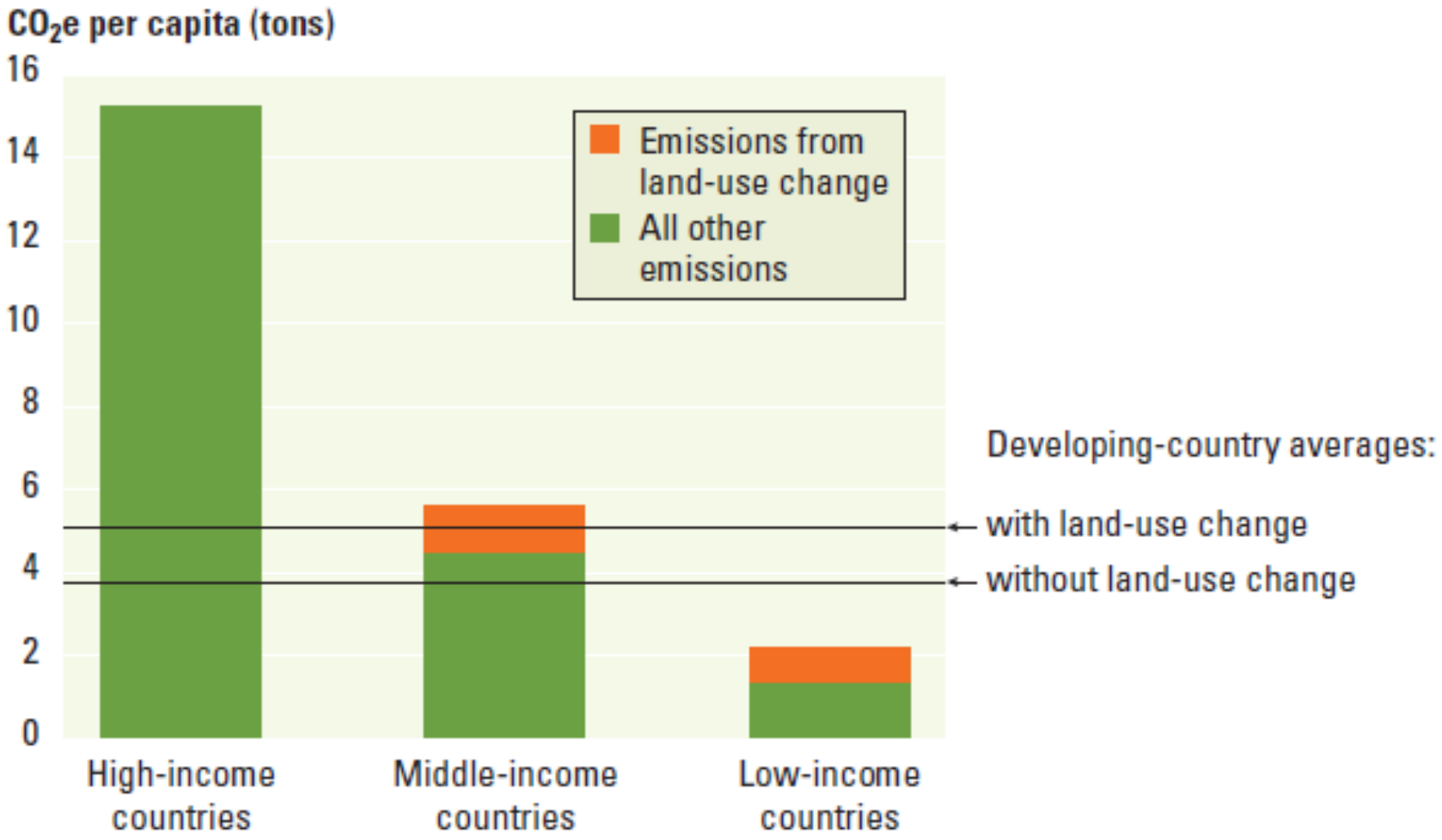
ENVIRONMENT
&
CLIMATE CHANGE

‘AS YOU WATCH THE SUN GO DOWN, EVENING AFTER EVENING THROUGH THE SMOG ACROSS THE POISON WATERS OF OUR NATIVE EARTH, WE MUST ASK OURSELVES SERIOUSLY WHETHER WE REALLY WISH SOME FUTURE UNIVERSAL HISTORIAN ON ANOTHER PLANET TO SAY ABOUT US:
WITH ALL THE GENIUS AND ALL THEIR SKILL, THEY RAN OUT OF FORESIGHT AND AIR AND FOOD AND WATER AND IDEAS’

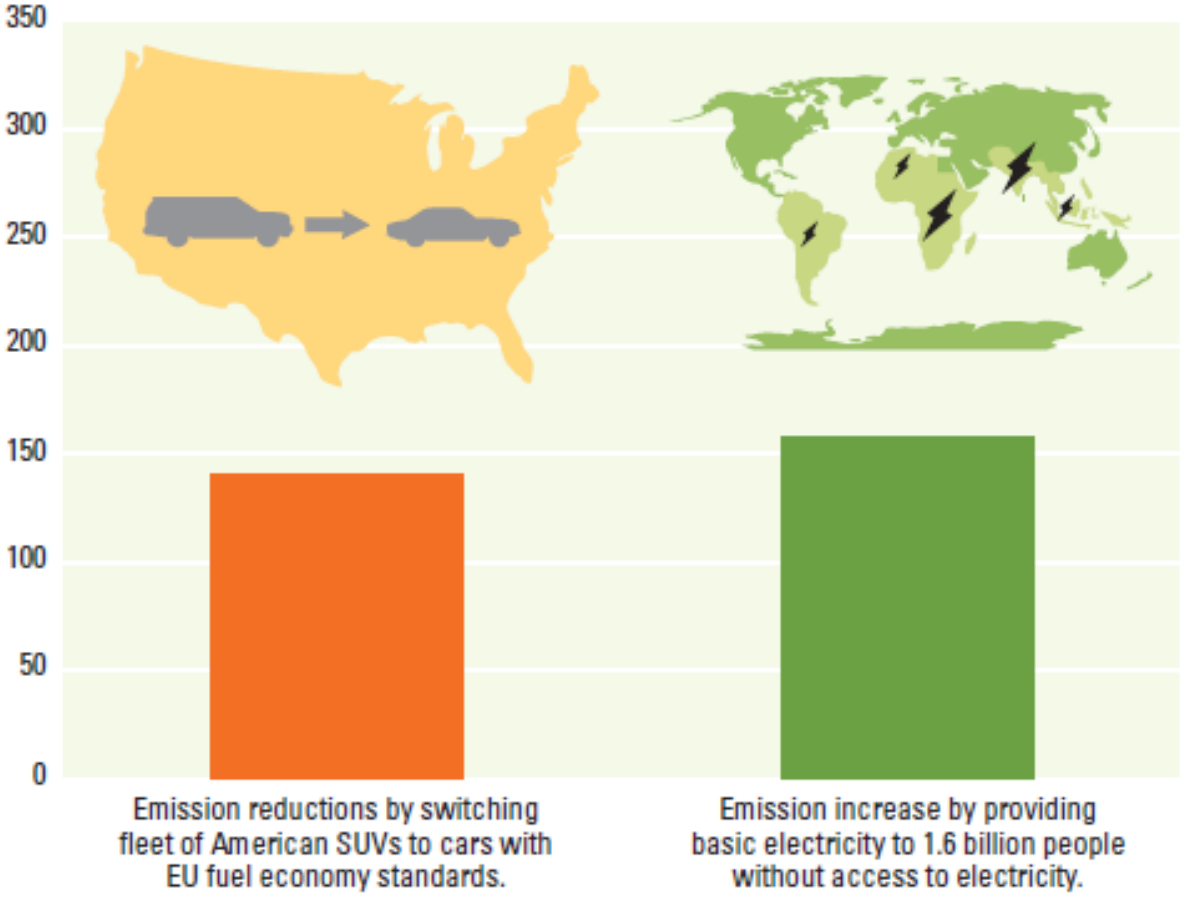
~ U Thant
Secretary General, United Nations, 1971

Unequal footprints: Emissions per capita in low-, middle-, and high-income countries, 2005



Sources: World Bank 2008c; WRI 2008 augmented with land-use change emissions from Houghton 2009.
Note: Greenhouse gas emissions include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and high-global-warming-potential gases (F-gases). All are expressed in terms of CO_2 equivalent (CO_2e)—the quantity of CO_2 that would cause the same amount of warming. In 2005 emissions from land-use change in high income countries were negligible.

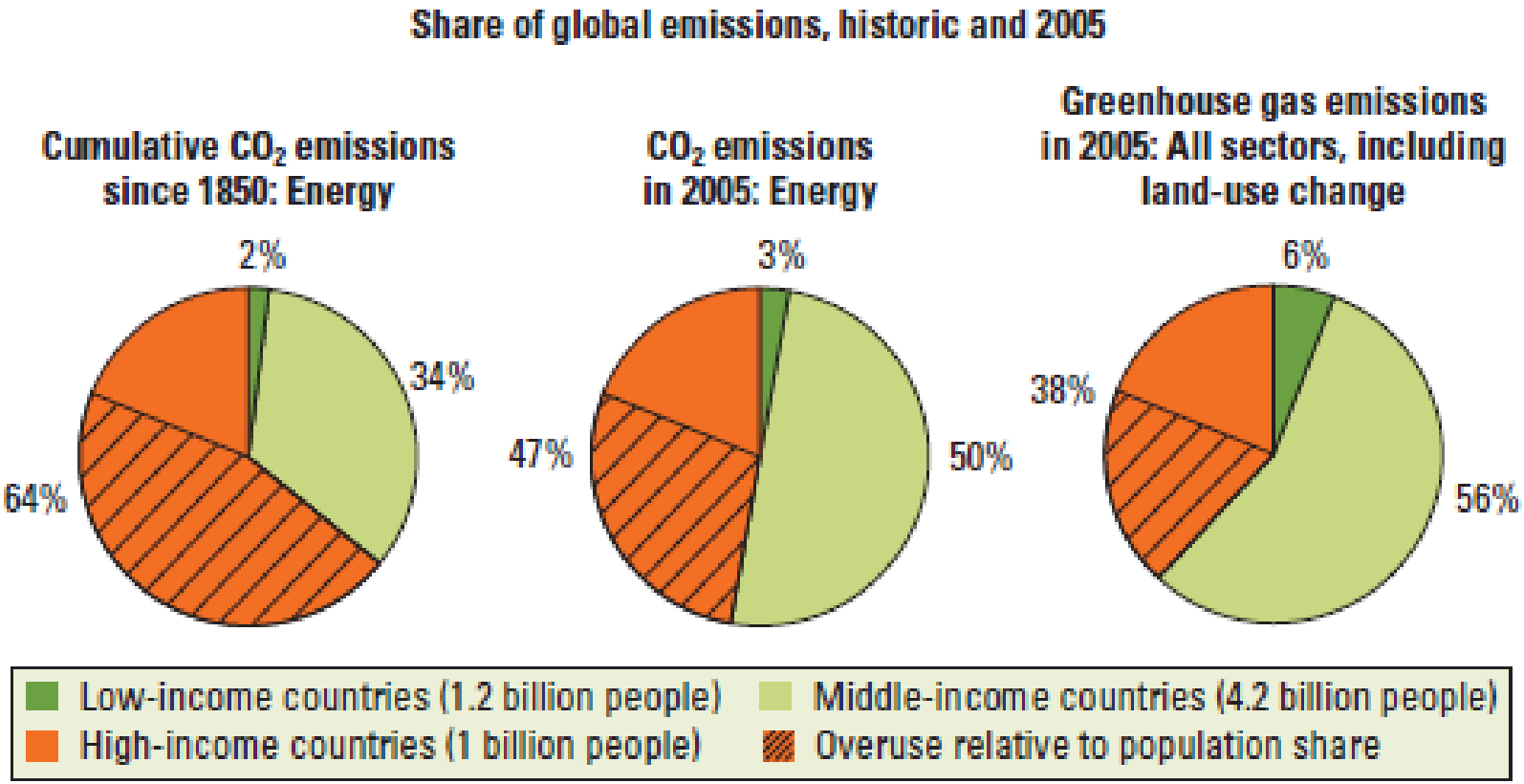
Rebalancing act: Switching from SUVs to fuel-efficient passenger cars in the U.S. alone would nearly offset the emissions generated in providing electricity to 1.6 billion more people



Source: WDR team calculations based on BTS 2008.

Note: Estimates are based on 40 million SUVs (sports utility vehicles) in the United States traveling a total of 480 billion miles (assuming 12,000 miles a car) a year. With average fuel efficiency of 18 miles a gallon, the SUV fleet consumes 27 billion gallons of gasoline annually with emissions of 2,421 grams of carbon a gallon. Switching to fuel-efficient cars with the average fuel efficiency of new passenger cars sold in the European Union (45 miles a gallon; see ICCT 2007) results in a reduction of 142 million tons of CO_2 (39 million tons of carbon) annually. Electricity consumption of poor households in developing countries is estimated at 170 kilowatt-hours a person-year and electricity is assumed to be provided at the current world average carbon intensity of 160 grams of carbon a kilowatt-hour, equivalent to 160 million tons of CO_2 (44 million tons of carbon). The size of the electricity symbol in the global map corresponds to the number of people without access to electricity.

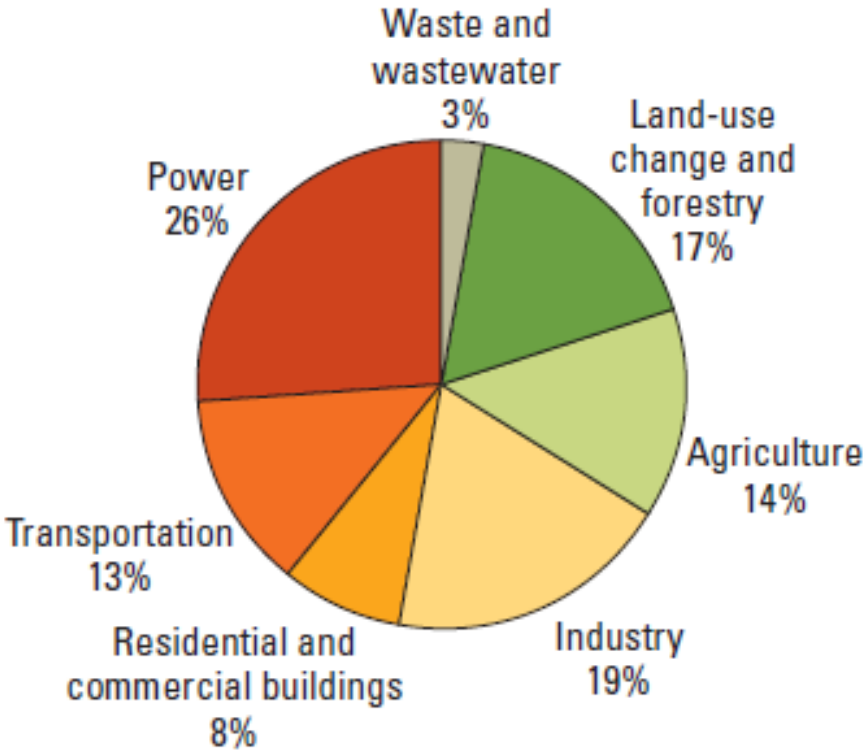
High-income countries have historically contributed a disproportionate share of global emissions and still do



Sources: DOE 2009; World Bank 2008c; WRI 2008 augmented with land-use change emissions from Houghton 2009.

Note: The data cover over 200 countries for more recent years. Data are not available for all countries in the 19th century, but all major emitters of the era are included. Carbon dioxide (CO_2) emissions from energy include all fossil-fuel burning, gas flaring, and cement production. Greenhouse gas emissions include CO_2, methane (CH_4), nitrous oxide (N_2O), and high-global-warming-potential gases (F-gases). Sectors include energy and industrial processes, agriculture, land-use change (from Houghton 2009), and waste. Overuse of the atmospheric commons relative to population share is based on deviations from equal per capita emissions; in 2005 high-income countries constituted 16 percent of global population; since 1850, on average, today's high-income countries constituted about 20 percent of global population.

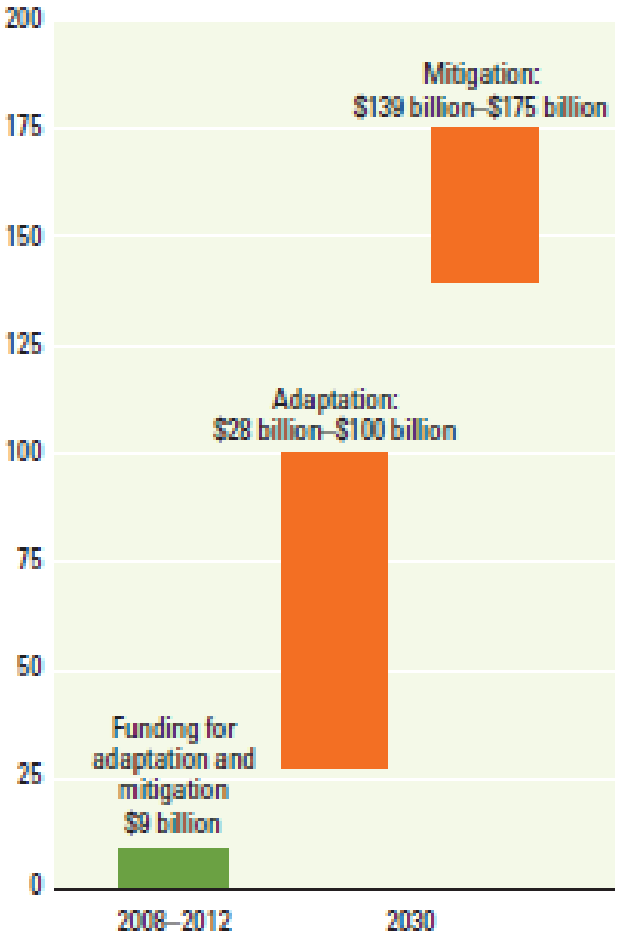
Global CO_2e emissions by sector: Energy, but also agriculture and forestry, are major sources



Source: IPCC 2007a, figure 2.1.

Note: Share of anthropogenic (human-caused) greenhouse gas emissions in 2004 in CO_2e (see figure 1 for the definition of CO_2e). Emissions associated with land use and land-use change, such as agricultural fertilizers, livestock, deforestation, and burning, account for about 30 percent of total greenhouse gas emissions. And uptakes of carbon into forests and other vegetation and soils constitute an important carbon sink, so improved land-use management is essential in efforts to reduce greenhouse gases in the atmosphere.

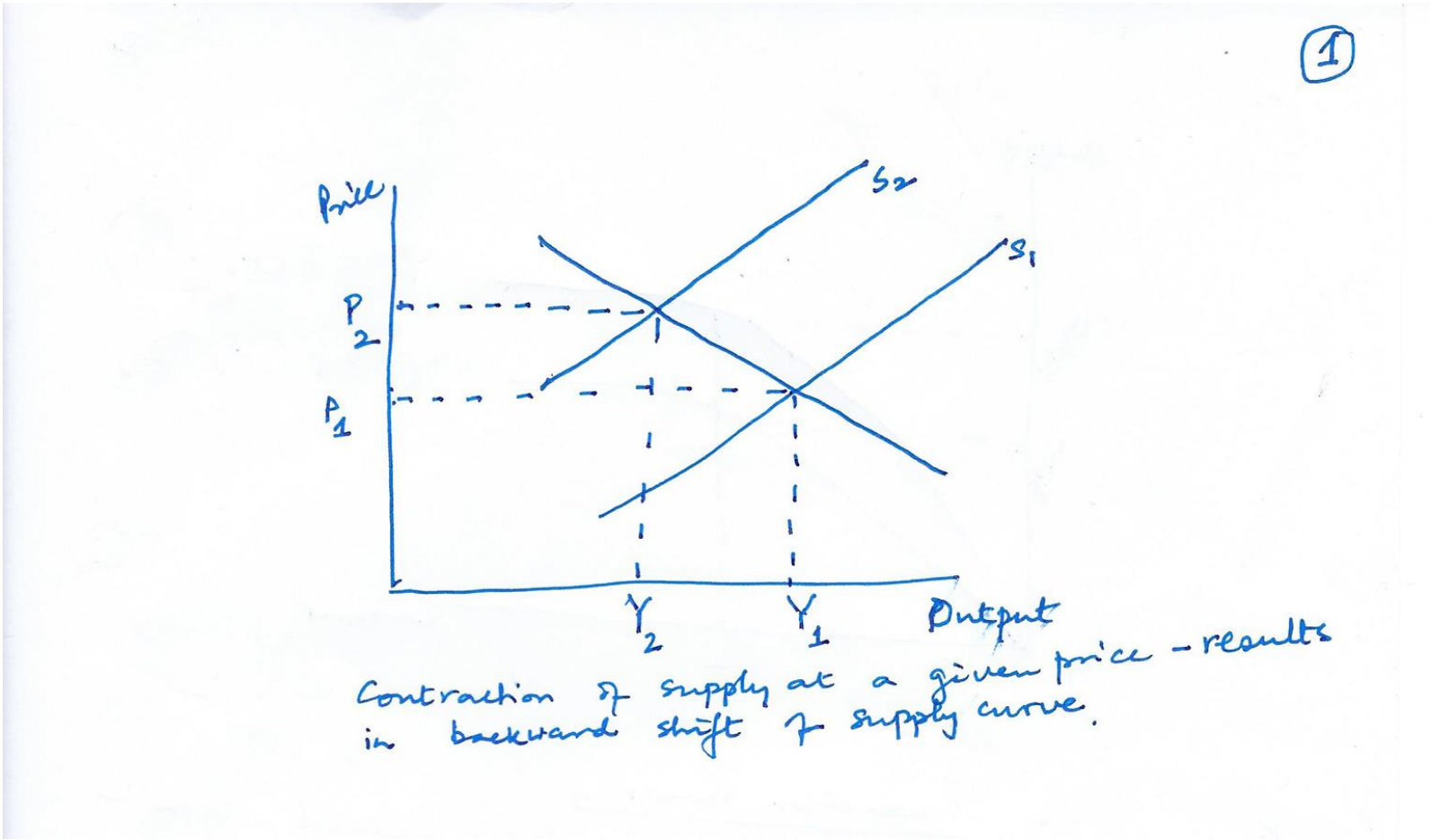
The gap is large: Estimated annual incremental climate costs required for a 2°C trajectory compared with current resources



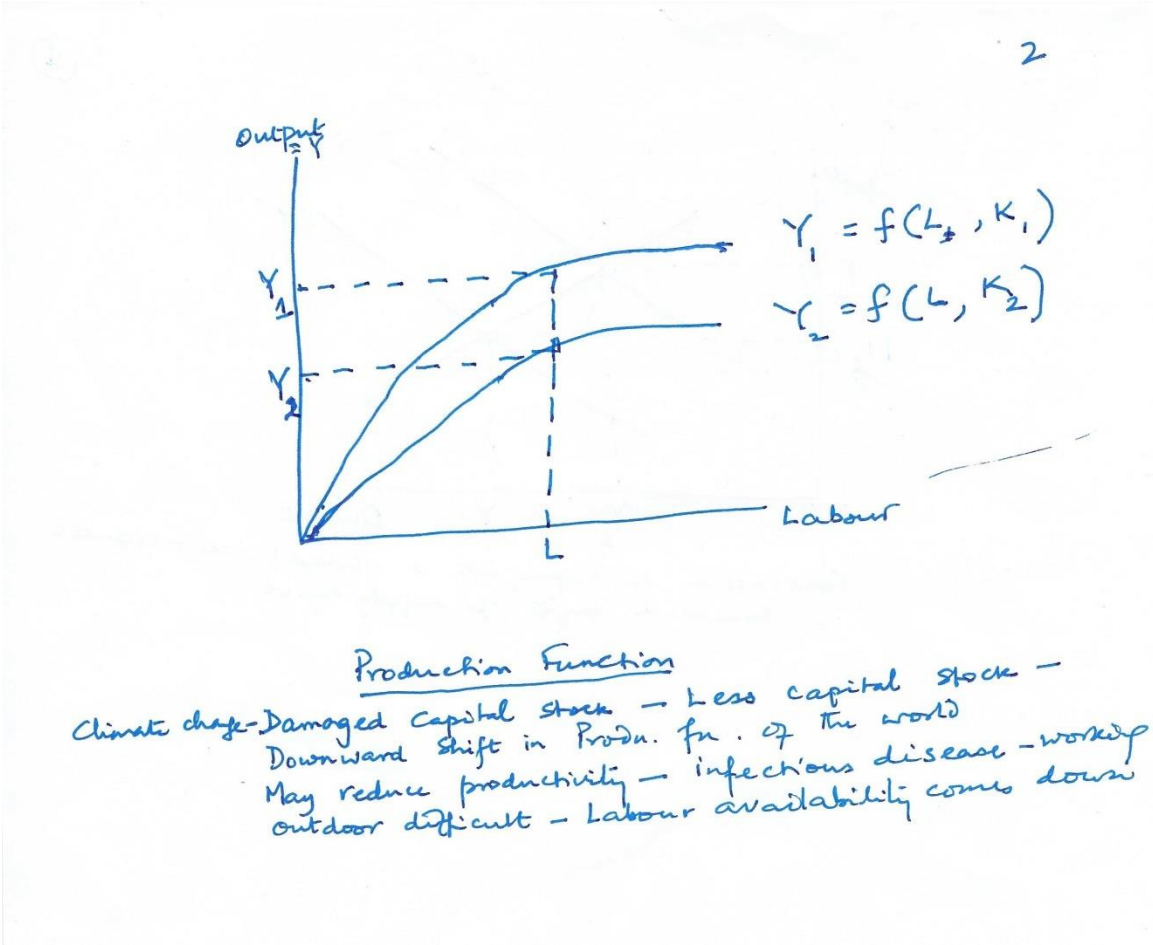
Sources: See table 1 on page 9 and the discussion in chapter 6.

Note: Mitigation and adaptation costs for developing countries only. Bars represent the range of estimates for the incremental costs of the adaptation and mitigation efforts associated with a 2°C trajectory. Mitigation financing needs associated with the incremental costs depicted here are much higher, ranging between $265 billion and $565 billion annually by 2030.

Contraction of Supply



Production Function



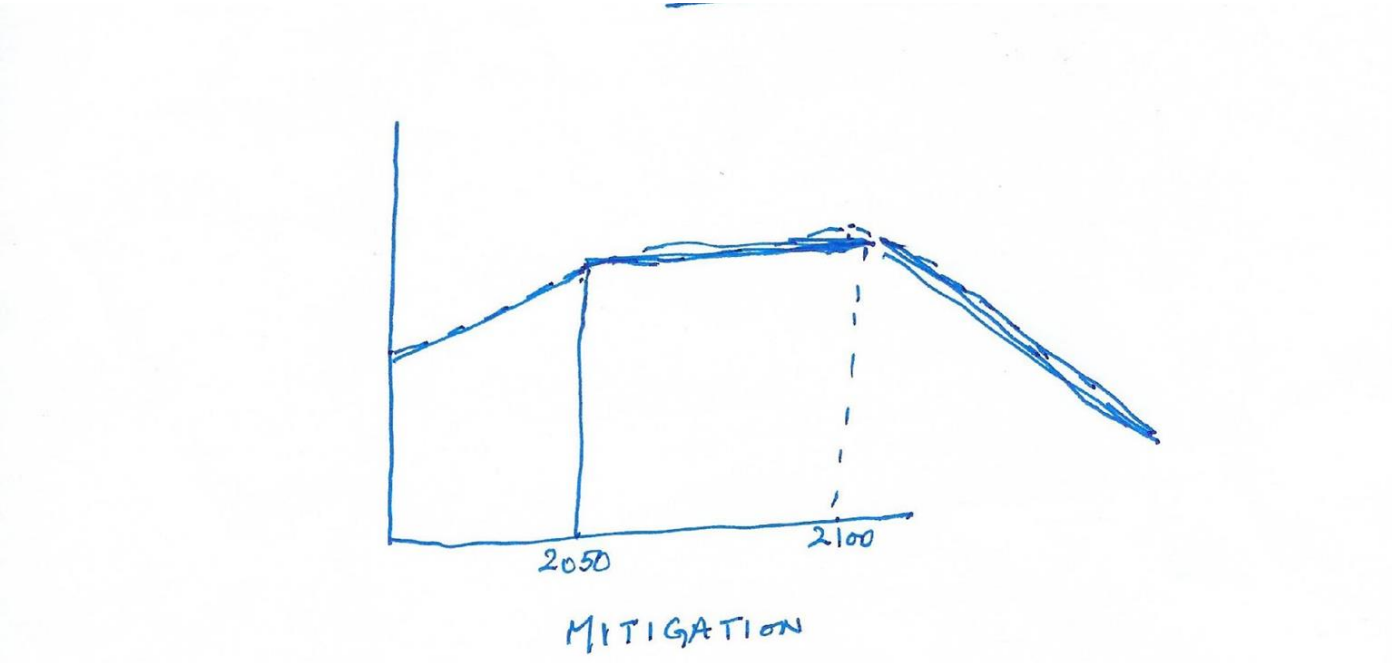
Comparative Damage Function

Warming	DS - Damage fn	W - Damage fn	N - Damage fn
1°	0%	0%	0%
2°	2%	1%	1%
3°	14%	3%	2%

Sources of Emission

Energy Sector	35%
Agriculture, forestry, livestock & other land use.	24%
Industry (oil, chemicals)	21%
Transport	14%
Building Sector	6.4%

Mitigation



Adaptation Without Mitigation