Chapter 2
By the Numbers: A Visual Chronicle of Carbon Dioxide Emissions

Tonya Boone and Ram Ganeshan

Abstract Carbon dioxide equivalent (CO_2-eq.) emissions are now considered a de facto indicator of environmental impact. Through a series of visuals, this chapter highlights the size and scope of carbon emissions at multiple levels—countries, cities, industrial sectors and products.

2.1 Introduction

The fourth assessment of the Inter Governmental Panel on Climate change (IPCC) reports that:

> Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level.[1]

Since the 1750s, atmospheric concentrations of carbon dioxide have risen from about 280 to 379 parts per million (ppm) in 2005. This increase is largely attributed to large-scale supply chains that sustain modern economies and lifestyles. The biggest contributor to greenhouse gases (GHG) emissions are energy use to run industrial processes, generate electricity, transport goods, and heat and cool residential and industrial structures. Changes in land use, agricultural and industrial processes, and waste management are the other major contributors to GHG in the environment.

GHG emissions has led to a 0.6°C increase in the global average surface temperature since 1900. If the current trends in emissions continue, the IPCC estimates that global temperatures will rise a further 1.4–5.8°C by 2100. Scientists agree that such

All web sites referenced in this Chapter were accessed 15th August 2010.

[1] IPCC Synthesis Report, p. 30, http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml.

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increases will likely disrupt eco-systems (about 30% of plant and animal species will face extinction); increase environmental and climate disasters; disrupt food supply, and cause widespread health issues. Such disruptions will impact supply chains in every country and in every industry and the consequences are likely to be detrimental to a large portion of the world's population, especially in the world's impoverished countries.

There is much agreement today that to keep the global average temperature from increasing more than 2°C above pre-industrial levels, GHG emissions would need to peak around 2015 and subsequently decline by 40–45% by 2050 compared to 1990 levels. This will involve a concerted efforts at all levels—countries, cities, local governments, corporations, and individuals. This effort needs to be focused on how we generate and use energy, increase the efficiency—both ecological and economic—of our industrial and agricultural processes, and finally an effort to "close the loop"—to conserve and reuse natural resources in supply chains.

Greenhouse gas emissions are often reported in terms of "carbon dioxide equivalents" (CO_2-eq.). Emissions from other gases such as methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are translated into their CO_2 equivalent emissions using what is called the global warming potential (GWP) over a specified time frame, usually 100 years. CO_2 has a GWP of 1 since it is the base unit against which all other GHGs are measured. Methane, for example, has a GWP of 25 which means that 1 ton of Methane has the same global warming potential as 25 tons of CO_2 over a 100-year horizon. For better or worse, GHG emissions in CO_2-eq. is increasingly a benchmark on how to measure, manage, and mitigate GHG emissions. International bodies such as the United Nations Framework Convention on Climate Change (UNFCCC) use CO_2-eq. to track national emission trends and inform the global community on human-induced interference with the climate system. National and local government leaders use GHG emissions in CO_2-eq. to develop policies for emissions reductions and to track the progress of those policies. Regulatory bodies rely on CO_2-eq. measurements to establish compliance records with allocated emission rates. Businesses use CO_2-eq. to better access the risks and opportunities of climate change, and finally, individuals use CO_2-eq. measurements to make environmentally friendly life style choices.

Our intent in this Chapter is to provide a snapshot of CO_2-eq. emissions from different entities—countries, cities, industrial sectors, an average firm, and individual products. Our goal is to inform the reader on the size and scope of GHG emissions in CO_2-eq. from these entities—not to explain *why* the emissions are the size they are or prescribe *if* and *how* the emissions can be curbed. The text in this Chapter merely lays the context for the visuals.

While comparisons of CO_2-eq. emissions between countries, cities, industrial sectors, or products are inevitable, we offer a few caveats. First, while rigorous protocols are available to compute total CO_2-eq. quantities, they are not consistently applied, especially for smaller entities such as products and services. Without knowledge of exactly what is included in the final, often self-reported, CO_2-eq. number, even a comparison between any two similar entities may be misleading. Second, while CO_2-eq. is an excellent surrogate for an entity's environmental impact, it is not all encompassing. Without knowledge of the entity's impact on water, natural resources, eco-systems, and public health, effective policies and strategies cannot be formulated.

2.2 Country Emissions

Human caused climate change is a global problem and it is no surprise that tackling it is addressed through international treaties such as the Kyoto Protocol[2]. Figure 2.1a, b show the 2007 gross CO_2-eq. emissions and the per-capita emissions from the countries of the world. The developed economies of the USA, European Union, Canada, Japan, the Russian Federation, and Australia; and the developing countries of China, India, Brazil, and are the largest emitters of greenhouses cases. But when compared on a per-capita basis, the emissions of the developed countries are much higher than the developing or the under-developed countries.

The Kyoto Protocol uses the principle of 'common but differentiated responsibility' to tackle GHG mitigation. It sets binding targets for 37 industrialized countries (also called "Annex I") for reducing GHG emissions and exempts developing economies from emission targets. The members of the European Union and other European countries[3] will reduce their GHG emission by 8% against 1990 levels over the five-year period 2008-2012. Over the same time period, Canada and Japan will reduce 6% over 1990 levels. The reductions will be through national measures and market-driven mechanisms[4] that were introduced as part of the Kyoto protocol. The USA has not ratified the Kyoto protocol. China, India, and Brazil—as developing economies—and are exempt from emission targets per the Kyoto protocol.

Figure 2.2a shows the trends in CO_2-eq. emissions from Annex I countries from 1990 through 2009. Figure 2.2b gives the percentage growth or reduction in CO_2-eq. relative to 1990, the base year per the Kyoto Protocol. The total Annex I emissions are down 11.3% compared to the 1990 base year. In the same time period, the EU-27 reduced emissions by 17.4% while the US increased its emissions by 7.2%. Meanwhile, China's emissions have grown 189.5% and India's by 126.1% from 1990 through 2007.

Efforts to legally extend carbon mitigation beyond the Kyoto Protocol are currently stalled—however the delegations attending the failed Copenhagen Summit have agreed "to take note of" but not "adopt" what is known as the Copenhagen Accord[5]. The Copenhagen Accord was drafted by the US and developing economies of China, India, Brazil, and South Africa (the BASIC countries). The Accord endorsed "the scientific view that the increase in global temperature should be below 2°C" and that Annex I countries will "commit to economy-wide emissions targets for 2020."

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[2] The Kyoto Protocol was signed on 11th December 1997 in Kyoto and went into force on 16th February 2005.

[3] This includes the 15 members in 1997 plus Bulgaria, Czech Republic, Estonia, Latvia, Liechtenstein, Lithuania, Monaco, Romania, Slovakia, Slovenia, and Switzerland. The members of the EU 15 will use this as a joint target, i.e., the total amounts to 8% reduction while individual countries differ in their reductions. Hungary and Poland have a 6% reduction target.

[4] http://unfccc.int/kyoto_protocol/mechanisms/items/1673.php.

[5] http://unfccc.int/meetings/cop_15/copenhagen_accord/items/5262.php.

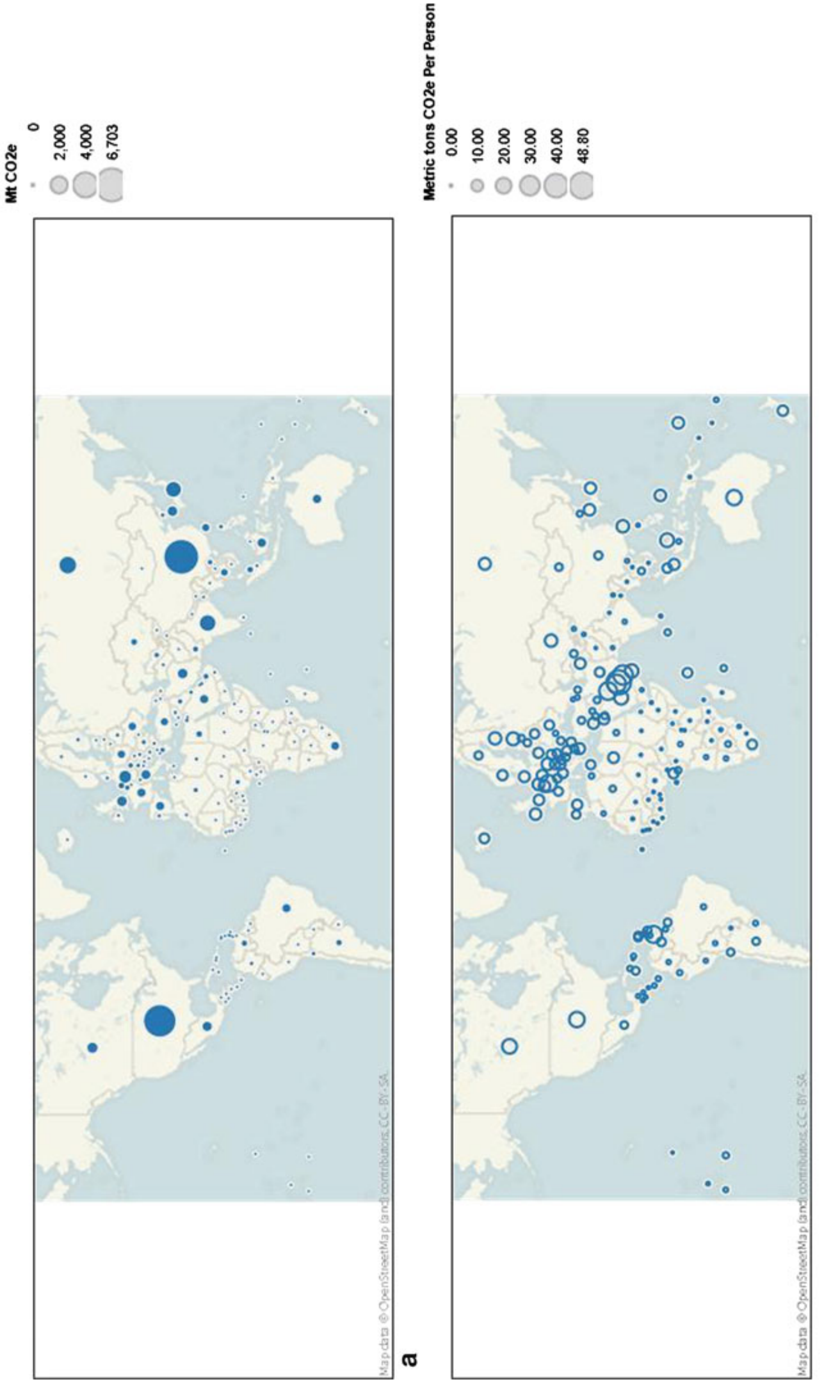

Fig. 2.1 **a** 2007 global Co_2-eq. Emissions (Kilotons). **b** 2007 global per capita Co_2-eq (Mt/person)

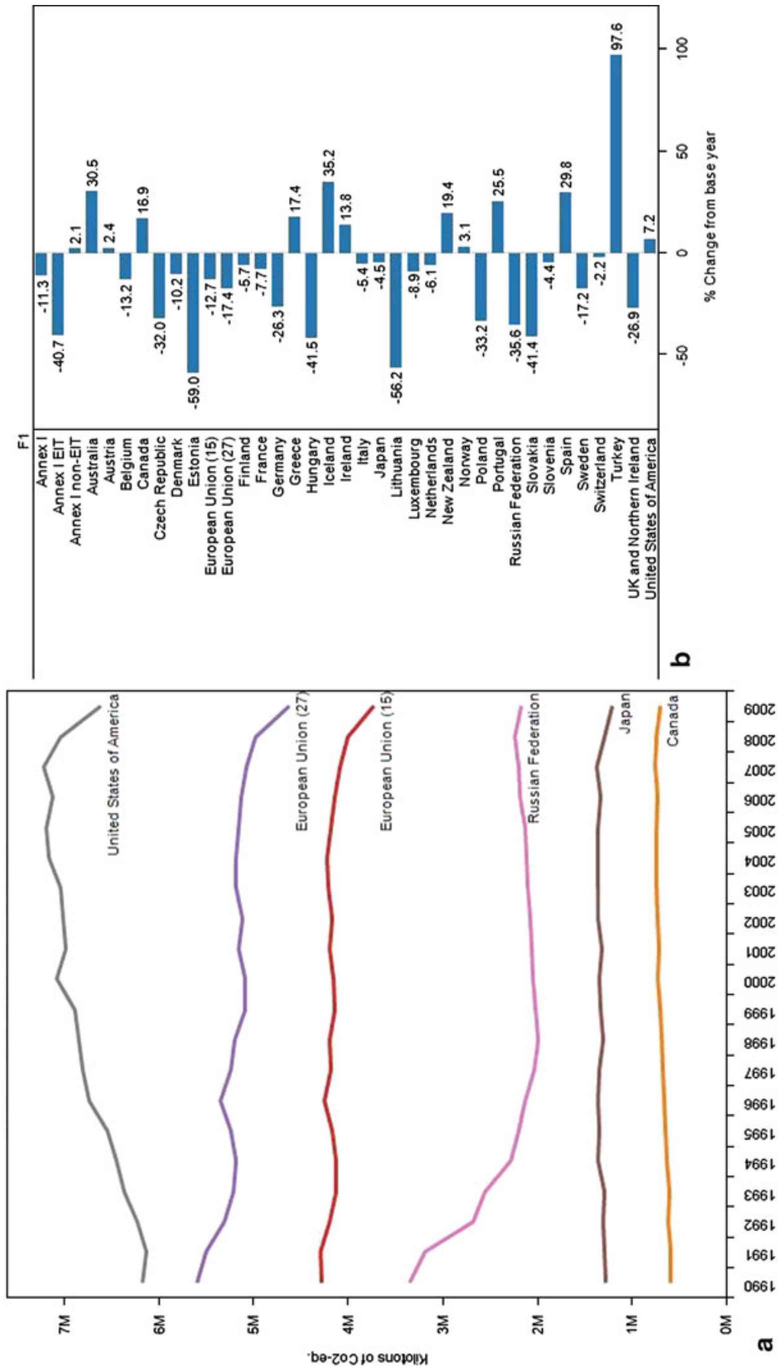

Fig. 2.2 **a** Trends in GHG Emissions (Annex I). **b** %change in GHG Emissions in 2009 compared to 1990

The Accord also recognized that developing nations would have to “implement mitigation actions,” report their emissions, and subject it to verification.

Although not legally binding, several countries have proposed reduction targets in connection with the Copenhagen Accord. Compared to 1990 levels, the EU has proposed a target reduction of 20–30%, Japan by 25%, and Russia by 15–25%. The US and Canada have proposed a 17% cut by 2020 compared to 2005 levels. China has proposed a cut of 40–45%; and India a cut of 20–25% on emission intensity[6] by 2020 compared to 2005 levels[7].

2.3 City Emissions

In 2010, about half of the world’s population lived in cities. Cities consume about 75% of the world’s energy and are responsible for anywhere from 40–70% of the world’s GHG emissions. Figure 2.3 gives the total and the per-capita GHG emissions for selected cities[8]. For example, Tokyo has emissions of 65.9 million metric tons with a per-capita of 5.16 metric tons/person.

Cities, as the hub of social and economic activity, are both significant contributors GHG emissions and highly vulnerable to climate change. City governments oversee infrastructure, host and promote businesses, and provide services for their citizens. Carefully assessing climate risk and taking steps to reduce their exposure to climate change will create a better business environment and improve the quality of life of its citizens.

Cities have a major role to play in GHG mitigation. First, city governments and services can have a substantial carbon footprint. For example, New York City government operations account for 3.47 million metric tons of CO_2-eq. annually. Tokyo’s city government emissions are 2.06 million metric tons annually[9]. Using renewable energy, improving efficiency and expanding public transport, retrofitting public buildings and street lighting, managing waste streams, and increasing green spaces all bring down the footprint and enable a better quality of life. Second, cities have a have a significant impact on how their citizens live and how corporations conduct business. Engaging citizens and businesses through incentives and joint partnerships will galvanize cities towards being climate neutral.

Cities are already taking major steps to battle climate change. For example, a group of 40 large cities have banded together to form the C40 city group. Partnering with the Clinton Climate Initiative (CCI), they plan to reduce energy use and

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[6] Emission intensity is the GHG emissions per unit of GDP. This unit does not ensure a reduction in absolute emissions—only that emissions will grow slower than GDP growth.

[7] Targets established by countries in the Copenhagen Accord are available at: http://unfccc.int/meetings/cop_15/copenhagen_accord/items/5262.php.

[8] Data is from cdpproject.net. A group of the world’s largest 40 cities (c40cities.org) in collaboration with the Clinton Climate Initiative report their GHG emissions through the CDP project. The absolute GHG emissions are self-reported. Where the per-capita is not reported, it was extrapolated by dividing the absolute GHG emissions by the population of the city reported at C40cities.org.

[9] City responses to CDP questionnaire.

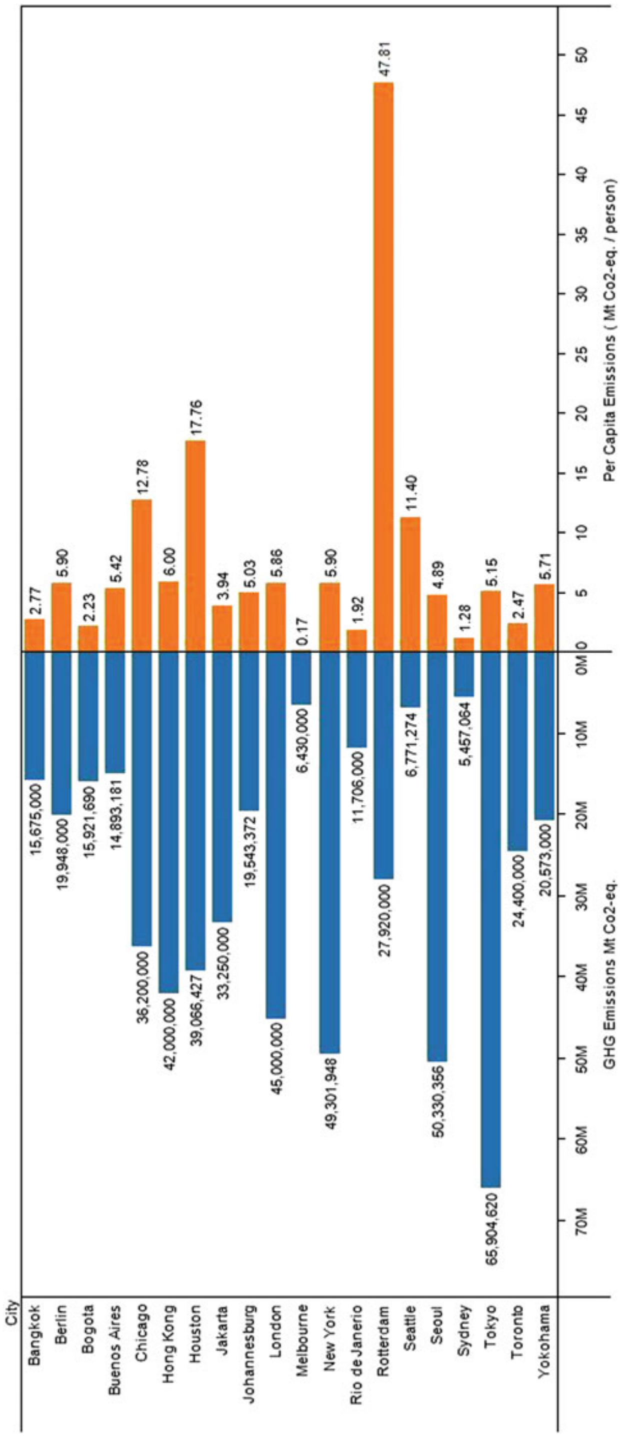

Fig. 2.3 Emissions of major cities

greenhouse gas emissions, by providing "direct assistance to individual cities, creating a purchasing consortium to pool the purchasing power of these cities, and facilitating the sharing of information about successful and replicable programs[10]." Programs involve building retrofitting, low-carbon transportation, waste management, and climate-positive growth. The C40 reports their emissions and mitigation strategies via the Carbon Disclosure Project's (CDP) Project Cities program.

ICLEI (Local Governments for Sustainability), an association of over 1220 local governments, also has several programs that help cities collaboratively combat GHG emissions. ICLEI's goals are to help local governments plan programs and policies for sustainable development. Among others, this includes creating baselines, setting GHG emission targets, meeting these targets through well-defined projects, and monitoring, reporting, and verifying GHG mitigation strategies.

One of the programs to which the ICLEI provides technical and strategic assistance is the World Mayors Council on Climate (WMCC), a group of Mayors of major cities committed to mitigating the impact of climate change. Over 191 Mayors and local authority representatives have signed the "Mexico City Pact[11]"—a pledge to voluntarily reduce GHG emissions, set targets, take GHG mitigating actions, and report them in a transparent manner.

Through efficiency and engagement programs cities are setting aggressive targets for emissions. For example Portland and Seattle, USA; Toronto, Canada; and Yokohama, Japan have targeted an 80% decrease in CO_2-eq. emissions by 2050 over 1990 levels. Rotterdam has pledged a cut in emissions by 50% and London has proposed a cut of 60% in emissions by 2025 over 1990 levels.

2.4 Sector Emissions

Businesses are responsible for 20–25% of the world's GHG emissions. Emissions for a firm are a result of their production processes and facilities, resources they consume, extraction and processing of relevant raw materials in supplier operations, and the impact of their product or service on their customers.

Firms are increasingly accessing the risk and opportunities of climate change and integrating it into the overall business strategy. In the latest survey by the CDP of the top 500 global firms[12], 48% said that they integrate risks and opportunities of climate change into their planning and 65% of them indicated that they had GHG emission mitigation targets. The major reasons for reducing GHG emissions include the increased ability to market new low-carbon products, compliance to existing and anticipated laws, and to increase efficiency while reducing disruptions in the supply chain.

Figure 2.4 gives the emissions from an "average firm" by sector. The data was collated from the Carbon Disclosure Project's "Investor CDP" program. Figure 2.5 also

[10] http://www.c40cities.org/about/aboutclinton.jsp.

[11] http://www.worldmayorscouncil.org/mexico-city-pact/read-the-pact.html.

[12] 410 firms responded to the survey. See cdpproject.net.

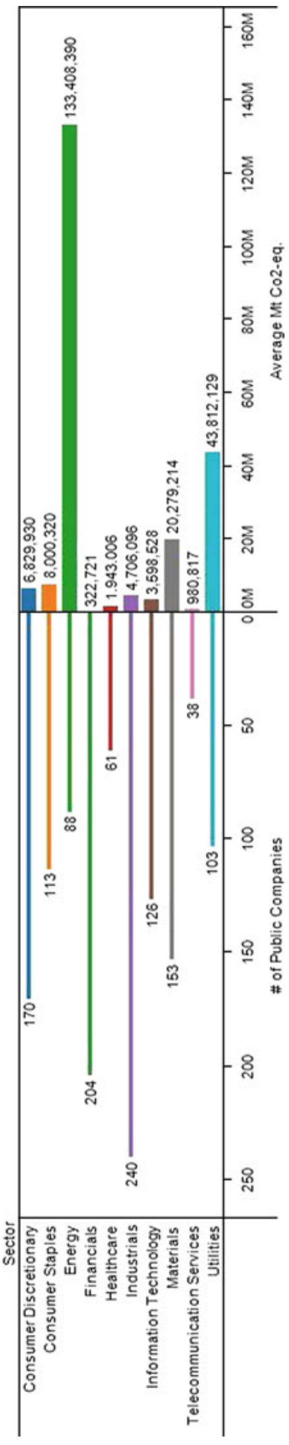

Fig. 2.4 Emissions of average firm by sector

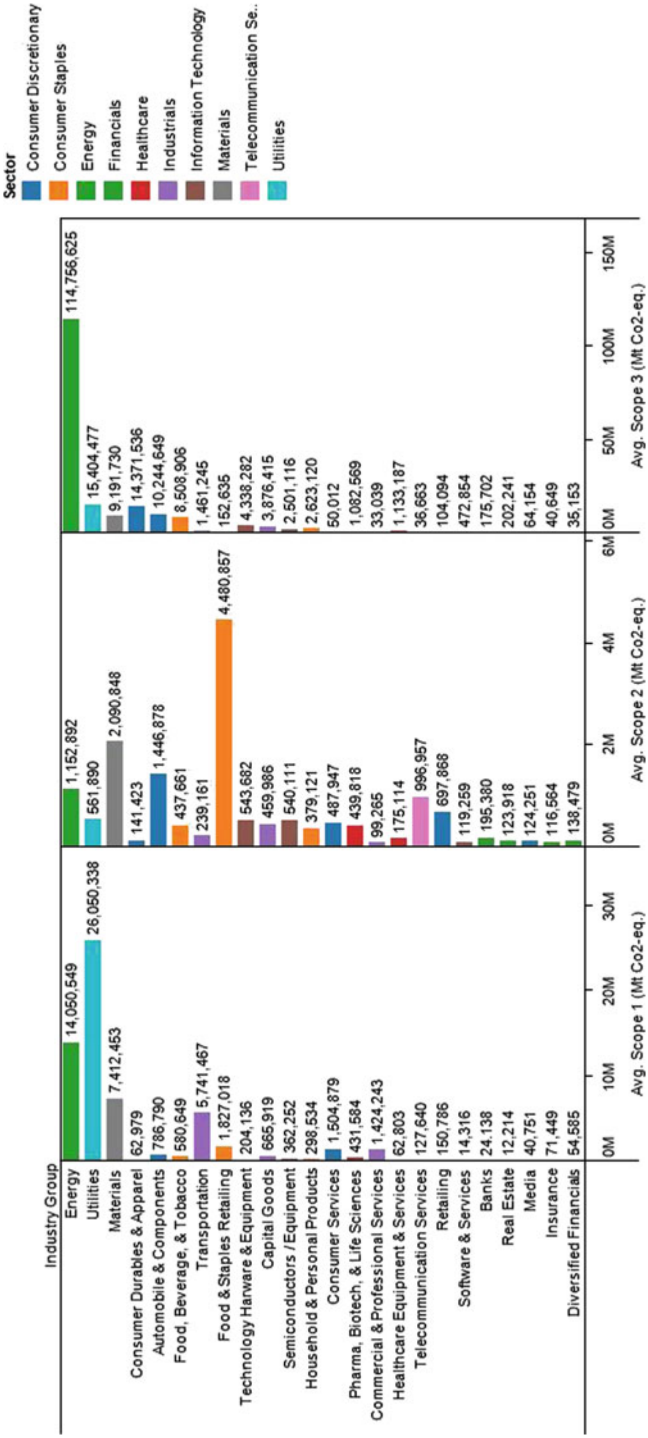

Fig. 2.5 Scopes by sector

shows the number of firms included to compute the average for the sector. For example, a sample of 88 firms in the Energy sector yielded an average of 133,408,390 Mt of CO_2-eq. while 204 firms in the Financial sector had an average emission of 322,721 Mt CO_2-eq.

There are multiple standards available to companies for accounting their GHG emissions. The GHG Protocol, developed in partnership with the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), is the most widely used standard. It provides businesses a consistent, and verifiable way to account for their GHG emissions. The GHG Protocol specifies three types of emissions called “scopes.” Scope 1 emissions are a result of all company operations—production processes, waste streams, “fugitive” emissions[13], facilities, and employees. Scope 2 is emissions from purchased electricity, and Scope 3 is emissions associated with the supply chain. This includes related emissions from suppliers who handle product components; and the emissions from downstream distribution, use, and end-of-life management of the product/service[14].

Figure 2.5 gives the breakdown of the three scopes by industry group[15]. The scope information gives an insight into appropriate strategies to reduce emissions. Scope 3, not surprisingly, for the Energy sector is almost an order of magnitude larger than the sum of scope 1 and scope 2. While Oil and Gas exploration, drilling, refining, transportation, and storage are responsible for large GHG emissions, the use of oil and gas by other industrial sectors, residences, automobiles, trains, and planes are responsible for most of the emissions in this sector. The solution to reduce emissions in this industry is obviously complex—a national energy policy, fuel efficiency standards, urban planning and transportation all have important roles to play in addition to the firms in the sector. Figure 2.6 also shows that for manufacturing-intensive groups, scope 3 emissions are much higher than scope 1 or 2 suggesting that engaging supply chain partners is essential in GHG emission mitigation. The service-based industry groups have relatively lower emissions but on average have a higher scope 2 emissions compared to their scope 1 or 3, indicating that energy efficiency and a move to renewable fuels as a strategy for GHG mitigation.

2.4.1 Firm Snapshot: Apple Inc.[16]

Apple Inc. designs, manufactures and markets a wide range of electronic devices (personal computers, mobile communication and media devices, digital music

[13] These are simply leaks from the system.

[14] See the Chapter on “Carbon Footprinting: A Supply Chain Approach” for more details on the process.

[15] Firms typically report Scope 1 and 2 emissions. Since they have no direct control over Scope 3, many firms simply do not compute or report it. The averages in Fig. 2.6 is over the firms that have reported scope 3 information. So the sum of the scopes in Fig. 2.6 may not add up to the average reported emissions in Fig. 2.5.

[16] We have chosen Apple simply to illustrate GHG emissions in a sample firm. The choice was based primarily on Apple’s strong brand recognition.

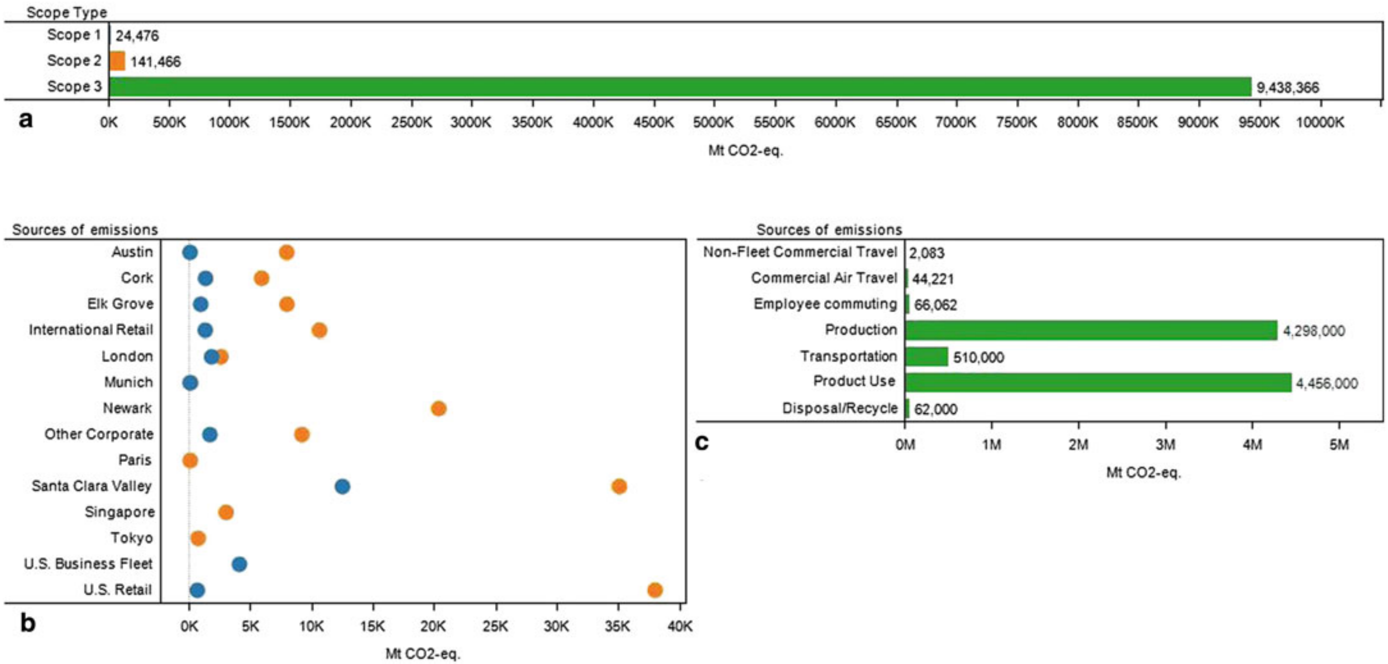

Fig. 2.6 **a** Apple GHG emissions by scope. **b** Scope 1 and 2 Breakdown by Facility. **c** Scope 3 Breakdown

players) software (OS X, iLife, etc.), services (iCloud), and third-party digital content and applications via its iTunes and App stores.

To manufacture its electronics devices, Apple sources components from all over the world, subcontracts production and assembly primarily in Asia, and sells in its own retail outlets in addition to several over distribution channels. Figure 2.6 gives the scope 1, 2, and 3 breakdown for Apple. Scope1 and 2 are primarily from its facilities and the breakdown between facilities is also shown in the figure. Scope 3 emissions, meanwhile, is more than 50 times the sum of the scope 1 and 2 combined. This includes among others, as Fig. 2.6 shows, the emissions from supplier operations, production, transportation, product use, and recycling. The two biggest sources of emissions are production and product use.

Apple's GHG reduction[17] efforts in production includes reducing material use in devices and in packaging, elimination of certain hazardous materials, and designing the product with appropriate materials such as Aluminum and glass so they can be recycled at end of life. The design also involves energy efficient components and it's monitoring via software so the emissions during product use are reduced. Apple has increased its reliance on renewable energy by 200% since 2005 and is using 100% renewable energy in its Elk Grove, Cork, and Austin facilities, reducing its Scope 1 and 2 emissions.

2.5 Product Emissions

In its most complete form, the CO_2-eq. emissions of a product includes activities throughout its life cycle right from extraction and processing of raw materials, production, use, and end-of-life. Figure 2.7a–e shows the CO_2-eq. of some common products and services[18].

Reporting the carbon emissions for a product or service, especially as a label on product packaging, is a recent phenomenon. Starting in 2007, Tesco, Britain's biggest retailer in conjunction with Carbon Trust (the UK-based developer of the PAS 2050 GHG standard) has carbon labels on more than 100 of its branded products such as pasta, potatoes, sugar, milk, laundry detergent, and orange juice. South Korea's environment ministry has introduced a "CooL Label," that covers products in multiple categories such as transportation and consumer electronics. E. Leclerc, a French retailer, has estimated the carbon emissions of 20,000 of its products and has launched an initiative where they can compute the total emissions of a consumer shopping cart[19]. Labeling initiatives are also underway in Thailand, Japan, Switzerland (Climatop label), Germany, and the USA.

While they help market products and inform consumers of the environmental impact, it is not clear if customers use the CO_2-eq. number on the label to guide purchase decisions. Second, standards for computing emissions for products are

[17] See http://www.apple.com/environment.

[18] Data sources are reported in the Appendix.

[19] http://www.jeconomisemaplanete.fr/.

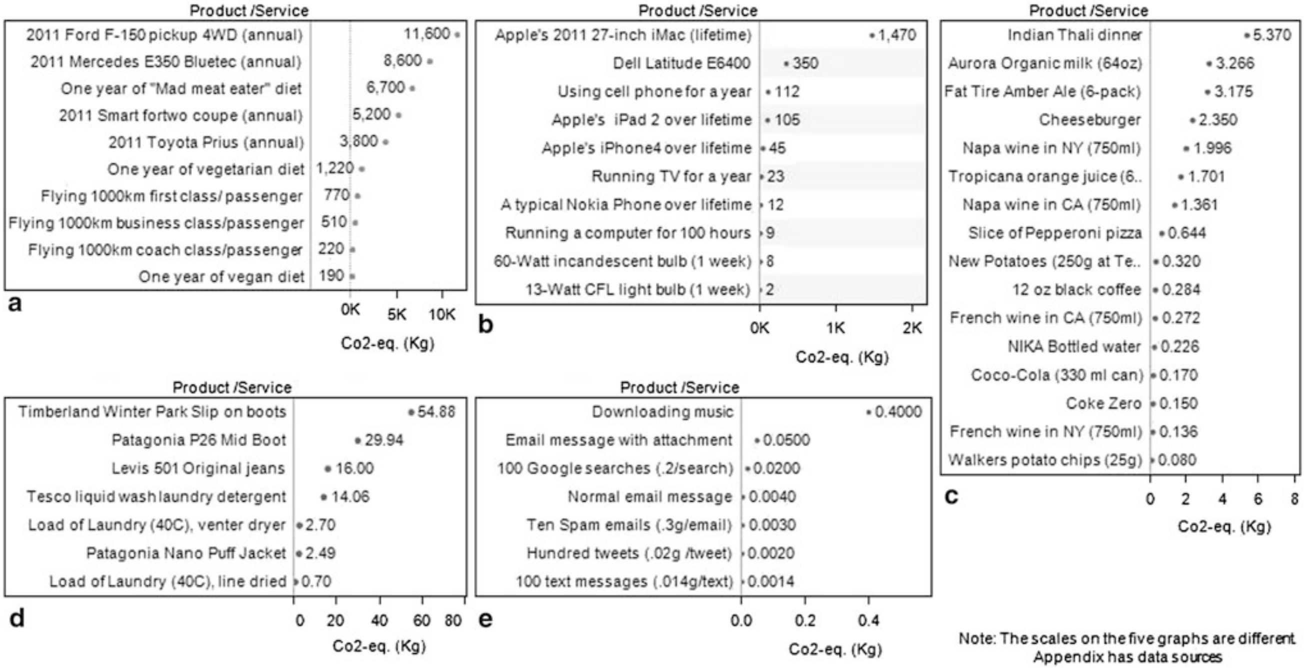

Fig. 2.7 **a** Travel and lifestyle, **b** Consumer electronics. **c** Food. **d** Clothing and washing. **e** Our digital social life

still evolving, and without a clear and consistent set of rules to compute the total emissions, customers can find the labels confusing.

While customer engagement through labeling and education is one way to mitigate GHG emissions, the emission analysis can have a significant impact on the firm reporting it.

The typical process is to map the supply chain, identify key activities in the product life cycle, and compute emissions. This analysis will identify carbon "hotspots" in the supply chain and appropriate actions can be taken to reduce emissions in those activities. This would typically involve engaging suppliers and customers to redesign products that have a smaller GHG impact, increasing efficiencies of processes, use of renewable energy, and reclaiming product after use to create raw material.

2.6 Conclusions

Our intent in this chapter was to give a snapshot of CO_2-eq. emissions of different entities. GHG mitigation will take actions at different levels—international agreements between countries, national measures, city and local government policies, firm level strategies, and finally individual choices—all aimed at reducing our impact on the environment. The policy issues or strategic considerations are multi-faceted and often involve multiple parties with differing objectives. However, we remain hopeful that entities at all levels will implement the required policies and execute the appropriate strategies to achieve the IPCC recommended 25–40% cut in emissions by 2050.

2.7 Appendix: Data Sources for the Visuals

This Appendix lists all data sources used to construct the visuals. All are available online.

2.7.1 Figure 2.1

GHG total and per-capita emissions: Climate Analysis Indicators Tool (CAIT) Version 8.0. (Washington:World Resources Institute 2011). Can be freely downloaded from: http://cait.wri.org.

2.7.2 Figure 2.2

Data is from the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat. Parties to the convention are required per article 4 and 12 of the Convention to submit GHG inventories to the Secretariat. Can be freely downloaded from: http://unfccc.int/ghg_data/ghg_data_unfccc/time_series_annex_i/items/3814.php.

2.7.3 Figure 2.3

The Carbon Disclosure Project in a non-profit organization based in London, UK.Working with multiple partners, they have developed a reporting protocol that many organizations, including the c40 cities and the Clinton Climate Initiative use. The data for this figure was from the "CDP Cities" program. Responses to questionnaires sent to cities on climate initiatives and GHG emissions are available free, but registration on the website is required: https://www.cdproject.net/en-US/Programmes/Pages/CDP-Cities-2011.aspx.

2.7.4 Figure 2.4

Data was obtained from CDP's "Investor CDP" program for the year 2010: https://www.cdproject.net/en-US/Programmes/Pages/CDP-Investors.aspx.

2.7.5 Figure 2.5

Datawas obtained from CDP's "Investor CDP" program for the year 2010: https://www.cdproject.net/en-US/Programmes/Pages/CDPInvestors.aspx.

2.7.6 Figure 2.6

Apple Inc. Emissions data was compiled from Apple's 2010 response to CDP's "Investor CDP" program. Much of the data is readily available from Apple's web site: http://www.apple.com/environment.

2.7.7 Figure 2.7

Data was compiled from a variety of sources. Where possible, the firm that did the footprinting exercise is referenced.

Category	Product/Service	Source
Clothing and laundry	Timberland Winter Park slip on boots	http://online.wsj.com/public/resources/documents/FOOTPRINT.pdf
	Patagonia P26 mid boot	http://www.patagonia.com/us/patagonia.go?assetid=23430
	Levis 501 original jeans	http://www.levistrauss.com/sites/default/files/librarydocument/2011/1/e-valuate-web-content-012011-finalv3.pdf
	Tesco liquid wash laundry detergent	http://online.wsj.com/public/resources/documents/FOOTPRINT.pdf
	Load of Laundry (40 C), venter dryer	http://www.guardian.co.uk/environment/green-living-blog/2010/oct/21/carbon-footprint-email
	Patagonia Nano puff jacket	http://www.patagonia.com/us/patagonia.go?assetid=23429
	Load of Laundry (40 C), line dried	http://www.guardian.co.uk/environment/green-living-blog/2010/oct/21/carbon-footprint-email
Consumer electronics	Apple's 2011 27 in iMac (lifetime)	apple.com/environment
	Dell Latitude E6400	http://i.dell.com/sites/content/corporate/corp-comm/en/Documents/dell-laptop-carbon-footprint-whitepaper.pdf
	Using cell phone for a year	http://www.unep.org/publications/ebooks/kick-the-habit/
	Apple's iPad 2 over lifetime	apple.com/environment
	Apple's iPhone4 over lifetime	apple.com/environment
	Running TV for a year	http://www.unep.org/publications/ebooks/kick-the-habit/
	A typical Nokia phone over lifetime	http://www.nokia.com/environment/devices-and-services/creating-our-products/environmental-impact
	Running a computer for 100 h	http://www.unep.org/publications/ebooks/kick-the-habit/
	60 W incandescent bulb (1 week)	apple.com/environment
	13 W CFL light bulb (1 week)	apple.com/environment
Food	Indian Thali dinner	http://www.eatlowcarbon.org/#
	Aurora organic milk (64 oz)	http://online.wsj.com/public/resources/documents/FOOTPRINT.pdf
	Fat tire amber ale (6-pack)	http://online.wsj.com/public/resources/documents/FOOTPRINT.pdf
	Cheeseburger	http://openthefuture.com/cheeseburger_CF.html
	Napa wine in NY (750 ml)	http://www.drvino.com/2009/04/14/the-carbon-footprint-of-wine-in-national-geographic/
	Tropicana orange juice (64 oz)	http://www.nytimes.com/2009/01/22/business/22pepsi.html?ref = business
	Napa wine in CA (750 ml)	http://www.drvino.com/2009/04/14/the-carbon-footprint-of-wine-in-national-geographic/

Category	Product/Service	Source
	Slice of pepperoni pizza	http://www.eatlowcarbon.org/#
	New potatoes (250 g at Tesco, UK)	http://www.footprintexpert.com/registry/Pages/default.aspx
	12 oz black coffee	http://www.eatlowcarbon.org/#
	French wine in CA (750 ml)	http://www.drvino.com/2009/04/14/the-carbon-footprint-of-wine-in-national-geographic/
	NIKA bottled water	https://www.nikawater.org/eco-policy/
	Coco-cola (330 ml can)	http://www.coca-cola.co.uk/press-centre/2009/march/coca_cola_announces_the_carbon_footprints_of_some_of_its_best_loved_brands.html
	Coke zero	http://www.coca-cola.co.uk/press-centre/2009/march/coca_cola_announces_the_carbon_footprints_of_some_of_its_best_loved_brands.html
	French wine in NY (750 ml)	http://www.drvino.com/2009/04/14/the-carbon-footprint-of-wine-in-national-geographic/
	Walkers potato chips (25 g)	http://www.walkerscarbonfootprint.co.uk/walkers_carbon_footprint.html
Our digital social life	Downloading music	http://download.intel.com/pressroom/pdf/CDsvsdownloadsrelease.pdf
	Email message with attachment	http://www.guardian.co.uk/environment/green-living-blog/2010/oct/21/carbon-footprint-email
	100 Google searches (0.2/search)	http://googleblog.blogspot.com/2009/01/powering-google-search.html
	Normal email message	http://www.guardian.co.uk/environment/green-living-blog/2010/oct/21/carbon-footprint-email
	Ten spam emails (0.3 g/email)	http://www.guardian.co.uk/environment/green-living-blog/2010/oct/21/carbon-footprint-email
	Hundred tweets (0.02 g/tweet)	http://mehack.com/from-chirp-energy-tweet-100-j-something-tweet
	100 text messages (0.014 g/text)	How Bad are Bananas bad: The Carbon Footprint of Everything by Mike Berners-Lee, Profile Books, 2010. ISBN-10: 1846688914
Travel and lifestyle	2011 Ford F-150 pickup 4WD (annual)	http://www.fueleconomy.gov/feg/findacar.htm
	2011 Mercedes E350 Bluetec (annual)	http://www.fueleconomy.gov/feg/findacar.htm
	One year of “Mad meat eater” diet	http://www.unep.org/publications/ebooks/kick-the-habit/
	2011 Smart for two coupe (annual)	http://www.fueleconomy.gov/feg/findacar.htm
	2011 Toyota prius (annual)	http://www.fueleconomy.gov/feg/findacar.htm

Category	Product/Service	Source
	One year of vegetarian diet	http://www.unep.org/publications/ebooks/kick-the-habit/
	Disposable diapers average child uses (8/day/2 years)	http://www.epa.gov/oms/climate/420f05001.htm
	Flying 1,000 km first class/passenger	http://www.unep.org/publications/ebooks/kick-the-habit/
	Reusable diapers average child uses (8/day/2 years)	http://www.epa.gov/oms/climate/420f05001.htm
	Flying 1,000 km business class/passenger	http://www.unep.org/publications/ebooks/kick-the-habit/
	Flying 1,000 km coach class/passenger	http://www.unep.org/publications/ebooks/kick-the-habit/
	One year of vegan diet	http://www.unep.org/publications/ebooks/kick-the-habit/