

APPENDICES

APPENDIX A: GLOSSARY

Glossary of Terms and Acronyms

Adaptation: This is the response to the changes that are occurring because of the excessive human-induced GHGs that have been collecting in the atmosphere for the past 100 years. While mitigation strategies are similar for most areas of the United States, the way that a community chooses to adapt to a changing climate is very specific for each region.

Baseline: The baseline serves as a reference point to assess changes in greenhouse gas emission from year to year. According to the California Air Resources Board (CARB), in general, Baseline Actual Emissions as of a particular date shall equal the average rate, in tons per year, at which the unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation. For purposes of creating the baseline emissions, local governments estimate emissions from government operations and community-level.

Business-As-Usual (BAU): A scenario used for the projection of greenhouse gas emissions at a future date based on current technologies and regulatory requirements in absence of other reductions.

Carbon Dioxide (CO₂): This is the reference gas against which other greenhouse gases are measured and therefore has a Global Warming Potential of 1. It is naturally occurring and is also a primary by-product from combustion of fossil fuels and other industrial and agricultural processes.

Carbon Dioxide Equivalent (CO₂e): This is a common unit for normalizing greenhouse gases with different levels of heat trapping potential. For carbon dioxide itself, emissions in tons of CO₂ and tons of CO₂e are the same, whereas for nitrous oxide and methane, stronger greenhouse gases, one ton of emissions is equal to 310 tons and 21 tons of CO₂e respectively.

Carbon Sequestration: Carbon sequestration is the capture and long-term storage of atmospheric carbon dioxide through biological, chemical, or physical processes

Chlorofluorocarbons (CFCs): A family of inert, nontoxic, and easily liquefied chemicals used in refrigeration, air conditioning, packaging, insulation, or as solvents and aerosol propellants. Because CFCs are not destroyed in the lower atmosphere, they drift into the upper atmosphere, where their chlorine components destroy the ozone layer.

The California Environmental Quality Act (CEQA): This was a California statute passed in 1970, shortly after the United States federal government passed the National Environmental Policy Act (NEPA), to institute a statewide policy of environmental protection. CEQA does not directly regulate land uses, but instead requires state and local agencies within California to follow a protocol of analysis and public disclosure of environmental impacts of proposed projects and adopt all feasible measures to mitigate those impacts.

Climate: This is typically defined as the “average weather,” or more rigorously, as the statistical description in terms of the average and variability of weather over a period of time ranging from months to thousands of years. These variables are most often temperature, precipitation, and wind. Climate can also refer to the global climate system.

Climate Action Plan: A description of the measures and actions that an organization will take to reduce greenhouse gas emissions and achieve an emissions reduction target. Most plans include a description of existing and future year emissions; a reduction target; a set of measures, including performance standards that will collectively achieve the target; and a mechanism to monitor the plan.

Climate Change: Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change results from: 1) natural factors, such as changes in the sun’s intensity or slow changes in the Earth’s orbit around the sun; 2) natural processes within the climate system (e.g. changes in ocean circulation); and 3) human activities that change the atmosphere’s composition (e.g. through burning fossil fuels) and the land surface (e.g. deforestation, reforestation, urbanization, desertification, etc.).

Co-Benefit: Multiple, ancillary benefits of a policy, program or intervention. Many climate change mitigation measures designed to reduce greenhouse gas emissions have other benefits such as energy and cost savings.

Corporate Average Fuel Economy (CAFE): The CAFE standards were originally established by Congress for new automobiles, and later for light trucks, in Title V of the Motor Vehicle Information and Cost Savings Act. Under CAFE, automobile manufacturers are required by law to produce vehicles with composite sales-weighted fuel efficiency, which cannot be lower than the CAFE standards in a given year. Standardized tests are used to rate the fuel economy of new vehicles.

Discount Rate: The choice of the discount rate for evaluating the net present value of these investments can be critical in determining whether or not to implement the associated mitigation efforts. By way of example, the Stern Review on the Economics of Climate Change utilizes a social discount rate of 1.4% for evaluating projects associated with climate change.

Energy Efficiency: This relates to a change in behavior in that the same function can be accomplished with less electricity. This usually requires newer equipment (such as televisions), different types of lighting (such as CFL bulbs) and other technology changes.

Energy Conservation: This is a typical practice using what you have more efficiently, such as shutting off the light or only using the dishwasher when it is full.

Emissions: The release of a substance (usually a gas when referring to the subject of climate change) into the atmosphere.

Emissions Factor: A set of coefficients used to convert data from electricity, natural gas, fuel and waste to calculate GHG emissions. These emission factors are the ratio of emissions of a particular pollutant (e.g., carbon dioxide) to the quantity of the fuel used (e.g., kilograms of coal). For example, when burned, 1 ton of coal = 2.071 tons of CO₂.

Forecast Year: Any future year in which predictions are made about emissions levels based on growth multipliers applied to the base year.

Global Warming: Global warming is an average increase in the temperature of the atmosphere near the Earth's surface and in the troposphere, which can contribute to changes in global climate patterns. Global warming can occur from a variety of causes, both natural and human induced. In common usage, "global warming" often refers to the warming that can occur as a result of increased emissions of greenhouse gases.

Global-warming Potential (GWP): This is a relative measure of how much heat a greenhouse gas traps in the atmosphere. It compares the amount of heat trapped by a certain mass of the gas in question to the amount of heat trapped by a similar mass of carbon dioxide. A GWP is calculated over a specific time interval, commonly 20, 100 or 500 years. GWP is expressed as a factor of carbon dioxide (whose GWP is standardized to 1). For example, the 20 year GWP of methane is 72, which means that if the same mass of methane and carbon dioxide were introduced into the atmosphere, that methane will trap 72 times more heat than the carbon dioxide over the next 20 years.

Greenhouse Effect: The build-up of heat in the atmosphere (troposphere) near the Earth's surface due to infrared radiation from the sun being absorbed by water vapor, carbon dioxide, ozone, and several other gases. This heat is then re-radiated back toward the Earth's surface. As atmospheric concentrations of these greenhouse gases rise, the average temperature of the lower atmosphere gradually increases.

Greenhouse Gas: Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include, but are not limited to, water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (NO₂), chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), ozone (O₃), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆).

Greywater: untreated wastewater that has not been contaminated by any toilet discharge or by any infectious, contaminated, or unhealthy bodily wastes, and does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes. Greywater includes but is not limited to wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines, and laundry tubs, but does not include wastewater from kitchen sinks, dishwashers, or toilets.

Heating, Ventilation, and Air Conditioning (HVAC): These are mechanical systems that control the ambient environment (temperature, humidity, air flow and air filtering) of a building.

Hydrofluorocarbons (HFCs): Man-made compounds containing hydrogen, fluorine, and carbon that were developed as an alternative to ozone-depleting substances for industrial, commercial, and consumer products. HFCs do not have the potential to destroy stratospheric ozone, but they are still powerful greenhouse gases.

Intergovernmental Panel on Climate Change (IPCC): The IPCC was established jointly by the United Nations Environment Program and the World Meteorological Organization in 1988. The purpose of the IPCC is to assess information in the scientific and technical literature related to all significant components of the issue of climate change. The IPCC draws upon hundreds of the world's expert scientists as authors and thousands as expert reviewers. Leading experts on climate change and environmental, social, and economic sciences from some 60 nations have helped the IPCC to prepare periodic assessments of the scientific underpinnings for understanding global climate change and its consequences. With its capacity for reporting on climate change, its consequences, and the viability of adaptation and mitigation measures, the IPCC is also looked to as the official advisory body to the world's governments on the state of the science of the climate change issue. For example, the IPCC organized the development of internationally accepted methods for conducting national greenhouse gas emission inventories.

Methane (CH₄): A hydrocarbon that is a greenhouse gas with a global warming potential most recently estimated at 23 times that of carbon dioxide (CO₂). Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills and sewage treatments, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

Measures: Any action taken to reduce GHG emissions.

Mitigation: This is putting in place enforceable plans, policies, and programs to reduce GHG emissions now in order to slow the rate of increase in the atmosphere. Successful mitigation at local, national and international levels will reduce the impacts of a changing climate for future generations. This is the legacy we leave.

Metric Ton (MT): Common international measurement for the quantity of greenhouse gas emissions. A metric ton is equal to 2205 lbs. or 1.1 short tons.

Mixed-Use: In a land-use planning context, a project that has at least three of the following amenities within a 1/4 mile radius: 1) residential development, 2) retail and/or commercial development, 3) park, and 4) open space. Mixed-use developments encourage walking and other non-auto modes of transport from residential to office/commercial locations. The project should minimize the need for external vehicle trips by including services and facilities for day care, banking/ATM, restaurants, vehicle refueling, and shopping.

Natural Gas: This is the typical fuel used in new power generating facilities in California. Underground deposits of gases consist of 50 to 90% methane and small amounts of heavier gaseous hydrocarbon compounds such as propane and butane.

Non-Potable Water: Water that is not suitable for drinking because it has not been treated to drinking water standards.

Perfluorocarbons (PFCs): Potent greenhouse gases that accumulate in the atmosphere and remain there for thousands of years. Aluminum production and semiconductor manufacture are the largest known man-made sources of perfluorocarbons.

Potable Water: Water that meets federal drinking water standards as well as state and local water quality standards so that it is safe for human consumption. Water treatment facilities that produce drinking water require a state permit.

Recycled Water: Treatment of wastewater beyond secondary treatment using tertiary filtration and chlorination. Water treated to this tertiary level is considered to be recycled water, which is suitable for many beneficial uses including irrigation or industrial processes. Recycled water meets treatment and reliability criteria established by Title 22, Chapter 4 of the California Code of Regulations.

Risk: Denotes the result of the interaction of physically defined hazards with the properties of the exposed systems - i.e., their sensitivity or social vulnerability. Risk can also be considered as the combination of an event, its likelihood and its consequences - i.e., risk equals the probability of climate hazard multiplied by a given system's vulnerability.

Resiliency: When referring to natural systems, the amount of change a system can undergo without changing state. When referring to human systems, the term "resiliency" can be considered as a synonym of adaptive capacity. This is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures.

Sector: A term used to describe emission inventory source categories for greenhouse gases based on broad economic sectors.

Target Year: The year by which the emissions reduction target should be achieved.

Transit Oriented Development (TOD): A moderate- to high-density development located within 1/4 mile of a major transit stop, generally with a mix of residential, employment, and shopping opportunities. TOD encourages walking, bicycling, and transit use without excluding the automobile.

Urban Heat Island Effect: the significantly higher temperatures in a metropolitan area, relative to its surrounding rural areas, caused by waste heat generated by energy use and the modification of land by buildings and surface materials that retain heat.

Vehicles Miles Traveled (VMT): This unit measures the aggregate mileage traveled by all vehicles in a specific location. VMT is a key measure of street and highway use. Reducing VMT is often a major objective in efforts to reduce vehicular congestion and achieve air quality goals. The transportation sector is the top GHG emitter in California, contributing roughly 40% of all California emissions. Poor fuel efficiency and high vehicle miles traveled (VMT) are primary contributors to transportation sector GHG emissions. Meeting California's GHG emissions reduction goals requires reductions in both per-mile emissions (often measured in as a vehicle's miles per gallon performance) and vehicle miles traveled. Fuel efficiency has been addressed historically by the federal Corporate Average Fuel Economy (CAFE) standards, and California has passed its own legislation regulating GHG emissions from vehicles. The number of miles traveled has ramifications on insurance premiums, but there has not been and likely will not be any legislative action to curb VMT even though it is growing at a much faster rate than population or the economy.

Vulnerability: The degree to which systems affected by climate change are susceptible to and unable to cope with adverse impacts.

Acronyms

AB - Assembly Bill
APCD – Air Pollution Control District (County of San Diego)
CACP - Clean Air and Climate Protection Software
CAP - Climate Action Plan
CAPP - Climate and Air Pollution Planning Assistant
CARB - California Air Resources Board
CEC - California Energy Commission
CEQA - California Environmental Quality Act
CH₄ - Methane
CO₂ - Carbon dioxide
CMAP – Climate Mitigation and Adaptation Plan (City of San Diego)
CO₂e - Carbon dioxide equivalent
EPA - U.S. Environmental Protection Agency
GHG - Greenhouse gas
HFC - Hydrofluorocarbons
HVAC - Heating, ventilating, and air conditioning
IPCC - Intergovernmental Panel on Climate Change
KWh - Kilowatt-hours
LCFS - Low Carbon Fuel Standard
MMT - Million metric tons
MW - Megawatt
NO₂ - Nitrous oxide
PPM - Parts per million
SANDAG – San Diego Association of Governments
SB - Senate Bill
TOD - Transit oriented development
USGBC - U.S. Green Building Council
VMT - Vehicle miles traveled

APPENDIX B: CITATIONS

REFERENCES:

- Clean Edge 2010. Pernick, R., C. Wilder, and T. Winnie 2010. Clean Tech Job Trends 2010. October.
- Clean Tech San Diego 2013. Annual Reports. <http://www.cleantechsandiego.org/annual-report.html>. Accessed on November 15, 2103.
- Environmental Entrepreneurs (E2) 2013. Clean Energy Works for Us: 2013 Third Quarter Clean Energy/Clean Transportation jobs Report.
- Farrell, J. and D. Morris 2010. Energy Self-Reliant States. New Rules Project. 2nd Edition. May.
- ICLEI (Local Governments for Sustainability) 2012. Sea Level Rise Adaptation Strategy for San Diego Bay. January.
- Intergovernmental Panel on Climate Change (IPCC) 2007. Contribution of Working Group II to the Fourth Assessment Report. M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds. Cambridge University Press, Cambridge, UK.
- Public Health Institute 2013. San Diego Community Health and Climate Pilot Project <http://www.phi.org/news-events/554/public-health-institute-awa>. Access November 15.
- San Diego, City of
2007. Mitigation Monitoring and Reporting Program for City of San Diego General Plan Final Program EIR. Development Services Department. September 28.
2009. City of San Diego 2008 General Plan. Development Services Department. July 9.
2012. Long-Range Water Resources Plan. Public Utilities Department. April.
- San Diego County Water Authority (SDCWA) 2011. 2010 Urban Water Management Plan. Water Resources Department. June.
- San Diego Foundation 2007. San Diego's Changing Climate: A Regional Wake-Up Call.
- San Diego Workforce Partnership (SDWP) 2011. Green Job Outlook for San Diego. June 7.
- Stanton, E.A., T. Comings, K. Takahashi, P. Knight, T. Vitolo, E.D. Hausman 2013. Economic Impacts of the NRDC Carbon Standard. Background Report prepared for the Natural Resources Defense Council.
- Synapse Energy Economics, Inc. June 20.
- Unified Port of San Diego 2013. Climate Plan. <http://www.portofsandiego.org/climate-mitigation-and-adaptation-plan.html>. Accessed November 15, 2013.
- United States
Bureau of Labor Statistics (BLS) 2013. Measuring Green Jobs. www.bls.gov/green. Accessed on November 15, 2013.
Department of Agriculture, Forest Service (USDA) 2010. Sustaining America's Urban Trees and Forests. General Technical Report NRS-62. June.

Environmental Protection Agency (EPA) 2013. Climate Impacts on Human Health. www.epa.gov/climatechange/impacts-adaptation/health.html. Accessed on November 15, 2013.

Middle Class Taskforce 2009. Green Jobs: A Pathway to a Strong Middle Class. Staff Report.

Williams, J., D. Takvorian, S. Holmquist, and N. Adess. 1997. Children at Risk? A Community-Based Health Survey of Residents in San Diego's Most Polluted Neighborhoods. Environmental Health Coalition.

PHOTO CREDITS:

Creative Commons Photos: Chapter 1: City of San Diego Bike Rack, Chapter 2: Contractors installing PV, Chapter 3: Green bike lane along Harbor Blvd., Chapter 5: Mission Valley flooded, Witch Creek Fire, and the leaf

City of San Diego Photos: Chapter 4: Hillcrest neighborhood and City of San Diego Wastewater Treatment Plant

Donna Chralowicz Photos: Chapter 5: La Jolla Beach

Dennis Larson Photos: Chapter 1: Balboa Park – Museum of Man

APPENDIX C: METHODOLOGY, FORECASTS, AND MEASURES

METHODOLOGY FORTHCOMING FROM EPIC