, 2011) <http://www.fas.org/sgp/crs/misc/RL30024.pdf> accessed on 26 November 2012.

emissions resulted from fossil fuel combustion, while the remainder was due to changing land use practices, non-energy use of fuels, iron and steel production, and cement production.<sup>30</sup>

Consequently, although the global economic recession led to a reduction of 1.4 percent in GHG emissions in 2009, there was an average increase of 5.9% in GHG emissions by 2010.<sup>31</sup> A new study further predicts an average annual growth of 3.1% in global GHG emissions.<sup>32</sup> In addition direct energy use, indirect energy<sup>33</sup> also plays a prominent role in future GHG emissions. Recent predictions based on the Econometric Lifestyle Environment Scenario Analysis tool indicate an increase in UK household real expenditure for nearly all expenditure categories and related GHG emissions up to 2030.<sup>34</sup> Only 30% of the future GHG emissions projected is attributed to 'direct energy' use by households, while the rest is attributed to 'indirect energy' through various categories of expenditure. And although a sample of public opinion supports the consumption of fewer goods, there is no evidence of corresponding change in consumer behaviour.<sup>35</sup>

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<sup>30</sup> Ibid.

<sup>31</sup> G. P. Peters, *et al.*, "Rapid Growth in CO<sub>2</sub> Emissions after the 2008–2009 Global Financial Crisis" (2012) 2 *Nature Climate Change* 2-4.

<sup>32</sup> Ibid

<sup>33</sup> EEA, Greenhouse gas emission trends and projections in Europe 2011 – Tracking progress towards Kyoto and 2020 targets. EEA Report No 4/2011 (Copenhagen: EEA 2011).

<sup>34</sup> M. Chitnis, *et al.*, "Forecasting Scenarios for UK Household Expenditure and Associated GHG Emissions: Outlook to 2030" (2012) 84 *Ecological Economics* 129-141.

<sup>35</sup> E. M. Markowitz and T. Bowerman, "How Much is Enough? Examining the public's beliefs about consumption" (2011) 12(1) *Analyses of Social Issues and Public Policy* 167 – 189 DOI: 10.1111/j.1530-2415.2011.01230.x; J. Nunes, *et al.*, "Conspicuous Consumption in a Recession: Toning it down or turning it up?" (2010) 21(2) *Journal of Consumer Psychology* 199 - 205.

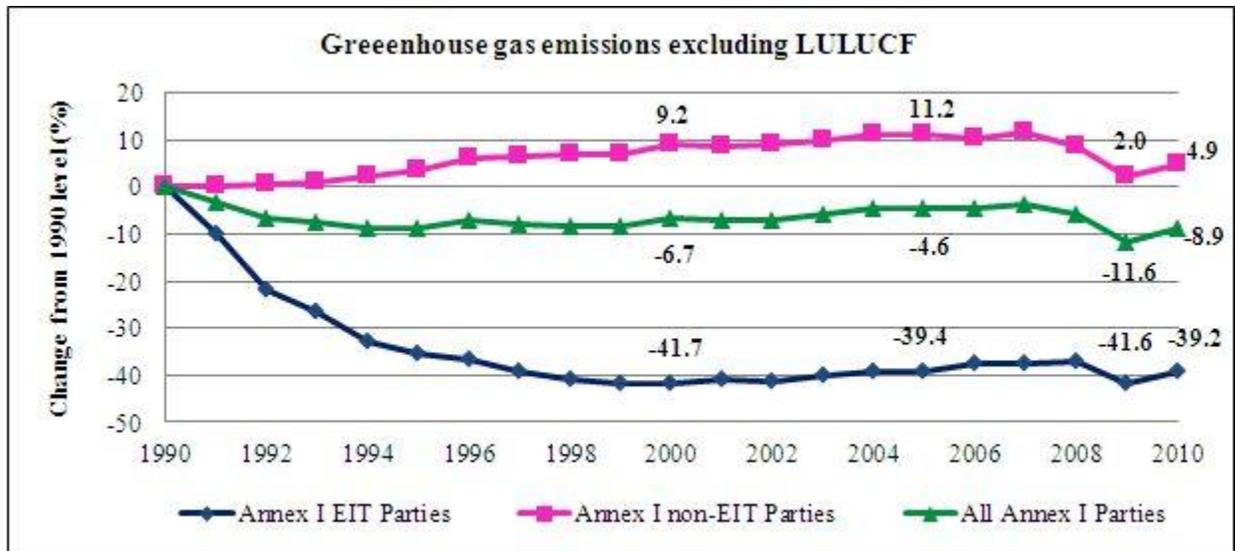


Figure 2 Trends in aggregate GHG emissions, 1990 - 2010 (excluding LULUCF)

Source: GHG data from UNFCCC [http://unfccc.int/ghg\\_data/ghg\\_data\\_unfccc/items/4146.php](http://unfccc.int/ghg_data/ghg_data_unfccc/items/4146.php) (accessed on 12 December, 2012)

### 2.2.3 Implications

The first trend shows that the economic recession has had significant short term impacts on GHG emissions by affecting production, distribution and consumption, mainly in developed countries. Nonetheless, the second trend shows a counter-effect, possibly associated with economic recovery since 2010. Although, in 2010, global GHG emissions by all Annex I parties reduced by 8.9% excluding LULUCF (see Figure 1), and 14.6% reduction, including LULUCF (see Figure 2), there was also an increase in global GHG emissions, compared to the 2009, as a result of increased consumption of energy for economic activities. Other contributory factors include population growth,<sup>36</sup> growing public consumption, growth in emerging economies, and globalisation of trade. In addition, "there is an environmental value-action gap" in the "adoption of low-carbon lifestyles."<sup>37</sup>

<sup>36</sup> C. Kennedy, *et al.*, "Cities Reducing" (n 25).

<sup>37</sup> L. Whitmarsh, *et al.*, "Public engagement with carbon and climate change: To what extent is the public 'carbon capable'?" (2011) 21 *Global Environmental Change* 56-65.

## 2.3 Green economy

### 2.3.1 Recession provides a positive potential for the green economy

The convergence of climate change, economic recession, food, and the energy crises creates very complex problems for human development.<sup>38</sup> As such, it is now widely accepted that climate change is a problem that needs to be kept within limits to prevent catastrophic consequences for the most vulnerable people in the least developed countries, but also other countries.<sup>39</sup> Hurricane Sandy has demonstrated that even the developed countries can be at risk from the impacts of climate change.<sup>40</sup> Furthermore, one of the fundamental issues in the 2012 US Presidential elections was the economic recession, and the need to reduce the country's dependence on oil supply from volatile parts of the world.<sup>41</sup> Hence, climate change and the economic recession remain very topical issues in both national and international discourse, for countries at different stages of development.

The opinion has been expressed, by many analysts and researchers, that both problems can be simultaneously tackled by integrating GHG emissions reductions into economic recovery plans.<sup>42</sup> This requires both context specific improvements at the national and local levels of government,<sup>43</sup> while taking into account broader developments in the industry and other external

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<sup>38</sup> M. Carney, "Compounding Crises of Economic Recession and Food Insecurity: A comparative study of three low-income communities in Santa Barbara County" (2012) 29(2) *Agriculture and Human Values* 185 - 201; M. W. Bloem, *et al.*, "An Introduction to the Impact of Climate Change, the Economic Crisis, and the Increase in the Food Prices on Malnutrition" (2010) 140 *Journal of Nutrition* 132S - 135S.

<sup>39</sup> UNFCCC, Report of the Conference of the Parties on its seventeenth session, held in Durban from 28 November to 11 December 2011 FCCC/CP/2011/9.

<sup>40</sup> See M. Marshall, "Slow-moving Hurricanes such as Sandy on the Rise" (2012) 216(2889) *New Scientist* 4; W. Steffen and M. England, Climate Commission Summary Statement: Was Hurricane Sandy influenced by climate change? (2012) <http://climatecommission.gov.au/wp-content/uploads/Nov-2-Climate-Commission-Hurricane-Sandy-Briefing.pdf> accessed on 10 December 2012.

<sup>41</sup> "The Candidates on Energy Policy" Issue Tracker, Council on Foreign Relations. 31 October, 2012 <[cfr.org/united-states/candidates-energy-policy/p26796](http://cfr.org/united-states/candidates-energy-policy/p26796)> accessed on 12 December 2012.

<sup>42</sup> A. Martinelli and A. Midttun, Editorial. "Introduction: Towards green growth and multilevel governance" (2012) 48 *Energy Policy* 1- 4; N. Stern, By unleashing the low-carbon economy we can create jobs and reduce deficits and debts *LSE European Politics and Policy (EUROPP) Blog* (28 May 2012) Blog Entry; A. D'Aloia, 'Climate Change and Law: A Constitutional Perspective'. In L.Westra, C. L. Soskolne, and D. W. Spady, eds., *Human Health and Ecological Integrity: Ethics, law and human rights* (Oxon and New York: Routledge 2012); B.S. Butcher and F. Stilwell, "Climate Change Policy and Economic Recession" (2009) 63 *The Journal of Australian Political Economy* 108 - 125; J. Porritt, *Living Within Our Means: Avoiding the ultimate recession* (London: Forum for the Future 2009).

<sup>43</sup> P. Monaghan, *Sustainability in Austerity. How Local Government Can Deliver During Times of Crisis* (Sheffield: Greenleaf Publishing Limited 2010).

factors.<sup>44</sup> Such integration can arguably be promoted through the green economy. The ‘green economy’<sup>45</sup> aims at scaling up clean energy, modern technologies and reducing waste, and it is promoted by proponents as necessary, efficient and affordable.<sup>46</sup> It can range from (a) internalising environmental externalities; through (b) a systemic incorporation of environmental challenges within the economic order; (c) linking social with economic goals; to (d) a new macroeconomic framework that designs a pathway towards sustainable development.<sup>47</sup> Achieving a green economy is possible by internalizing environmental externalities, investing in green technologies and infrastructure, promoting green consumption patterns, creation of jobs in the renewable energy sector during recovery, decarbonisation and dematerialisation of society, and empowering society.<sup>48</sup> But, the green economy ignores diminishing ecosystem services,<sup>49</sup> the new resource scarcities,<sup>50</sup> and the need to build social resilience.<sup>51</sup>

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<sup>44</sup> C. C. R. Penna and F. W. Geels, “Multi-dimensional struggles in the greening of industry: A dialectic issue lifecycle model and case study” (2012) 79 *Technological Forecasting & Social Change* 999–1020; F. W. Geels, “A socio-technical analysis of low-carbon transitions: introducing the multi-level perspective into transport studies” (2012) 24 *Journal of Transport Geography* 471–482.

<sup>45</sup> UNEP, Towards a Green Economy: Pathways to sustainable development and poverty eradication – A synthesis for policy makers (2011) [www.unep.org/greeneconomy/Portals/88/documents/ger/ger\\_final\\_dec\\_2011?Green%20EconomyReport\\_Final\\_Dec2011\\_pdf](http://www.unep.org/greeneconomy/Portals/88/documents/ger/ger_final_dec_2011?Green%20EconomyReport_Final_Dec2011_pdf) (accessed on 20 December 2012); United Nations, The Future We Want- Zero draft of the outcome document. Rio + 20 United Nations Conference on Sustainable Development [www.uncsd2012.org/futurwqewant.html](http://www.uncsd2012.org/futurwqewant.html) (accessed on 12 December 2012); G20 Summit of 2010.

<sup>46</sup> C. Withagen and S. Smulders, Green Growth: Lessons from growth theory. WPS6230 (World Bank Development Research Group Environment and Energy Team and Sustainable Development Network Office of the Chief Economist, 2012).

<sup>47</sup> Progress to Date and Remaining Gaps in the Implementation of the Outcomes of the Major Summits in the Area of Sustainable Development, as well as an Analysis of the Themes of the Conference: Report of the Secretary General. A/CONF.216/PC/2 (1 April, 2010) para 44. [www.un-ngls.org/IMG/pdf/Secretary\\_General\\_s\\_report\\_2.pdf](http://www.un-ngls.org/IMG/pdf/Secretary_General_s_report_2.pdf) accessed on 14 December 2012.

<sup>48</sup> European Commission, Press Release: Towards a global green economy and better governance – the commission presents policy orientations for the Rio+20 conference. IP/11/754. 20 June 2011. [Europa.eu/rapid/press-release\\_IP-11-754\\_en.htm](http://Europa.eu/rapid/press-release_IP-11-754_en.htm); Netherlands National Platform Rio+20, Priorities for a Sustainable Future: Civil society outcomes of the Netherlands Rio+20 Preparations [www.uncsd2012.org/content/documents/447NPRio+20%20priorities%for%20a%20sustainable%20future.pdf](http://www.uncsd2012.org/content/documents/447NPRio+20%20priorities%for%20a%20sustainable%20future.pdf) (both accessed on 15 December 2012); Report of the Secretary General (n ).

<sup>49</sup> E. B. Barbier, Transaction Costs and the Transition to Environmentally Sustainable Development (2011) 1 *Environmental Innovation and Societal Transitions* 58 – 69.

<sup>50</sup> U. Brand, Green Economy- The Next Oxymoron?: No lessons learnt from the failures of implementing sustainable development (2012) 21/1 *GAIA* 28 – 32.

<sup>51</sup> S. Maxwell, Chairman’s Essay: Inclusive Green Growth: The pathway to sustainable development. A review of the World Bank Policy Paper by Simon Maxwell, Executive Chairman CDKN (16 May, 2012) [www.cdkn.org/wp-content/uploads/2012/05/Inclusive-green-growth-review.pdf](http://www.cdkn.org/wp-content/uploads/2012/05/Inclusive-green-growth-review.pdf) accessed on 14 December, 2012.

### 2.3.2 Recession can negatively influence the green economy

An examination of various international green economic policy interventions for tackling climate change and the economic recession, such as green economy, green new deal, green growth, and sustainable growth, reveals fundamental problems.<sup>52</sup> These proposals are based on the paradigm of neoclassical economics which does not question the notion of indefinite economic growth.<sup>53</sup> As such, they are inadequate for ensuring global environmental justice and sustainability.<sup>54</sup>

At the national level, the recession brought about the credit crunch, reduction in capital accumulation for new investments, and an uncertain business climate.<sup>55</sup> These, in turn, affect the pace of innovation, future supply capacities of companies, and the general development of the green economy.<sup>56</sup> In USA, investments in clean technology dropped to \$154 million in the first quarter of 2009 from \$1 billion in the last quarter of 2008.<sup>57</sup> The downward trend has also been recorded in subsequent years: in 2012, venture capital investment in clean technology dropped to \$791 million compared to \$991 million in the previous quarter, although there was a 2% increase recorded in the volume of sales.<sup>58</sup> Likewise in the UK, the economic crisis has led to budget cuts resulting in changes to the eligibility of technologies, reduced government funding, new scales of generation, or policy cancellations affecting renewable energy schemes such as the Feed-In Tariff Scheme, and the Renewable Heat Incentive and Low Carbon Buildings Programme.<sup>59</sup> This is negatively affecting the future expansion of microgeneration.<sup>60</sup>

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<sup>52</sup> O. Bina and F. L. Camera, “Promise and shortcomings of a green turn in recent policy responses to the “double crisis”” (2011 ) 70 *Ecological Economics* 2308 –2316.

<sup>53</sup> Ibid.

<sup>54</sup> Ibid.

<sup>55</sup> A. Bowen *et al.*, The Implications of the Economic Slowdown (n 8); N. Bloom, “The impact of uncertainty shocks” (2009) 77(3) *Econometrica* 623 – 685.

<sup>56</sup> N. Bloom, “The impact of uncertainty shocks” (ibid).

<sup>57</sup> R. Waters, Venture capital investment falls (FT, San Francisco 18 April 2009) <http://www.ft.com/intl/cms/s/0/e7949d3a-2ba5-11de-b806-00144feabdc0.html#axzz2DKXkOvmB> last accessed on 26 November 2012; A. Dembosky, US Venture capital investment declines (FT, San Francisco 19 October 2012) <http://www.ft.com/cms/s/0/f83d3244-1a0a-11e2-9922-00144feabdc0.html#ixzz2COUSZsul> accessed on 26 November 2012.

<sup>58</sup> PWC, Venture capital investments decline in dollars and deal volume in Q3 2012 (Washington, October 19, 2012) <http://www.pwc.com/us/en/press-releases/2012/venture-capital-investments-q3-2012-press-release.jhtml> accessed on 16 November, 2012.

<sup>59</sup> K. N. Finney, V. N. Sharifi, and J. Swithenbank, The negative impacts of the global economic downturn on funding decentralised energy in the UK (2012) 51 *Energy Policy* 290–300.

<sup>60</sup> Ibid.

The low rates of economic activities during recession negatively affect the efficiency of weak and unstable carbon markets, as seen in the case of the EU emission trading scheme.<sup>61</sup> The failure of the second phase of the EU emission trading scheme (EU ETS) was especially exacerbated by the economic recession.<sup>62</sup> The economic recession led to reduced energy demand and excess permits. As a result, in February 2009, the price of European Union Allowances crashed from €31 in the summer of 2008 to €8.<sup>63</sup> With the option to ‘bank’ permits, the worst emitters were able to buy at the prevailing low prices even though there would have been only a few traders needing extra permits to meet the cap requirements; removing any incentive for the worst emitters to change in response to the EU ETS price signals. This could also lead to significant negative spill over effects if the third phase of the EU ETS commences with surplus permits, with the cap set based on projected growth before the economic recession.

Furthermore, with the recovery of the European manufacturing sector by 14% higher than its trough in 2009, as at 2011,<sup>64</sup> there is also likely to be a continual increase in GHG emissions from the sector. Some researchers have suggested the use of policy interventions such as price floors, price ceilings, and price collars, in order to reduce volatility in the carbon markets.<sup>65</sup> While price floors complement price ceilings, they can be very complex in implementation and exacerbate inefficiencies in global emissions abatement if unevenly applied between countries.<sup>66</sup>

Another negative consequence of the economic recession on climate change is the recourse to macro-economic policies for economic recovery, without any clear indication of how to achieve sustainable development which meets the needs of both the present and future generations of

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<sup>61</sup> Z. Feng, *et al.*, “Carbon price volatility: Evidence from EU ETS” (2011) 88 *Applied Energy* 590 – 598.

<sup>62</sup> *Ibid.*

<sup>63</sup> T. Gilbertson and O. Reyes, *Carbon Trading: How it works and why it fails?* (Uppsala: Dag Hammarskjöld Foundation 2009).

<sup>64</sup> Europa, Industrial Policy: Reinforcing competitiveness (MEMO/11/701 Brussels, 14 October 2011) [http://europa.eu/rapid/press-release\\_MEMO-11-701\\_en.htm](http://europa.eu/rapid/press-release_MEMO-11-701_en.htm) accessed on 15 December 2012.

<sup>65</sup> P. J. Wood and F. Jotzo, “Price Floors for Emissions Trading” (2011) 39 *Energy Policy* 1746–1753; H. Fell and R. D. Morgenstern, *Alternative Approaches to Cost-Containment in a Cap-and-Trade System. Resources for the Future* (Washington, DC: Resources for the Future, 2009); W. J. McKibbin, *et al.*, ‘A Copenhagen Collar: Achieving comparable effort through carbon price agreements’. In: *Proceedings of the Climate Change Policy: Recommendations to Reach Consensus* (Washington, DC: The Brookings Institution 2009) 26–34.

<sup>66</sup> *Ibid.*

mankind, or indications of how to reverse the trend of ‘growth-at-all-cost’.<sup>67</sup> Even though climate change is a prominent issue in most economic bailout plans, issues such as the effectiveness of the measures and the real motive behind the policies remain grey areas in many cases.<sup>68</sup> In addition, some environmental policies also seem to be motivated by the governments’ desire to protect national industries rather than environmental objectives.<sup>69</sup>

In the case of the UK Climate Change Agreements (CCA) scheme, designed to improve the international competitiveness of UK energy intensive industries with regards to climate change,<sup>70</sup> a recent study showed no evidence that firms receiving tax discounts face higher business risks than others paying the full climate change levy.<sup>71</sup> However, the study found evidence of a reduction in energy consumption by those companies paying the full climate change levy. Hence, the environmental rationale for the tax discount remains unclear, and it appears that the government is missing out on the opportunity to collect additional tax revenues which could be applied to reduce the budget deficit.<sup>72</sup> Nonetheless, the CCA scheme has been extended to 2023 without any changes to the beneficiaries.<sup>73</sup> This shows how economic instruments for environmental regulation negatively affect GHG emissions due to the lack of proper integration of GHG emissions reduction objectives into macroeconomic policies.

### 2.3.3 Implications

In theory, the economic recession presents an opportunity for the development of green economies. This can be achieved through investments in renewable energy technology, the

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<sup>67</sup> See J. M. Senona, “EPAs and the Doha Round: Development or discontent” (2009) 8(1) *Journal of International Trade Law and Policy* 60-83.

<sup>68</sup> A. Kolk and J. Pinkse, “Business and climate change: Key challenges in the face of policy uncertainty and economic recession” [2009] *Management Online Review* available at SSRN <http://ssrn.com/abstract=1433037>.

<sup>69</sup> E. Reed, *et al.*, Trade-in incentives not long-term solution (27th March, 2009) *Financial Times*; B. Simon., US moves closer to rebate scheme on old cars for new. (6 May, 2009) *Financial Times*.

<sup>70</sup> The CCA specifies the terms under which eligible companies may claim a 65% reduction to their Climate Change Levy (CCL), provided they have met certain requirements for reducing their CO<sub>2</sub> emissions, or improving energy efficiency. The CCL was introduced in 2001 to encourage businesses to reduce their GHG emissions and become more energy efficient in their operations. It is a tax on energy consumption by the public sector, commercial sector or industry which is ploughed back to businesses through 0.3% reduction in employers’ National Insurance contribution, and support for low carbon technology, and energy efficiency projects.

<sup>71</sup> R. Martin, *et al.*, “When governments design policies to reduce firms’ greenhouse gas emissions, are they too lenient on heavy polluters that claim such measures will damage their ability to compete in the global economy?” (2012) 17(1) *Centre Piece* 16 - 19.

<sup>72</sup> *Ibid.*

<sup>73</sup> HMRC, Climate Change Levy: Reform of Climate Change Agreements (23 March 2011).

creation of jobs in the renewable energy sector, context specific improvements at the national and local levels of government, while taking into account broader developments in the industry and other external factors, during recovery. But the reality is that the economic recession presents both threats and opportunities for achieving long term sustainable development through green economy.<sup>74</sup> The economic recession stifles renewable energy innovation and development of a green economy due to a reduction in energy demand, business uncertainty, and a credit crunch. It also brings about macroeconomic policies which promote economic recovery without any clear environmental focus. Nonetheless, integration of GHG emissions reduction strategy in the economic recovery plans, following an economic recession, could promote sustainable social and environmental benefits.

## 2.4 Climate Change Policy and Public Opinion

### 2.4.1 Recession and public opinion and the effect on climate change policy

There has been a considerable amount of research on the relationship between economic conditions and concern for the environment.<sup>75</sup> Public opinion towards environmental issues such as climate change has an important influence on government policies. Where there is widespread public support for climate change, the government is more likely to respond through effective policies.<sup>76</sup> The public could also act as stewards for the environment by opposing government policies which might have negative environmental impacts.

Various studies have shown that of the different factors which might affect public opinion about climate change: media coverage and partisanship, weather, and the economy, the latter has the greatest influence.<sup>77</sup> It therefore is important to understand the influence of the economic recession on the public opinion about climate change. Historically in the United States, the restrictive environmental policies of the Reagan administration, during the economic recession of

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<sup>74</sup> K. Tienhaara, "A Tale of Two Crises: What the global financial crisis means for the global environmental crisis" (2010) 20 *Environmental Policy and Governance* 197-208.

<sup>75</sup> G. M. Grossman and A. B. Krueger, "Economic Growth and the Environment" (1995) 110(2) *The Quarterly Journal of Economics* 353-377; J. K. Boyce, *The Political Economy of the Environment* (Northampton, MA: Edward Elgar 2002); H. Liu, "Investigation of Relationship between Economy and Environment" (2009) 1(1) *Journal of Geography and Geology* 43 – 46.

<sup>76</sup> L. Scruggs and S. Benegal, "Declining Public Concern about Climate Change" (n 7).

<sup>77</sup> L. Scruggs and S. Benegal, "Declining Public Concern about Climate Change" (n 7); R. Y. Shum, "Effects of Economic Recession" (n 7).

the early 1980s, failed because they were rejected by the public.<sup>78</sup> And, there are examples of important environmental policies and legislations which have been enacted during tough economic times.<sup>79</sup> However, the trend of the influence of the economic recession on climate change policy is similar to the influence on the development of a green economy (see 2.3.1). Hence, climate change and the economic crisis can benefit where the public harness environmental sustainability as a catalyst rather than a barrier to economic recovery.<sup>80</sup>

#### 2.4.2 Negative impact on climate change policy and public attitude

Climate change raises fundamental issues of risk and uncertainty analysis communication;<sup>81</sup> affecting government's energy policies, and public attitude towards climate change. Although absolute denial of climate change is now less common than the perception that the effects are over-exaggerated by scientists,<sup>82</sup> the economic recession has changed government's priorities towards pressing financial and social issues.<sup>83</sup> Governments who adopt economic instruments for environmental regulation prefer cap and trade options under which they can allocate permits to selected industries.<sup>84</sup> Furthermore, the cap and trade system appears to be less expensive for

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<sup>78</sup> J. Gillroy and R. Shapiro, "The polls: environmental protection" (1986) 50(2) *Public Opinion Quarterly* 270–279.

<sup>79</sup> Clean Air Act Amendments (1977), Clean Water Act Amendments 1977, and the Comprehensive Environmental Response, Compensation, and Liability (USA) Act (Superfund) 1980; Climate Change (United Kingdom) Act 2008; Climate Change (Scotland) Act 2009; Regulation (EU) no 510/2011 setting emission performance standards for new light commercial vehicles as part of the Union's integrated approach to reduce CO<sub>2</sub> emissions from light-duty vehicles (OJ L 145, 31.5.2011); Decision 2011/389/EU on the Union-wide quantity of allowances referred to in Article 3e(3) (a) to (d) of Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowances trading within the Community (OJ L 173, 1.7.2011).

<sup>80</sup> Eurobarometer, Special Eurobarometer 372: Climate Change. Report [http://ec.europa.eu/public\\_opinion/archives/ebs/ebs\\_372\\_en.pdf](http://ec.europa.eu/public_opinion/archives/ebs/ebs_372_en.pdf) accessed on 16 December 2012.

<sup>81</sup> N. Pidgeon, "Climate Change Risk Perception and Communication: Addressing a critical moment?" (2012) 6(2) *Risk Analysis* 951; A. Carvalho and J. Burgess, "Cultural Circuits of Climate Change in U.K. Broadsheet Newspapers, 1985-2003" (2005) *Risk Analysis* 1457-1469.

<sup>82</sup> L. Whitmarsh, "Scepticism and uncertainty about climate change: Dimensions, determinants and change over time" (2011) 21 *Global Environmental Change* 690 - 700; K. Beven, "I believe in climate change but how precautionary do we need to be in planning for the future?" (2011) 25 *Hydrological Process* 1517 - 1520; E. Lachapelle, C. P. Borick, and B. Rabe, "Public Attitudes toward Climate Science and Climate Policy in Federal Systems: Canada and the United States compared" (2012) 29(3) *Review of Policy Research* 334–357; K. Anderson and A. Bows, "Beyond 'Dangerous' Climate Change: Emission scenarios for a new world" (2011) *Philosophical Transactions of the Royal Society* 20 - 44; K. Anderson and A. Bows, "Reframing the Climate Change Challenge in Light of Post-2000 Emission Trends" (2008) 366 *Philosophical Transactions of the Royal Society A* 3863 - 3882. cf. N. A. Leith and R. E. Chandler, "A Framework for Interpreting Climate Model Outputs" (2010) 59 *Journal of the Royal Statistical Society: Series C-Applied Statistics* 279 - 296.

<sup>83</sup> A. D'Aloia, 'Climate Change and Law' (n 42).

<sup>84</sup> K. Harrison, "A Tale of Two Taxes: The fate of environmental tax reform in Canada" (2012) 29(3) *Review of Policy Research* 383 - 407.

consumers than the option of carbon taxes for instance.<sup>85</sup> Despite the inefficiencies of the emission trading system, it is increasingly becoming a popular policy tool for pursuing GHG emissions reductions in many parts of the world.<sup>86</sup> This shows a preference by policymakers for politically safe options.

The economic recession also affects public attitude towards climate change. This is because of the commonly held public perception that GHG emissions reduction requires less economic activity whereas people need more jobs and economic recovery.<sup>87</sup> There is evidence, from studies conducted in USA and the EU, to support this economic explanation of the changing public opinion about climate change.<sup>88</sup> The results suggest that the global recession caused a sharp decline in the level of support for climate change, starting from 2008, whereas other popular alternative explanations such as media bias, partisan politicization, changes in weather did not account for "the suddenness and timing of opinion trends".<sup>89</sup> As such, it can be concluded that a favourable public attitude towards climate change will return with economic recovery, however during economic recession people will not support austerity measures even where these may be beneficial for the environment.<sup>90</sup>

### 2.4.3 Implications

Evidence from USA and the EU suggests that the economic recession negatively affects public attitude towards climate change because people see climate change policy as opposed to the much needed economic recovery. Governments who adopt economic instruments for environmental regulation also favour politically safe options such as emissions trading, and neglect other environmentally efficient options like a carbon tax. However, the economic recession is predicted to last until 2018<sup>91</sup> and climate change will not pause for economic recovery. It is therefore important for stakeholders around the world to devise innovative ways of

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<sup>85</sup> Ibid.

<sup>86</sup> Ibid.

<sup>87</sup> K. Beven, "I believe in climate change but how precautionary do we need to be in planning for the future?" (2011) *25 Hydrological Process* 1517.

<sup>88</sup> L. Scruggs and S. Benegal, "Declining Public Concern about Climate Change" (n 7); R. Y. Shum, "Effects of Economic Recession" (n 7).

<sup>89</sup> L. Scruggs and S. Benegal, "Declining Public Concern about Climate Change" (n 7).

<sup>90</sup> L. Scruggs and S. Benegal, "Declining Public Concern about Climate Change" (n 7).

<sup>91</sup> P. Inman, No Recovery until 2018 (n 4).

projecting the objective of tackling climate change despite the economic crisis. It has been suggested that a 'green new deal' which places greater emphasis on climate mitigation and happiness, rather than GDP, as the key indicators for economic growth could be the ideal strategy for the economic recovery.<sup>92</sup> This would also contribute to ensure that future economic growth does not aggravate GHG emissions. The strategies for implementing such a green new deal need to be worked out in a paradigm of sustainable development, taking account of economic, social, and environmental considerations in development decision making, rather than the current macro-economic policies which do not account for limits to growth.

### 3. Impact on developing countries

#### 3.1 Greenhouse gas emissions and economic growth (EKC hypothesis)

The relationship between the environment and economic growth has been widely researched, first starting from a focus on non-renewable resources,<sup>93</sup> material use,<sup>94</sup> pollutants,<sup>95</sup> and evolving towards environmental and social sustainability.<sup>96</sup> According to the Environmental Kuznets Curve (EKC) hypothesis, which shows the relationship between the scale of environmental impact and economic growth, environmental pollution will continue to increase during the early stages of economic development until a turning point is reached in the level of income and environmental improvements begin to occur.<sup>97</sup> The reduction in environmental

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<sup>92</sup> F. FitzRoy, *et al.*, "Policy Review: Climate change policy and subjective well being" (2012) 22 *Environmental Policy and Governance* 205 - 216.

<sup>93</sup> W. Beckerman, *In Defence of Economic Growth* (London: Jonathan Cape 1974); W. Beckerman, "Economic Growth and the Environment: Whose growth? Whose environment?" (1992) 20(4) *World Development* 481-496; D. Meadows, *et al.*, *The Limits to Growth* (New York: Universe Books 1972); D. Meadows, *et al.*, *Beyond the Limits: Global Collapse or a Sustainable Future* (London: Earthscan 1992); D. Meadows, D. Meadows, and J. Randers, *The Limits to Growth: the 30-year Update* (White River Junction: Chelsea Green 2004).

<sup>94</sup> M. Jänicke, *et al.*, "Economic Structure and Environmental Impacts: East-west comparisons" (1989) 9(3) *The Environmentalist* 171-183.

<sup>95</sup> T. M. Selden and D. Song, "Neoclassical growth, the J curve for abatement and the inverted U curve for pollution" (1995) 29(2) *Journal of Environmental Economics and Management* 162-168.

<sup>96</sup> WCED. *Our Common Future* (Oxford: Oxford University Press 1987); J. Rockström, *et al.*, "Planetary boundaries: exploring the safe operating space for humanity" (2009) 14(2) *Ecology and Society* 32; K. Raworth, *A safe and just space for humanity. Can we live within the doughnut?* (Oxfam Discussion Papers 2012).

<sup>97</sup> The EKC derives its name from Simon Kuznets, who proposed a similar pattern of economic inequality and per capita income in 1955, but was popularised in the 1990s. See N. Shafik and S. Bandyopadhyay, *Economic Growth and Environmental Quality: Time series and crosscountry evidence*. Background paper for the World Development Report 1992 (Washington, DC: The World Bank 1992); G. M. Grossman and A. B. Krueger, 'Environmental impacts of the North American Free Trade Agreement' (1991) In NBER (ed.), Working paper 3914; G. M. Grossman and A. B. Krueger, "Economic Growth and the Environment" (1995) 110(2) *Quarterly Journal of Economics* 353-377; D. I. Stern, "The Environmental Kuznets Curve" (2003) *Online Encyclopedia of*

pollution may be related to a shift in society towards a service economy, or a reduction in the material intensity.<sup>98</sup> However, it is possible that there are periods of delinking, associated with a growth in the volume of production.<sup>99</sup> There is growing evidence of a possible ‘N’ shaped curve<sup>100</sup> in areas of global pollutants.<sup>101</sup> Further elaborations of the EKC assumes that at the level of the household, economic growth causes decline in indoor environmental pollutants at the household-level, and, at the level of the community this relationship becomes like an inverted U-shape. However, global environmental problems such as GHG emissions continue to rise. See Figure 3.

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*Ecological Economics*; D. I. Stern, “The rise and fall of the environmental Kuznets curve” (2004) 32(8) *World Development* 1419-1439.

<sup>98</sup> M. Jänicke, *et al.*, “Economic Structure and Environmental Impacts” (n 94).

<sup>99</sup> F. Berkhout and D. Smith, “Products and the Environment: An integrated approach to policy” (1999) 9 *European Environment* 174 – 185; S. M. de Bruyn, *Economic Growth and the Environment: An empirical analysis* (Dordrecht: Kluwer Academic Publishers 1999).

<sup>100</sup> J. L. Caviglia-Harris, *et al.*, “Taking the ‘U’ out of Kuznets a comprehensive analysis of the EKC and environmental degradation” (2009) 68 *Ecological Economics* 1149-1159.

<sup>101</sup> H. Opschoor, “Ecospace and the Fall and Rise of Throughput Intensity” (1995) 15(2) *Ecological Economics* 137-141; S. M. de Bruyn and J.B. Opschoor, “Developments in the Throughput-Income Relationship: Theoretical and empirical observations” (1997) 20(3) *Ecological Economics* 255-268; B. R Copeland and M. S. Taylor, “Trade, Growth, and the Environment” (2004) 42(1) *Journal of Economic Literature* 7-71; S. Dinda, “Environmental Kuznets Curve Hypothesis: A Survey” (2004) 49(4) *Ecological Economics* 431-455; UNDP, *Human Development Report 2011. Sustainability and Equity: A Better Future for All* (New York: Palgrave Macmillan 2011).

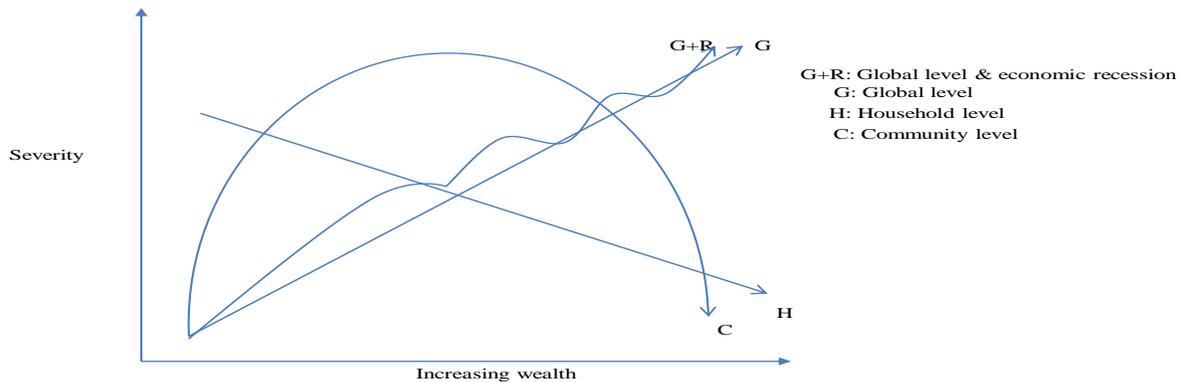


Figure 3 Environmental Kuznets Curve (EKC) at different levels of environmental pollution and economic growth

Source: Based on UNDP, 2011<sup>102</sup>

The challenge of climate change therefore poses particularly negative implications for developing economies that show less decoupling of the environment from economic growth than do developed economies.<sup>103</sup> There is no evidence that developing countries will be able to replicate the economic growth of developed countries and experience a turning growth for economic improvement in the future. Rather, it has been shown that GHG emissions reductions in the developed countries are partly due to the export of pollution-intensive production processes to developing countries with weak environmental regulatory regimes.<sup>104</sup> Accordingly, the developing countries can be expected to continue experiencing environmental degradation

<sup>102</sup> UNDP, *Human Development Report 2011. Sustainability and Equity: A better future for all* (New York: Palgrave Macmillan 2011).

<sup>103</sup> A. K. Jorgenson and B. Clark, "Are the Economy and the Environment Decoupling? A comparative study, 1960-2005" (2012) 18(1) *American Journal of Sociology* 1 – 44.

<sup>104</sup> M. A. Cole and E. Neumayer, 'Environmental policy and the environmental Kuznets curve: can developing countries escape the detrimental consequences of economic growth?'. In P. Dauvergne ed., *International Handbook of Environmental Politics* (Cheltenham and Northampton: Edward Elgar 2005); P. Erickson, *et al.*, *Low-Greenhouse-Gas Consumption Strategies and Impacts on Developing Countries* (Stockholm: Stockholm Environment Institute 2012).

despite economic growth.<sup>105</sup> The reasons range from high resource dependence, to low capital accumulation, and institutional failures.<sup>106</sup> In addition, there is no evidence to show that the internal and external socio-economic conditions faced by developing countries are the same as those which developed countries experienced during the earlier stages of their development.<sup>107</sup>

Developing countries have fared poorly with decoupling economic growth from environmental pollution. They are more vulnerable to environmental pollution due to weak environmental institutions,<sup>108</sup> population growth,<sup>109</sup> and poverty.<sup>110</sup> The economic challenges and environmental problems which they face are further exacerbated by climate change. Any policy changes aimed at lowering greenhouse gas emissions through consumers' behaviours within developed economies could reduce the standard of living in the exporting developing countries. There is also no evidence that developing countries will reach the turning point on their EKC for decades to come, even with economic growth. Hence there is need to take positive proactive initiatives for environmental protection, rather than rely solely on economic development.

### **3.2 Reduction in ODA and new and additional resources**

Another area where the global recession impacts on climate change adaptation and mitigation is through Official Development Assistance (ODA), and new and additional assistance. ODA refers to the official assistance provided by OECD/DAC countries to developing countries to help with poverty amelioration and increased growth. New and additional assistance refers to the additional resources that need to be generated to help with environmental issues. The recession poses serious risks for development assistance to the small and poor countries most affected by climate change. This is because aid targets are expressed as a percentage of economic size. As such, even as the recession causes a fall in domestic revenues and increases the need for external

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<sup>105</sup> See UNEP, *Decoupling Natural Resource Use and Environmental Impacts from Economic Growth* (Paris CEDEX: UNEP DTIE 2011).

<sup>106</sup> Ibid.

<sup>107</sup> M. A. Cole and E. Neumayer, 'Environmental policy and the environmental Kuznets curve' (n 104).

<sup>108</sup> Ibid.

<sup>109</sup> UNDP, *Human Development Report Statistics CD-Rom* (New York: United Nations Development Programme 1999).

<sup>110</sup> However, there is no evidence to show that the rich care more for the environment. See J. Martinez-Alier, "The Environment as a Luxury Good or 'Too Poor to be Green'?" (1995) 13(1) *Ecological Economics* 1-10; B. Kriström and P. Riera, "Is the Income Elasticity of Environmental Improvements Less Than One?" (1996) 7(1) *Environmental and Resource Economics* 45-55.

funding of development in the poor countries, it also diminishes the volume of Official Development Assistance which has a target of at least 0.7 per cent of Gross National Income. However, only 4 countries have ever reached this target (Sweden, Denmark, Luxembourg, Norway and the Netherlands).<sup>111</sup>

In 2011, donations from the Development Assistance Committee (DAC) of the OECD to developing countries fell by nearly 3%, in relation to annual increases since 1997, and it has been acknowledged that continuing tight budgets in OECD countries will put pressure on aid levels in future years.<sup>112</sup> The decline in ODA hampers the ability of the least developed and developing countries to meet basic needs, support basic services, and tackle developmental challenges.

New and additional funding refers to the fact that assistance for environmental issues was meant to be over and above the assistance for developmental issues. The idea was first developed following the 1972 Conference on the Human Environment in Stockholm which led to the establishment of the Environment Fund.<sup>113</sup> This further led to a series of environmental funds including for the 1983 International Tropical Timber Agreement, the 1987 Basel Convention on the Control of the Transboundary Movement of Hazardous Wastes and their Disposal, the 1990 Montreal Protocol on Substances that Deplete the Ozone Layer, and the Climate Convention 1992. However, although there has been a proliferation of funds, the resources in these funds have not necessarily increased as well.<sup>114</sup> In fact, much of the money for environmental issues is coming from diverted ODA funds. This has led to considerable discussions on the need for new and innovative sources of funding, but decisions with respect to these sources have yet to be

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<sup>111</sup> J. Gupta, Global governance: development cooperation. In J. Gupta, and N. van de Grijp (eds.). *Mainstreaming Climate Change in Development Cooperation: Theory, Practice and Implications for the European Union*, (Cambridge: Cambridge University Press 2010) 99-133.

<sup>112</sup> OECD, Development: Aid to developing countries falls because of global recession (4/4/2012) <[http://www.oecd.org/document/3/0,3746,en\\_2649\\_37413\\_50058883\\_1\\_1\\_1\\_37413,00.html](http://www.oecd.org/document/3/0,3746,en_2649_37413_50058883_1_1_1_37413,00.html)> last accessed 10th July 2012.

<sup>113</sup> 'Decides that, in order to ensure that the development priorities of developing countries shall not be adversely affected, adequate measures shall be taken to provide additional financial resources on terms compatible with the economic situation of the recipient developing country, and that, to this end, the Executive Director, in co-operation with competent organizations, shall keep this problem under continuing review' (Stockholm Declaration, 1972: xxvii).

<sup>114</sup> A. Michaelowa, *Carbon Markets or Climate Finance?: Low carbon and adaptation investment choices for the developing world* (New York: Routledge 2012).

taken. The lack of new and additional resources hinders their ability to invest in climate change adaptation and mitigation.<sup>115</sup>

### 3.3 Implications

The relative isolation of developing countries' economies from the advanced capital markets has not been a sufficient buffer.<sup>116</sup> Although developing economies may not have been directly affected by the economic recession, their exports are likely to fall due to the recession in developed economies.<sup>117</sup> To start with, many consumer goods sold in developed countries are produced in developing countries.<sup>118</sup> Therefore, any policy change which targets lower consumption of consumer goods within developed economies could also indirectly reduce the standard of living in the exporting developing countries. In addition, with the reduction in ODA caused by the economic recession, developing countries are likely to have less access to funding for their development needs.

## 4. Reinforcing nature of the trends

The foregoing trends show a two-way relationship between the economic recession and climate change. On the one hand, reduced economic activity which characterises the economic recession also results in reduced GHG emissions for otherwise energy-intensive economies. This could have a positive impact on climate change policy and the development of a green economy, but only in the short term. In the absence of capital investment in renewable energy technology, the reduction in GHG emissions is only short-lived and reversed with the slightest economic recovery. Furthermore, governments are unlikely to pursue strict GHG emission reduction policies at the risk of economic recovery. This is reflected in the fact that the bail-out plans released following the recession of the late 2000s hardly contained any environmental criteria for

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<sup>115</sup> According to the UN Secretary General Ban Ki-moon while addressing the leaders of the Group of Eight (G8) industrialized nations at a gathering on the impact of the global recession on Africa, previous financial crises have led annual aid to Africa plummet by as much as 30 per cent. See *Global Recession Threatens Development* (ibid).

<sup>116</sup> Africa's relative isolation from capital markets has not shielded it from the effects of the global economic turmoil. See UN News Centre, *Global Recession Threatens African Development, Ban says* (10 July 2009) < <http://www.un.org/apps/news/story.asp?NewsID=31434&Cr=africa&Cr1=mdg> > last accessed on 26 November 2012.

<sup>117</sup> A. K. Jorgenson and B. Blark, "Are the economy and the environment decoupling? A comparative international study, 1960 - 2005" (2012) 18(1) *American Journal of Sociology* 1–44.

<sup>118</sup> P. Erickson, A. Owen, and E. Dawkins, *Low-Greenhouse-Gas Consumption Strategies and Impacts on Developing Countries* (Stockholm: Stockholm Environment Institute 2012). This also means that developing countries cannot be expected to reach the turning point on their EKC merely as a result of economic growth.

the macro-economic policies proposed. In addition, the public attitude towards climate change is negatively affected by the economic recession. Studies also show a gap in the adoption of low-carbon lifestyles by consumers; this requires long-term transformation in consumer behaviour that can be achieved through changes in collective customs rather than the singular adoption of reasoned action.<sup>119</sup>

On the other hand, there is poor decoupling of economic growth from the environment in many countries. As such, despite the current economic recession, there has been a global rise in GHG emissions since 2010 due to economic recovery and growth in OECD countries and emerging economies respectively. This makes it impossible to count on the economic recession to deliver any substantial gains for climate change policy and long term GHG emissions reductions. The effect of poor decoupling is particularly evident in developing economies which are reliant on the export of consumer goods to developed economies. Due to developing countries reliance on environmental resources and weak environmental regulation, it is unlikely that they will be able to reach the turning point on their EKC where they can begin to experience environmental improvements, by investing large-scale in renewable energies. Furthermore, there is no evidence of an EKC in relation to GHG emissions and both developed and developing country emissions are expected to keep increasing. In addition, the precautionary approach warns of the risk of irreversible damage if countries pursue a business-as-usual approach in the regulation of environmental issues. The implications of the economic recession on developing countries also extend to the achievement of long-term development goals due to reduction of ODA and new and additional assistance.

Clearly, the economic recession cannot be relied upon to bring about the desired levels of reduction in GHG emissions, in the next eight years.<sup>120</sup> The intricate relationship between economic recession and GHG emissions shows there is need to consider emissions from direct energy use and indirect energy use when making future emission predictions or formulating climate change policy. There is also need to adopt efficient economic instruments that produce

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<sup>119</sup> T. Schwanen, D. Banister, & J. Anable, "Rethinking habits and their role in behaviour change: the case of low-carbon mobility" (2012) 24 *Journal of Transport Geography* 522–532.

<sup>120</sup> D. Evans, "Thrifty, Frugal or Green: Reflections on sustainable consumptions in a changing economic climate" (2011) 42 *Geoforum* 550 - 557.

reduction in GHG emissions. The funds raised in the process can be channelled into renewable energy technology investments. Efforts should be made to create a global paradigm shift in consumers towards consumption of less energy-intensive products, while developing countries should be supported with sufficient funding, technological support, and trade laws which can enable them achieve the turning point on their EKC in the near future. This is only possible through directional (promoting ideas and pilot projects to demonstrate feasibility) and instrumental (building coalitions of like-minded actors) leadership at multiple levels of governance.

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