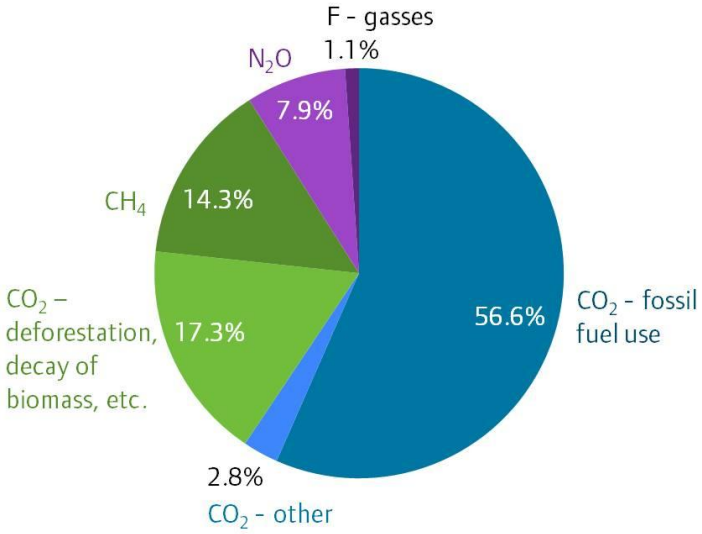
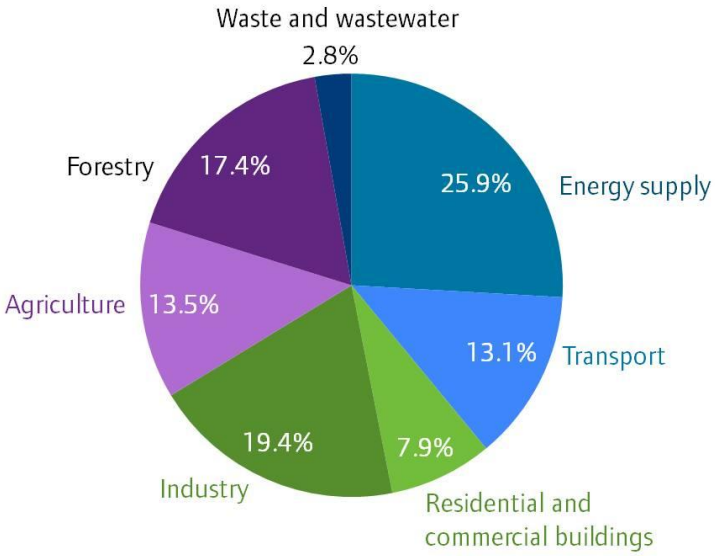
Figure 1: Share of different anthropogenic greenhouse gases in total emissions in 2004



Source: Adapted from IPCC 2007, AR4 Synthesis Report. Figure 2.1, latest official figure available

Figure 2: Share of different sectors in total anthropogenic GHG emissions in 2004



Source: Adapted from IPCC 2007 AR4

Table 1: Projected effects of climate change on different systems and sectors

System/Sector	Projected changes
Ecosystems	Approximately 20-30% of known plant and animal species are likely to be at increased risk of extinction if increases in global average temperature exceed 1.5-2.5°C. This would cause major changes in ecosystem structure and function, species' ecological interactions and shifts in species' geographical ranges, with mostly negative consequences for biodiversity and ecosystem goods and services.
Food	Crop productivity is projected to increase slightly at mid to high latitudes for local mean temperature increases of up to 1 to 3°C depending on the crop, and then decrease beyond that in some regions. At lower latitudes, especially in seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases (1 to 2°C).
Coasts	Coasts are projected to be exposed to increasing risks, including coastal erosion, due to climate change and sea level rise. By the 2080s, many millions more people than today are projected to experience floods every year due to sea level rise.
Industry, settlements and society	The most vulnerable industries, settlements and societies are generally those in coastal and river flood plains, those whose economies are closely linked with climate-sensitive resources and those in areas prone to extreme weather events.
Health	The health status of millions of people is projected to be affected through, for example, increases in malnutrition; increased deaths, diseases and injury due to extreme weather events; increased burden of diarrheal diseases; and the altered spatial distribution of some infectious diseases.
Water	Changes in precipitation and temperature lead to changes in runoff* and water availability. Runoff is projected with high confidence to increase by 10 to 40% by mid-century at higher latitudes and in some wet tropical areas and decrease by 10 to 30% over some dry regions at mid-latitudes and dry tropics. There is also high confidence that many semi-arid areas will suffer a decrease in water resources due to climate change. Drought-affected areas are projected to increase in extent.

* Surface runoff occurs when soil is infiltrated to full capacity and excess water (e.g. rain, melt water) flows over the land.

Source: IPCC, Fourth Assessment Report, Synthesis Report, 3.3.1 Impacts on systems and sectors, 2007

Climate change skepticism

People denying or doubting the existence or anthropogenic causes to climate change are abundant and loud in the popular media. In scientific literature, however, a strong consensus exists that climate change is happening and is caused mainly by human-induced greenhouse gas emissions. A broad analysis of the climate scientist community shows that 97-98% of the climate researchers most actively publishing in the field support the tenets of anthropogenic climate change outlined by the IPCC. No scientific body of national or international standing disagrees with this view. The popular website, Skeptical Science, is

devoted to scientifically disproving the most widely used skeptic arguments as well as to initiate scientific discussions regarding the issue. The table below summarizes the favorite skeptic arguments as well as their rebuttal as described by the website.

Table 2: Most widely used skeptic arguments

Skeptic argument	What the science really says
It's the Sun	In the last 35 years of global warming, the sun has shown a slight cooling trend. Sun and climate have been going in opposite directions.
Climate has changed before	Climate reacts to whatever forces it to change at the time; humans are now the dominant force
It's not bad	Negative impacts of global warming on agriculture, health & environment far outweigh any positives.
There is no consensus	97% of climate experts agree humans are causing global warming.
It's cooling	All the indicators show that global warming is still happening.
Models are unreliable	Models successfully reproduce temperatures since 1900 globally, on land, in the air and in the oceans.
Temperature record is unreliable	The warming trend is the same in rural and urban areas, measured by thermometers and satellites.
Animals and plants can adapt to climate change	A large number of ancient mass extinction events have been strongly linked to global climate change. Because current climate change is so rapid, the way species typically adapt (e.g. through migration) is, in most cases, simply not possible.
It hasn't warmed since 1998	For global records, 2010 is the hottest year on record, tied with 2005.
Antarctica is gaining ice	Satellite measurements show Antarctica is gaining sea ice but losing land ice at an accelerating rate, which has implications for sea level rise.

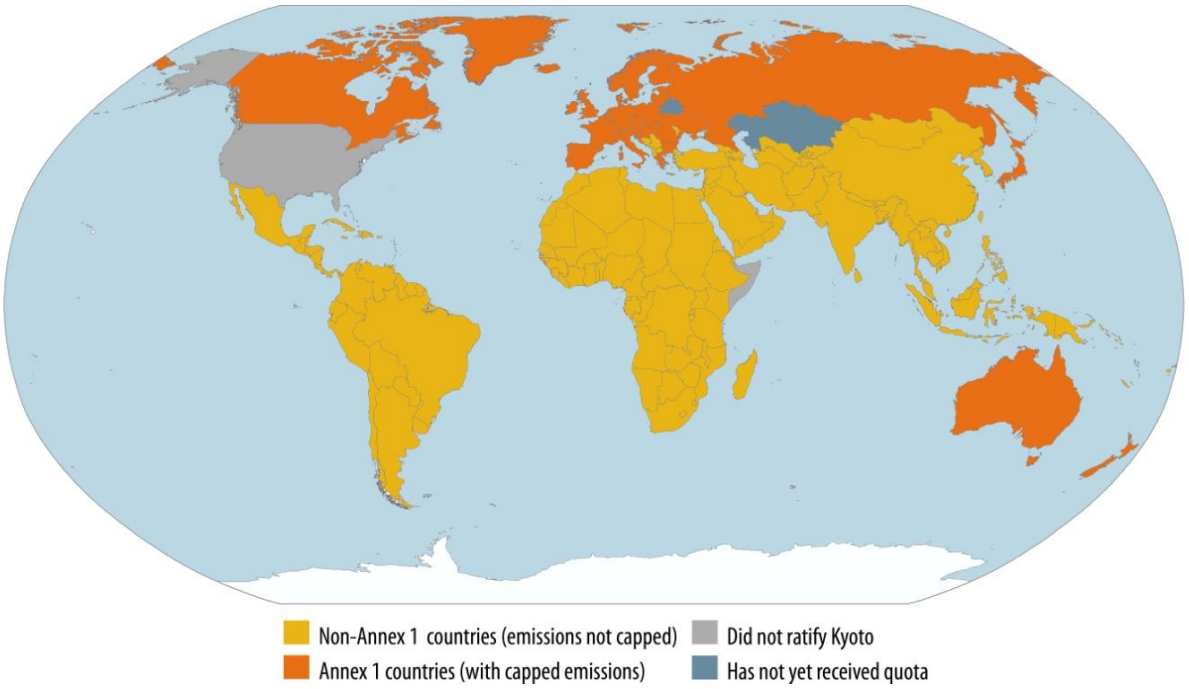
Source: Skeptical Science, Global Warming & Climate Change Myths, 2011

In 1997, the UNFCCC was complemented by another environmental international treaty, the Kyoto Protocol, ratified by 191 countries. Under the Kyoto Protocol, 37 industrialized countries and the European Community committed to reducing their greenhouse gas emissions by an average of 5.2% by 2012 against 1990 levels. While the Protocol stresses the importance of domestic action, it also allows the utilization of 'market based mechanisms', through which emission reductions achieved abroad may be counted towards meeting domestic emission limitation targets.

Under the UNFCCC, Annex I countries are those with emission limitation commitments. This includes industrialized countries and countries with economies in transition. Annex II countries are a subgroup of

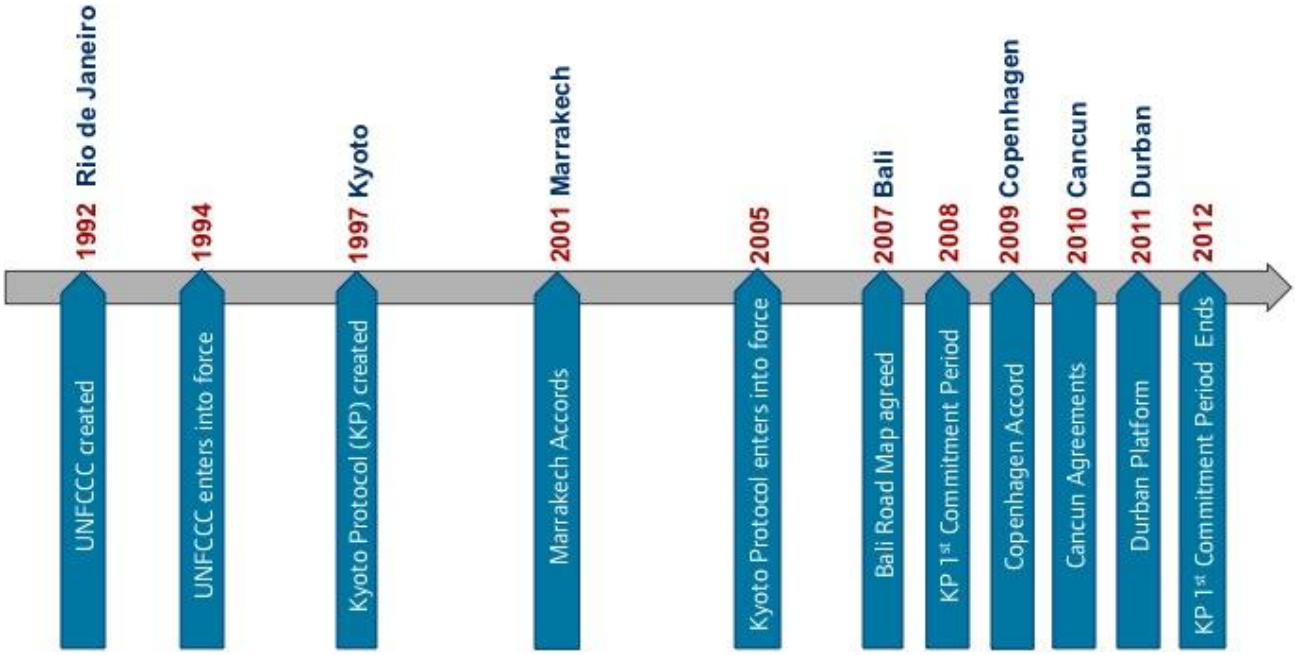
Annex I and include industrialized countries that are committed to provide financial support to developing countries to help meet climate change related costs. Developing countries with no financial or legally-binding emissions limitation obligations are referred to as non-Annex I countries.

Figure 3: Kyoto Protocol world map



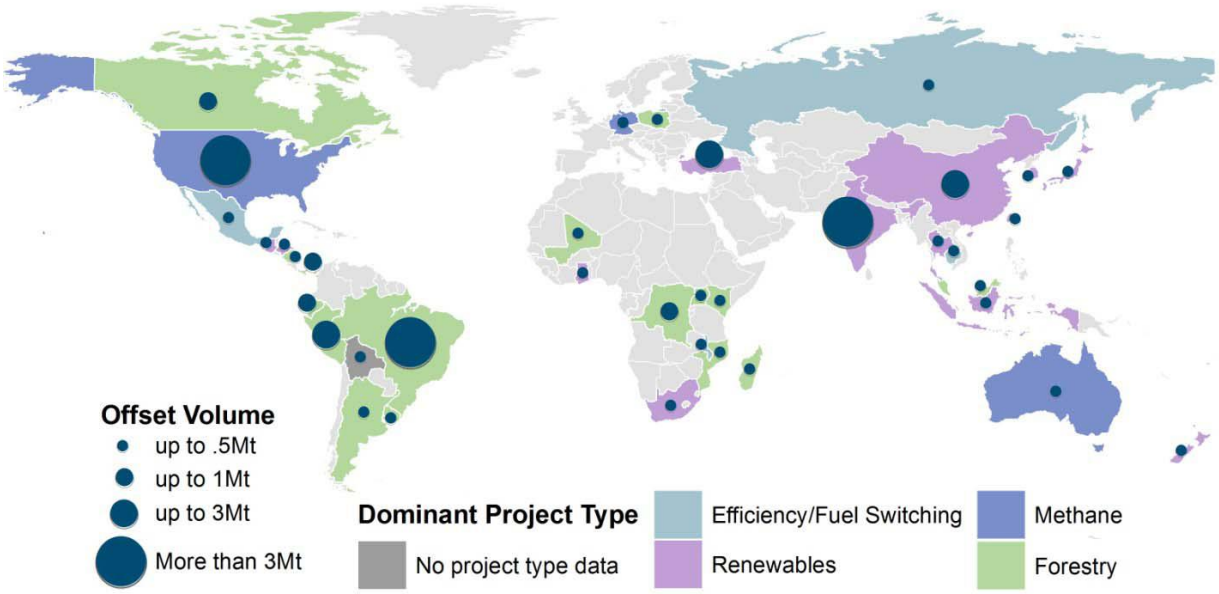
Source: Climate Focus

Figure 4: Timeline of the UNFCCC process



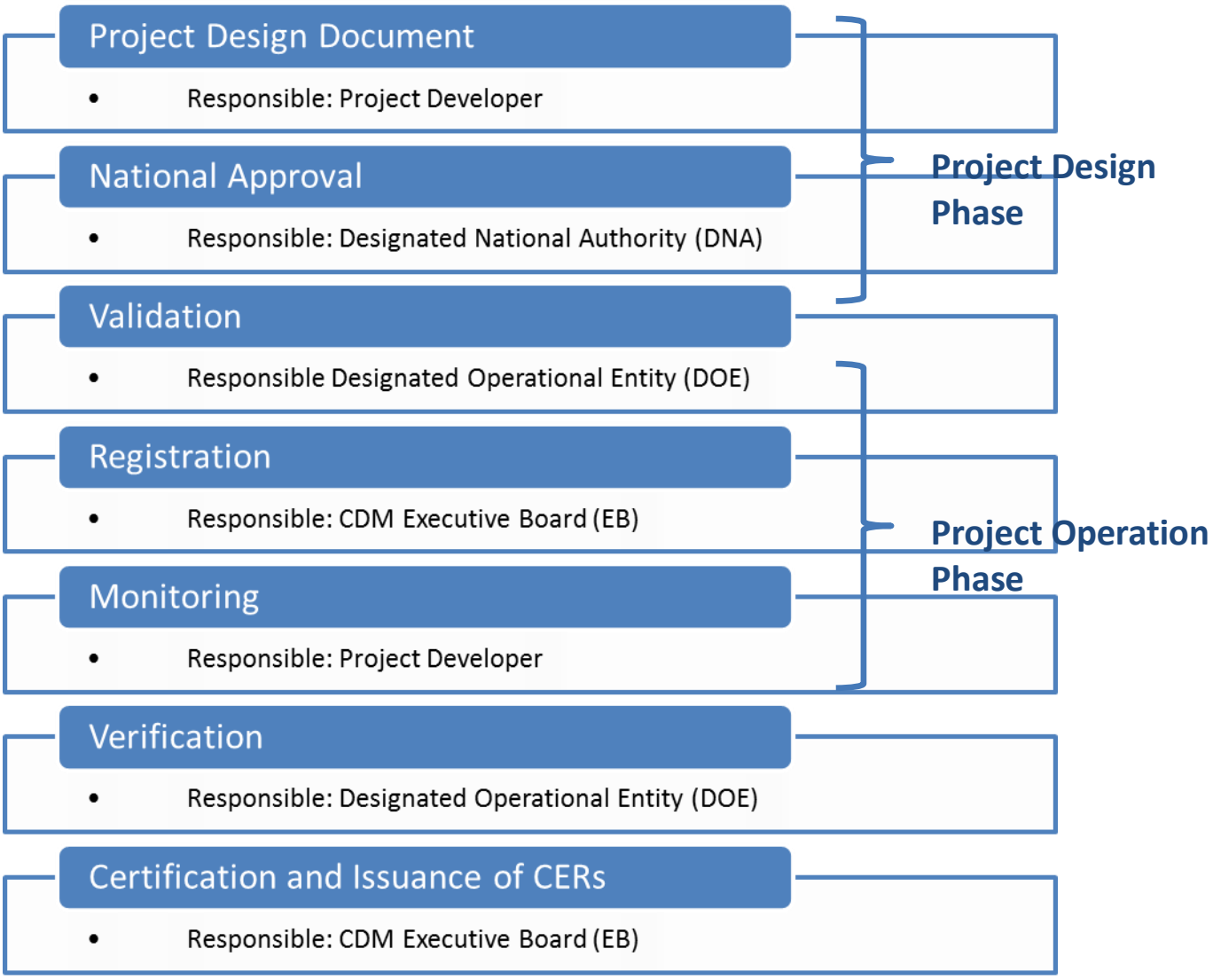
Source: Climate Focus

Figure 5: Transaction volume and project type by location



Note: Based on 394 observations, "Dominant project type" classified as type associated with largest volume by country.
Source: Ecosystem Marketplace, Building Bridges, State of the Voluntary Carbon Markets 2010

Figure 6: The CDM Project Cycle



Source: Climate Focus (2011)

Environmentally Sound Technologies (ESTs) are technologies that have the potential for significantly improved environmental performance relative to other technologies. ESTs protect the environment, are less polluting, use resources in a sustainable manner, recycle more of their wastes and products, and handle all residual wastes in a more environmentally acceptable way than the technologies for which they are substitutes. ESTs are not just individual technologies. They can also be defined as total systems that include know-how, procedures, goods and services, and equipment, as well as organizational and managerial procedures for promoting environmental sustainability.

Defining environmentally sound technologies in an absolute sense is difficult since the environmental performance of a technology depends upon its impacts on specific human populations, biota and ecosystems, and the availability of supporting infrastructure and human

resources for the management, monitoring and maintenance of the technology, as well as the sustainability of natural systems. The soundness of environmental technology is also influenced by temporal and geographical factors, to the extent that some technologies may be environmentally sound now but may be replaced in the future by even cleaner technologies.

Table 2. Some Examples of Ecological Engineering and Ecotechnology Applications

Application	Examples
Ecosystems are used to reduce or solve a pollution problem that would otherwise be harmful to other ecosystems.	Wastewater recycling inwetlands; sludge recycling
Ecosystems are imitated or copied to reduce or solve a resource problem.	Reconstructed wetlands; integrated fishponds
The recovery of an ecosystem is nurtured after significant disturbance.	Surface coal minerestoration; lake and river restoration; restoration of hazardous waste sites
Existing ecosystems are modified in an ecologically sound way to solve an environmental problem.	Biomanipulation of species; biological control of eutrophication processes
Ecosystems are used for the benefit of humans without destroying the ecological balance.	Sustainable agro-ecosystems; sound renewable resource harvesting