3.2 Climate Change and Greenhouse Gas

This section provides a discussion on the proposed project's effect on greenhouse gas (GHG) emissions and the associated effects of climate change. The California Environmental Quality Act (CEQA) requires that lead agencies consider the reasonably foreseeable adverse environmental effects of projects they are considering for approval. This section is based on an analysis of project-related GHG analysis prepared by Air Permitting Specialists (2014) as well as the *Mt. Diablo Resource Recovery Park Greenhouse Gas Impact Assessment for the City of Pittsburg Generated Waste Stream for the Baseline Scenario, 2020 and 2035*, prepared by Edgar & Associates (2012) included in **Appendix E**. The reader is referred to Section 3.1, Air Quality, for a discussion of project impacts associated with air quality.

3.2.1 EXISTING SETTING

EXISTING CLIMATE SETTING

To fully understand global climate change, it is important to recognize the naturally occurring "greenhouse effect" and to define the GHGs that contribute to this phenomenon. Various gases in the earth's atmosphere, classified as atmospheric GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space and a portion of the radiation is absorbed by the earth's surface. The earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. Greenhouse gases, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect. Among the prominent GHGs contributing to the greenhouse effect are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Following are descriptions of the primary GHGs attributed to global climate change, including a description of their physical properties, primary sources, and contribution to the greenhouse effect.

Carbon Dioxide

Carbon dioxide (CO_2) is a colorless, odorless gas. CO_2 is emitted in a number of ways, both naturally and through human activities. The largest source of CO_2 emissions globally is the combustion of fossil fuels such as coal, oil, and gas in power plants, automobiles, industrial facilities, and other sources. A number of specialized industrial production processes and product uses such as mineral production, metal production, and the use of petroleum-based products can also lead to CO_2 emissions. The atmospheric lifetime of CO_2 is variable because it is so readily exchanged in the atmosphere (USEPA 2008a).

Methane

Methane (CH_4) is a colorless, odorless gas that is not flammable under most circumstances. CH_4 is the major component of natural gas, about 87 percent by volume. It is also formed and released to the atmosphere by biological processes occurring in anaerobic environments. Methane is emitted from a variety of both human-related and natural sources. Human-related sources include fossil fuel production, animal husbandry (enteric fermentation in livestock and manure management), rice cultivation, biomass burning, and waste management. These activities release significant quantities of methane to the atmosphere. Natural sources of methane include wetlands, gas hydrates, permafrost, termites, oceans, freshwater bodies, non-wetland soils, and other sources such as wildfires. Methane's atmospheric lifetime is about 12 years (USEPA 2006a).

Nitrous Oxide

Nitrous oxide (N_2O) is a clear, colorless gas with a slightly sweet odor. N_2O is produced by both natural and human-related sources. Primary human-related sources of N_2O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuels, adipic acid production, and nitric acid production. N_2O is also produced naturally from a wide variety of biological sources in soil and water, particularly microbial action in wet tropical forests. The atmospheric lifetime of N_2O is approximately 120 years (USEPA 2006b).

Hydrofluorocarbons

Hydrofluorocarbons (HFCs) are man-made chemicals, many of which have been developed as alternatives to ozone-depleting substances for industrial, commercial, and consumer products. The only significant emissions of HFCs before 1990 were of the chemical HFC-23, which is generated as a byproduct of the production of HCFC-22 (or Freon 22, used in air conditioning applications). The atmospheric lifetime for HFCs varies from just over a year for HFC-152a to 260 years for HFC-23. Most of the commercially used HFCs have atmospheric lifetimes of less than 15 years (e.g., HFC-134a, which is used in automobile air conditioning and refrigeration, has an atmospheric life of 14 years) (USEPA 2006c).

Perfluorocarbons

Perfluorocarbons (PFCs) are colorless, highly dense, chemically inert, and nontoxic. There are seven PFC gases: perfluoromethane (CF_4), perfluoroethane (C_2F_6), perfluoropropane (C_3F_8), perfluorobutane (C_4F_{10}), perfluorocyclobutane (C_4F_8), perfluoropentane (C_5F_{12}), and perfluorohexane (C_6F1_4). Natural geological emissions have been responsible for the PFCs that have accumulated in the atmosphere in the past; however, the largest current source is aluminum production, which releases CF_4 and C_2F_6 as byproducts. The estimated atmospheric lifetimes for CF_4 and C_2F_6 are 50,000 and 10,000 years, respectively (EFCTC 2003; USEPA 2006a).

Nitrogen Trifluoride

Nitrogen trifluoride (NF_3) is an inorganic, colorless, odorless, toxic, nonflammable gas used as an etchant in microelectronics. Nitrogen trifluoride is predominantly employed in the cleaning of the plasma-enhanced chemical vapor deposition chambers in the production of liquid crystal displays and silicon-based thin film solar cells. It has a global warming potential of 17,200 carbon dioxide equivalents (CO_2e). While NF_3 may have a lower global warming potential than other chemical etchants, it is still a potent GHG. In 2009, NF_3 was listed by California as a high global warming potential GHG to be listed and regulated under Assembly Bill (AB) 32 (Section 38505 Health and Safety Code).

Sulfur Hexafluoride

Sulfur hexafluoride (SF_6) is an inorganic compound that is colorless, odorless, nontoxic, and generally nonflammable. SF_6 is primarily used as an electrical insulator in high voltage equipment. The electric power industry uses roughly 80 percent of all SF_6 produced worldwide. Significant leaks occur from aging equipment and during equipment maintenance and servicing. SF_6 has an atmospheric life of 3,200 years (USEPA 2008b).

Each GHG differs in its ability to absorb heat in the atmosphere based on the lifetime, or persistence, of the gas molecule in the atmosphere. Gases with high global warming potential, such as HFCs, PFCs, and SF_6, are the most heat-absorbent. Methane traps over 21 times more heat per molecule than CO_2, and N_2O absorbs 310 times more heat per molecule than CO_2. Often, estimates of GHG emissions are presented in carbon dioxide equivalents (CO_2e), which weight each gas by its global warming potential. Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted. **Table 3.2-1** shows the global warming potentials for different GHGs for a 100-year time horizon.

TABLE 3.2-1
GLOBAL WARMING POTENTIAL FOR GREENHOUSE GASES

Greenhouse Gas	Global Warming Potential
Carbon Dioxide (CO_2)	1
Methane (CH_4)	21
Nitrous Oxide (N_2O)	310
Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs)	6,500
Sulfur Hexafluoride (SF_6)	23,900

Source: BAAQMD 2006

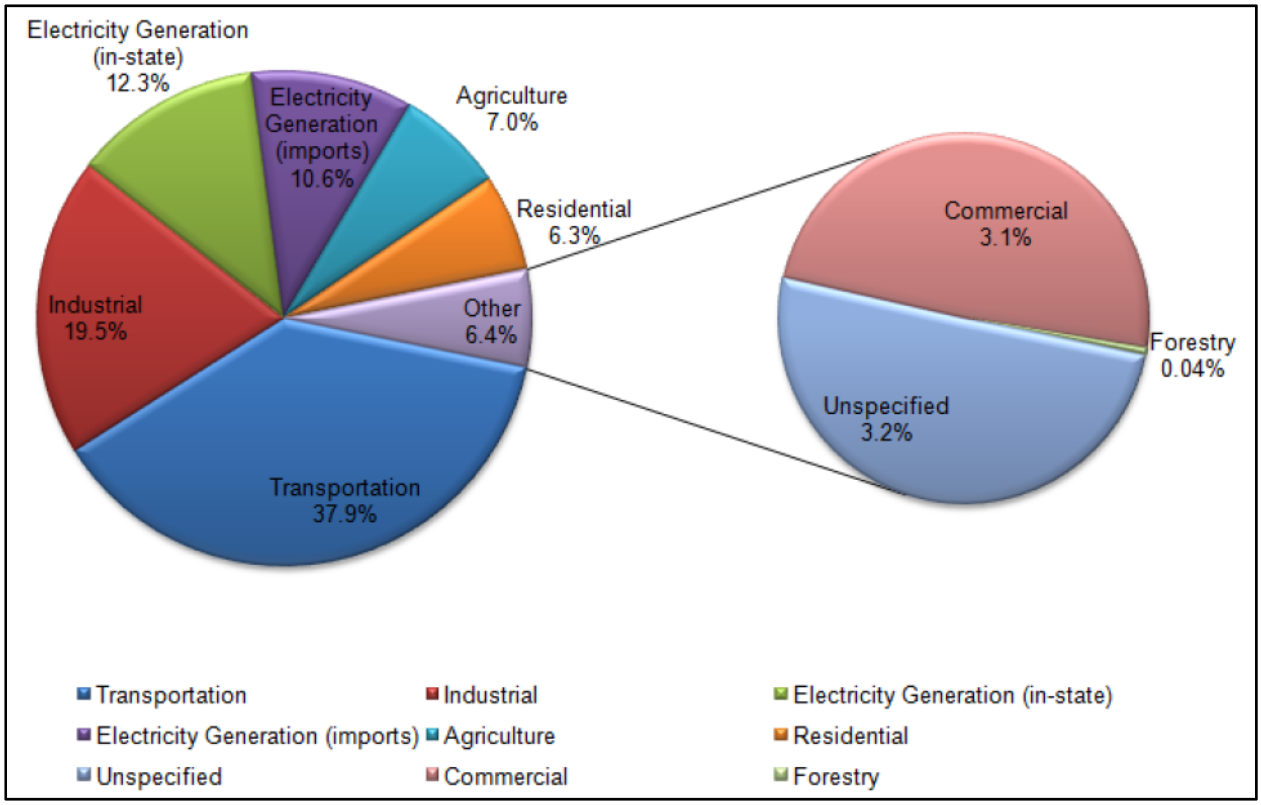
As the name implies, global climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern, respectively. California is a significant emitter of CO_2 in the world and produced 477 million gross metric tons of carbon dioxide equivalents in 2008. Consumption of fossil fuels in the transportation sector was the single largest source of California's GHG emissions in 2008, accounting for 36.4 percent of total GHG emissions in the state. This category was followed by the electric power sector (including both in-state and out-of-state sources) (24.3 percent) and the industrial sector (19.3 percent) (CARB 2010).

SOURCES OF GHG EMISSIONS

On a global scale, GHG emissions are predominantly associated with activities related to energy production; changes in land use, such as deforestation and land clearing; industrial sources; agricultural activities; transportation; waste and wastewater generation; and commercial and residential land uses. Worldwide, energy production including the burning of coal, natural gas, and oil for electricity and heat is the largest single source of global GHG emissions (USEPA 2014).

In 2009, GHG emissions in California totaled 457 million metric tons of carbon dioxide equivalents ($MMTCO_2e$). In California, the transportation sector is the largest contributor, accounting for approximately 38 percent of total statewide GHG emissions. Emissions associated with electricity generation are the second largest contributor, totaling roughly 23 percent, with almost equal contributions from in-state and imported electricity. On a global scale, California had the fourteenth largest carbon dioxide emissions and the nineteenth largest per capita emissions (CARB 2011). The State of California GHG emissions inventory is depicted in **Figure 3.2-1**.

FIGURE 3.2-1
STATE OF CALIFORNIA GREENHOUSE GASES EMISSIONS INVENTORY



Source: CARB 2011
Note: Totals may not sum due to rounding. Unspecified includes evaporative losses and emissions from use of ozone-depleting substances (ODS) substitutes, which could not be attributed to an individual sector.

EFFECTS OF GLOBAL CLIMATE CHANGE

The effects of climate change in California are the subject of substantial scientific research conducted by experts at various state universities and research institutions. With more than a decade of concerted research, scientists have established that the early signs of climate change are already evident in the state—as shown, for example, in increased average temperatures, changes in temperature extremes, reduced snowpack in the Sierra Nevada, sea level rise, and ecological shifts.

Many of these changes are accelerating—locally, across the country, and around the globe. As a result of emissions already released into the atmosphere, California will face intensifying climate changes in coming decades. Generally, research indicates that California should expect overall hotter and drier conditions with a continued reduction in winter snow (with concurrent increases in winter rains), as well as increased average temperatures and accelerating sea-level rise. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing (CNRA 2009).

Climate change temperature projections identified in the 2009 California Climate Adaptation Strategy suggest the following (CNRA 2009):

- Average temperature increase is expected to be more pronounced in the summer than in the winter season.

- Inland areas are likely to experience more pronounced warming than coastal regions.

- Heat waves are expected to increase in frequency, with individual heat waves also showing a tendency toward becoming longer, and extending over a larger area, thus more likely to encompass multiple population centers in California at the same time.

- As GHGs remain in the atmosphere for decades, temperature changes over the next 30 to 40 years are already largely determined by past emissions. By 2050, temperatures are projected to increase by an additional 1.8 to 5.4°F (an increase one to three times as large as that which occurred over the entire twentieth century).

- By 2100, the models project temperature increases between 3.6 and 9°F.

Precipitation levels are expected to change over the twenty-first century, though models differ in determining where and how much rain and snowfall patterns will change (CNRA 2009). Eleven out of twelve precipitation models run by the Scripps Institution of Oceanography suggest a small to significant (12–35 percent) overall decrease in precipitation levels by mid-century (CNRA 2009). In addition, higher temperatures increase evaporation and make for a generally drier climate, as higher temperatures hasten snowmelt. Moreover, the 2009 California Climate Adaptation Strategy concludes that more precipitation will fall as rain rather than as snow, with important implications for water management in the state. California communities have largely depended on runoff from yearly established snowpack to provide water supplies during the warmer, drier months of late spring, summer, and early autumn. With rainfall and meltwater running off earlier in the year, the State will face increasing challenges of storing water for the dry season while protecting Californians downstream from floodwaters during the wet season.

Changes in average temperature and precipitation are significant. Yet gradual changes in average conditions are not all for which California must prepare. In the next few decades, it is likely that the state will face a growing number of climate change–related extreme events such as heat waves, wildfires, droughts, and floods. Because communities, infrastructure, and other assets are at risk, such events can cause significant damages and are already responsible for a large fraction of near-term climate-related impacts every year (CNRA 2009).

Most climate projections developed to date, including those used in this section of the DEIR, produce gradual if sometimes substantial changes for a given climate variable. In the past, rapid climate changes have been observed and scientists are increasingly concerned about additional abrupt changes that could push natural systems past thresholds beyond which they could not recover. Such events have been recorded in paleoclimatological records but current global climate models cannot predict when they may occur again (CNRA 2009). Such abrupt changes have been shown to occur over very short periods of time (a few years to decades) and thus represent the most challenging situations to which society and ecosystems would need to adapt (CNRA 2009). Short of being able to predict such abrupt changes, scientists are focusing their attention on aspects of the climate and earth system called “tipping elements” that can rapidly bring about abrupt changes.

Tipping elements refer to thresholds where increases in temperature cause a chain reaction of mutually reinforcing physical processes in the earth’s dynamic cycles. The most dangerous of these include the following (CNRA 2009):

- A reduction in Arctic sea ice, which allows the (darker) polar oceans to absorb more sunlight, thereby increasing regional warming, accelerating sea ice melting even further, and enhancing Arctic warming over neighboring (currently frozen) land areas.

- The release of methane (a potent GHG), which is currently trapped in frozen ground (permafrost) in the Arctic tundra, will increase with regional warming and melting of the ground, leading to further and more rapid warming and resulting in increased permafrost melting.

- Continued warming in the Amazon could cause significant rainfall loss and large-scale dying of forest vegetation, which will further release CO_2.

- The accelerated melting of Greenland and the West Antarctic Ice Sheet observed in recent times, together with regional warming over land and in the oceans, involves mechanisms that can reinforce the loss of ice and increase the rate of global sea-level rise.

According to the 2009 California Climate Adaptation Strategy, the impacts of global warming in California have the potential to include, but are not limited to, the areas discussed below.

Public Health

Climate change is expected to lead to an increase in ambient (i.e., outdoor) average air temperature, with greater increases expected in summer than in winter months. Larger temperature increases are anticipated in inland communities as compared to the California coast. The potential health impacts from sustained and significantly higher than average temperatures include heat stroke, heat exhaustion, and the exacerbation of existing medical conditions such as cardiovascular and respiratory diseases, diabetes, nervous system disorders, emphysema, and epilepsy. Numerous studies have indicated that there are generally more deaths during periods of sustained higher temperatures, and these are due to cardiovascular causes and other chronic diseases. The elderly, infants, and socially isolated people with pre-existing illnesses who lack access to air conditioning or cooling spaces are among the most at risk during heat waves (CNRA 2009).

Floods and Droughts

The impacts of flooding can be significant. Results may include population displacement, severe psychosocial stress with resulting mental health impacts, exacerbation of pre-existing chronic conditions, and infectious disease (CNRA 2009). Additionally, impacts can range from a loss of personal belongings, and the emotional ramifications from such loss, to direct injury and/or mortality.

Drinking water contamination outbreaks in the United States are associated with extreme precipitation events. Floodwaters may contain household, industrial, and agricultural chemicals as well as sewage and animal waste. Flooding and heavy rainfall events can wash pathogens and chemicals from contaminated soils, farms, and streets into drinking water supplies. Flooding may also overload storm and wastewater systems, or flood septic systems, also leading to possible contamination of drinking water systems. Runoff from rainfall is also associated with coastal contamination that can lead to contamination of shellfish and contribute to foodborne illness (CNRA 2009).

Drought impacts develop more slowly over time. Risks to public health that Californians may face from drought include impacts on water supply and quality, food production (both agricultural and commercial fisheries), and risks of waterborne illness. As surface water supplies are reduced as a result of drought conditions, the amount of groundwater pumping is expected to increase to make up for the water shortfall. The increase in groundwater pumping has the potential to lower the water tables and cause land subsidence (CNRA 2009). Communities that utilize well water will be adversely affected by drops in water tables or through changes in water quality. Groundwater supplies have higher levels of total dissolved solids compared to surface waters. This introduces a set of effects for consumers, such as repair and maintenance costs associated with mineral deposits in water heaters and other plumbing fixtures, and on public water system infrastructure designed for lower salinity surface water supplies. Drought may also lead to increased concentration of contaminants in drinking water supplies (CNRA 2009).

Water Resources

The state's water supply system already faces challenges to provide water for California's growing population. Climate change is expected to exacerbate these challenges through increased temperatures and possible changes in precipitation patterns. The trends of the last century—especially increases in hydrologic variability—will likely intensify in this century. We can expect to experience more frequent and larger floods and deeper droughts (CNRA 2009). The rising sea level will threaten the Delta water conveyance system and increase salinity in near-coastal groundwater supplies (CNRA 2009). Planning for and adapting to these simultaneous changes, particularly their impacts on public safety and long-term water supply reliability, will be among the most significant challenges facing water and flood managers this century.

Agriculture

Increased GHG emissions could cause widespread changes to the agriculture industry, reducing the quantity and quality of agricultural products statewide. First, California farmers could possibly lose as much as 25 percent of the water supply they need. California's farmers could face greater water demand for crops and a less reliable water supply as temperatures rise. Crop growth and development could change, as could the intensity and frequency of pest and disease outbreaks. Rising temperatures could aggravate ozone pollution, which makes plants more susceptible to disease and pests and interferes with plant growth.

Plant growth tends to be slow at low temperatures, increasing with rising temperatures up to a threshold. However, faster growth can result in less than optimal development for many crops, so rising temperatures could worsen the quantity and quality of yield for a number of California's agricultural products. Products likely to be most affected include wine grapes, fruits, and nuts. In addition, continued global climate change could shift the ranges of existing invasive plants and weeds and alter competition patterns with native plants. Range expansion could occur in many species while range contractions may be less likely in rapidly evolving species with significant populations already established. Should range contractions occur, new or different weed species could fill the emerging gaps. Continued global climate change could alter the abundance and types of many pests, lengthen pests' breeding season, and increase pathogen growth rates.

Forests and Landscapes

Global climate change has the potential to intensify the current threat to forests and landscapes by increasing the risk of wildfire and altering the distribution and character of natural vegetation. If temperatures rise into the medium warming range, wildfire occurrence statewide could

increase from 57 percent to 169 percent by 2085 (CNRA 2009). However, since wildfire risk is determined by a combination of factors, including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the state.

Fishing

Studies found that as a result of changes in ocean conditions, the distribution and abundance of major fish stocks will change substantially. Impacts to fisheries related to El Niño/Southern Oscillation illustrate how climate directly affects marine fisheries on a short-term basis. Higher sea surface temperatures in 1997–1998 during El Niño had a great impact on market squid, California's largest fishery by volume. The California Regional Assessment Group reports that landings fell to less than 1,000 metric tons in that season, down from 110,000 tons in the 1996–1997 season. Other unusual events, such as poor salmon returns, a series of plankton blooms, and seabird die-offs, also occurred.

Coastline

With climate changes, recreational facilities and developed coastlines will be more vulnerable to hurricanes, storm surges, and flooding. Increasing population growth in coastal areas is a reason for further concern, since these areas could be more vulnerable to climate change impacts. Impacts of expected sea level rise and increased storm surges are numerous. Beachfront homes and harbors as well as wetlands may flood. Sewage systems may be overwhelmed by storm runoff and high tides.

Sea Level Rise

The San Francisco Bay Conservation and Development Commission (BCDC) issued a report on sea level rise in April 2009, which states that sea level along the West Coast rises approximately 7.9 inches per century, or approximately 0.08 inches per year. However, the rate of sea level rise is increasing. During the period of 1993–2003, the rate was approximately 0.12 inches per year, which could demonstrate the result of human-induced warming on sea level. The BCDC uses the same sea level rise estimates that are used by California Climate Action Team–funded assessments. These estimates anticipate the sea level in the Bay Area will rise 16 inches by mid-century and 55 inches by the end of the century. This data was used to make maps of projected flood areas but does not take into consideration existing shoreline protections; if an area is below sea level, it is shown as vulnerable on their maps despite any existing projections. By mid-century, approximately 180,000 acres of the Bay Area could be flooded, and 213,000 acres could be flooded by the end of the century. A large amount of development along the shoreline is vulnerable to flooding and erosion. Because of Bay Area topography, 100 percent of the development located in 100-year floodplain areas will likely flood by the year 2050. Also, different parts of the Bay Area are more vulnerable to flooding and erosion than others. Several large commercial and industrial developments in the vulnerable areas may be inundated by 2100, including 93 percent of both the Oakland and the San Francisco airports. Half of the vulnerable development is residential, and approximately 270,000 people would be at risk of flooding and problems with erosion. Approximately 4,300 acres of waterfront parks are expected to flood by 2100 (BCDC 2009).

The Bay Area currently has approximately 300 miles of public access to and along the San Francisco Bay shoreline. Of that access, 87 percent is located in areas vulnerable to flooding and erosion by 2100. It may be very hard to relocate or re-create access opportunities in areas farther inland. Jetties and seawalls may have to be raised and strengthened to protect harbors that are used for shipping, recreation, and tourism.

Pittsburg, which encompasses the proposed project, is located in the eastern Bay Area. Much of the developed Bay Area shoreline will require enhanced shoreline protection, which will be developed regionally to maximize safety and minimize impacts on sensitive Bay resources including public access, visual resources, and soil stability. Structural shoreline protections common to the Bay Area include seawalls, riprap revetments, and levees. These protections are reliable but expensive to build and maintain and often cause significant impacts to resources. Incorporating ecosystem elements with engineering elements would provide balanced and long-term shoreline protection.

3.2.2 REGULATORY FRAMEWORK

FEDERAL

International Regulation and the Kyoto Protocol

The United States participates in the United Nations Framework Convention on Climate Change (UNFCCC). While the United States signed the Kyoto Protocol, which would have required reductions in GHGs, Congress never ratified the protocol. The federal government chose voluntary and incentive-based programs to reduce emissions and has established programs to promote climate technology and science. In 2002, the United States announced a strategy to reduce the greenhouse gas intensity of the American economy by 18 percent over a 10-year period from 2002 to 2012.

As part of the commitments to the UNFCCC, the US Environmental Protection Agency (USEPA) has developed an inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases. This inventory is periodically updated, with the latest update in 2010. The USEPA reports that total US emissions rose by 14 percent from 1990 to 2007, while the US gross domestic product increased by 59 percent over the same period. A 2.9 percent decrease in emissions was noted from 2007 to 2008, which is reported to be attributable to climate conditions, reduced use of petroleum products for transportation, and increased use of natural gas over other fuel sources. The inventory notes that the transportation sector emits about 32 percent of CO_2 emissions, with 53 percent of those emissions coming from personal automobile use. Residential uses, primarily from energy use, accounted for 21 percent of CO_2 emissions (USEPA 2010a).

As a part of the USEPA's responsibility to develop and update an inventory of US greenhouse gas emissions and sinks, the USEPA compared trends of other various US data. Over the period between 1990 and 2008, GHG emissions grew at an average rate of about 0.7 percent per year. Population growth was slightly higher at 1.1 percent, while energy and fossil fuel consumption grew at 0.9 and 0.8 percent, respectively. Gross domestic product and energy generation grew at much higher rates.

Federal Regulation and the Clean Air Act

In the past, the USEPA has not regulated greenhouse gases under the Clean Air Act because it asserted that the act did not authorize the USEPA to issue mandatory regulations to address global climate change and that such regulation would be unwise without an unequivocally established causal link between GHGs and the increase in global surface air temperatures. However, the US Supreme Court held that the USEPA must consider regulation of motor vehicle GHG emissions. In *Massachusetts v. Environmental Protection Agency et al.*, twelve states and cities, including California, together with several environmental organizations, sued to require the USEPA to regulate GHGs as pollutants under the Clean Air Act (127 S. Ct. 1438 [2007]). The court ruled that

GHGs fit within the Clean Air Act's definition of a pollutant and that the USEPA did not have a valid rationale for not regulating GHGs. In response to this ruling, the USEPA made an endangerment finding that GHGs pose a threat to the public health and welfare. This is the first step necessary for the establishment of federal GHG regulations under the Clean Air Act.

In April 2010, the USEPA issued the final rule on new standards for GHG emissions and fuel economy for light-duty vehicles in model years 2017–2025. In November 2010, the USEPA published *PSD and Title V Permitting Guidance for Greenhouse Gases*, which provides the basic information that permit writers and applicants need to address GHG emissions regulated under the Clean Air Act. In that document, the USEPA described the "Tailoring Rule" in the regulation of GHG emissions. With the Tailoring Rule, the USEPA established a phased schedule in the regulation of stationary sources. The first phase of the Tailoring Rule began January 2, 2011, and focuses the GHG permitting programs on the largest sources with the most Clean Air Act permitting experience. Then, in step two beginning June 1, 2011, the rule expanded to cover large sources of GHGs that may not have been previously covered by the Clean Air Act for other pollutants. The rule also describes the USEPA's commitment to future rulemaking that will describe subsequent steps of the Tailoring Rule for GHG permitting (USEPA 2010b).

Mandatory Greenhouse Gas Reporting Rule

In response to the Consolidated Appropriations Act, the USEPA issued the Greenhouse Gas Reporting Rule (74 FR 56260), which requires reporting of GHG emissions and other relevant information from large sources and suppliers in the United States. The USEPA's Greenhouse Gas Reporting Program will assist the USEPA, as well as members of the public and industry, to better understand sources of GHG emissions and to reduce emissions in the future.

STATE

Assembly Bill 1493

Assembly Bill (AB) 1493 (Pavley) of 2002 (Health and Safety Code Sections 42823 and 43018.5) requires the California Air Resources Board (CARB) to develop and adopt the nation's first GHG emission standards for automobiles. These standards are also known as Pavley I. The California Legislature declared in AB 1493 that global warming is a matter of increasing concern for public health and the environment. It cites several risks that California faces from climate change, including a reduction in the state's water supply, an increase in air pollution caused by higher temperatures, harm to agriculture, an increase in wildfires, damage to the coastline, and economic losses caused by higher food, water, energy, and insurance prices. The bill also states that technological solutions to reduce GHG emissions would stimulate California's economy and provide jobs. In 2004, the State of California submitted a request for a waiver from federal clean air regulations, as the State is authorized to do under the Clean Air Act, to allow the State to require reduced tailpipe emissions of CO_2. In late 2007, the USEPA denied California's waiver request and declined to promulgate adequate federal regulations limiting GHG emissions. In early 2008, the State brought suit against the USEPA related to this denial.

In January 2009, President Obama instructed the USEPA to reconsider the Bush Administration's denial of California's and 13 other states' requests to implement global warming pollution standards for cars and trucks. In June 2009, the USEPA granted California's waiver request, enabling the State to enforce its GHG emissions standards for new motor vehicles beginning with the current model year.

Also in 2009, President Obama announced a national policy aimed at both increasing fuel economy and reducing GHG pollution for all new cars and trucks sold in the US. The new standards would cover model years 2012 to 2016 and would raise passenger vehicle fuel economy to a fleet average of 35.5 miles per gallon by 2016. When the national program takes effect, California has committed to allowing automakers who show compliance with the national program to also be deemed in compliance with state requirements. California is committed to further strengthening these standards beginning in 2017 to obtain a 45 percent GHG reduction from the 2020 model year vehicles.

Executive Order S-3-05

Executive Order S-3-05 (State of California) proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total greenhouse gas emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, to the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

The Executive Order directed the secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce greenhouse gas emissions to the target levels. The secretary will also submit biannual reports to the governor and state legislature describing (1) progress made toward reaching the emission targets, (2) impacts of global warming on California's resources, and (3) mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the secretary of CalEPA created a Climate Action Team made up of members from various state agencies and commissions. The Climate Action Team released its first report in March 2006 and continues to release periodic reports on progress. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.

Executive Order S-6-06

Executive Order S-6-06 (State of California), signed on April 25, 2006, established two primary goals related to the use of biofuels within California, including: (1) by 2010, 20 percent of its biofuels need to be produced within California; increasing to 40 percent by 2020 and 75 percent by 2050; and (2) by 2010, 20 percent of the renewable electricity should be generated from biomass resources within the state, maintaining this level through 2020.

Assembly Bill 32, the California Global Warming Solutions Act of 2006

AB 32 (Health and Safety Code Sections 38500, 38501, 28510, 38530, 38550, 38560, 38561–38565, 38570, 38571, 38574, 38580, 38590, 38592–38599) requires that statewide GHG emissions be reduced to 1990 levels by the year 2020. The gases that are regulated by AB 32 include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride, and sulfur hexafluoride. The reduction to 1990 levels will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then CARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that CARB adopt a quantified cap on greenhouse gas emissions representing 1990 emissions levels and disclose how it arrives at the cap, institute a schedule to meet the emissions cap, and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

Climate Change Scoping Plan

In October 2008, CARB published its Climate Change Proposed Scoping Plan, which is the State's plan to achieve GHG reductions in California required by AB 32. The Scoping Plan contains the main strategies California will implement to achieve reduction of 169 million metric tons (MMT) of CO_2e, or approximately 30 percent from the state's projected 2020 emissions level of 596 $MMTCO_2e$ under a business-as-usual scenario (this is a reduction of 42 $MMTCO_2e$, or almost 10 percent, from 2002–2004 average emissions). The Scoping Plan also includes CARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. The largest proposed GHG reduction recommendations are from improving emissions standards for light-duty vehicles (estimated reductions of 31.7 $MMTCO_2e$), implementation of the Low Carbon Fuel Standard (15.0 $MMTCO_2e$) program, energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems (26.3 $MMTCO_2e$), and a renewable portfolio standard for electricity production (21.3 $MMTCO_2e$). The Scoping Plan identifies the local equivalent of AB 32 targets as a 15 percent reduction below baseline GHG emissions level, with baseline interpreted as GHG emissions levels between 2003 and 2008.

A key component of the Scoping Plan is the Renewables Portfolio Standard, which is intended to increase the percentage of renewables in California's electricity mix to 33 percent by year 2020, resulting in a reduction of 21.3 $MMTCO_2e$. Sources of renewable energy include, but are not limited to, biomass, wind, solar, geothermal, hydroelectric, and anaerobic digestion. Increasing the use of renewables will decrease California's reliance on fossil fuels, thus reducing GHG emissions.

The Scoping Plan states that land use planning and urban growth decisions will play important roles in the state's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions. (Meanwhile, CARB is also developing an additional protocol for community emissions.) CARB further acknowledges that decisions on how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emissions sectors. The Scoping Plan states that the ultimate GHG reduction assignment to local government operations is to be determined. With regard to land use planning, the Scoping Plan expects that approximately 5.0 $MMTCO_2e$ will be achieved associated with implementation of Senate Bill 375, which is discussed further below. The Climate Change Proposed Scoping Plan was approved by CARB on December 11, 2008.

CARB approved the First Update of the Scoping Plan on May 22, 2014, which looked past 2020 to set mid-term goals (2030–2035) toward reaching the 2050 goals. CARB's Key Action for the Waste Sector focused on eliminating organics from landfills starting in 2016 and financing the in-state infrastructure development of composting and anaerobic digestion facilities. CARB's Key Action for Short-Lived Climate Pollutants such as methane is to develop a comprehensive strategy by 2015 that will focus on methane generated at landfills from the disposal of organic wastes.

Senate Bill 1368

Senate Bill (SB) 1368 (codified at Public Utilities Code Chapter 3) is the companion bill of AB 32. SB 1368 required the California Public Utilities Commission (CPUC) to establish a greenhouse gas emissions performance standard for baseload generation from investor-owned utilities by February 1, 2007. The bill also required the California Energy Commission (CEC) to establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the greenhouse gas emission rate from a baseload combined-cycle natural-gas-fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the CPUC and the CEC.

Senate Bill 1078 and Governor's Order S-14-08 (California Renewables Portfolio Standards)

Senate Bill 1078 (Public Utilities Code Sections 387, 390.1, 399.25 and Article 16) addresses electricity supply and requires that retail sellers of electricity, including investor-owned utilities and community choice aggregators, provide a minimum 20 percent of their supply from renewable sources by 2017. This Senate Bill will affect statewide GHG emissions associated with electricity generation. In 2008, Governor Schwarzenegger signed Executive Order S-14-08, which set the Renewables Portfolio Standard target to 33 percent by 2020. It directed state government agencies and retail sellers of electricity to take all appropriate actions to implement this target. The proposed project area would receive energy service from the investor-owned Pacific Gas and Electric Company.

Prior to the Executive Order, the CPUC and the CEC were responsible for implementing and overseeing the Renewables Portfolio Standard. The Executive Order shifted that responsibility to CARB, requiring it to adopt regulations by July 31, 2010. CARB is required by current law, AB 32 of 2006, to regulate sources of greenhouse gases to meet a state goal of reducing greenhouse gas emissions to 1990 levels by 2020 and an 80 percent reduction of 1990 levels by 2050. The CEC and the CPUC are expected to serve in advisory roles to help CARB develop the regulations to administer the 33 percent by 2020 requirement. Additionally, the CEC and the CPUC will continue their implementation and administration of the 20 percent requirement. The Executive Order also stipulates that CARB may delegate to the CPUC and the CEC any policy development or program implementation responsibilities that would reduce duplication and improve consistency with other energy programs. CARB is also authorized to increase the target and accelerate and expand the time frame.

The general definition under the State Renewables Portfolio Standard for biomass is any organic material not derived from fossil fuels, including agricultural crops, agricultural wastes and residues, waste pallets, crates, dunnage, manufacturing, and construction wood wastes, landscape and right-of-way tree trimmings, mill residues that result from milling lumber, rangeland maintenance residues, sludge derived from organic matter, and wood and wood waste from timbering operations. Biomass feedstock from state and national forests is allowable under the definition.

Executive Order S-13-08: The Climate Adaptation and Sea Level Rise Planning Directive

On November 14, 2008, Governor Schwarzenegger issued Executive Order S-13-08 in order to reduce and assess California's vulnerability to climate change and sea level rise. The Executive Order initiated four major actions:

- Initiate California's first statewide climate change adaptation strategy that will assess the state's expected climate change impacts, identify where California is most vulnerable, and recommend climate adaptation policies by early 2009.

- Request the National Academy of Sciences establish an expert panel to report on sea level rise impacts in California to inform state planning and development efforts.

- Issue interim guidance to state agencies for how to plan for sea level rise in designated coastal and floodplain areas for new projects.

- Initiate a report on critical existing and planned infrastructure projects vulnerable to sea level rise. The California Natural Resources Agency released this report in 2009 as the California Adaptation Strategy.

Mandatory Reporting of Greenhouse Gas Emissions

Reporting of greenhouse gases by major sources is required by the California Global Warming Solutions Act (AB 32, 2006). Revisions to the existing CARB mandatory GHG reporting regulation were considered at the board hearing on December 16, 2010. The revised regulation was approved by the California Office of Administrative Law and became effective on January 1, 2012. The revised regulation affects industrial facilities, suppliers of transportation fuels, natural gas, natural gas liquids, liquefied petroleum gas, and carbon dioxide, operators of petroleum and natural gas systems, and electricity retail providers and marketers.

LOCAL

Bay Area Air Quality Management District

The Bay Area Air Quality Management District (BAAQMD) CEQA Air Quality Guidelines were developed to assist lead agencies in evaluating air quality impacts for projects and plans in the San Francisco Bay Area Air Basin. The guidelines were updated in 2010 to include guidance on assessing GHG and climate change impacts as required under CEQA Section 15183.5(b) and to establish thresholds of significance for impacts related to GHG emissions. These thresholds can be used to assess plan-level and project-level impacts and allow a lead agency to determine that a project's impact on GHG emissions is less than significant if it is in compliance with a Qualified Greenhouse Gas Reduction Strategy.[1]

City of Pittsburg 2005 Greenhouse Gas Emissions Inventory

In 2007, the Contra Costa County Climate Leaders (4CL) program was formed as a network for the county and its 19 cities to provide support for measuring and reducing GHG emissions. As part of the 4CL program, Pittsburg and 15 other local governments in Contra Costa County joined the Cities for Climate Protection program offered by ICLEI-Local Governments for Sustainability.

Two separate emission inventories were prepared for the City of Pittsburg's GHG emissions inventory—a community inventory and a municipal operations inventory. The community inventory includes GHG emissions resulting from activities that occur within the Pittsburg city limits, such as industrial, transportation, commercial, residential, and waste disposal, in the year 2005 as well as those projected for 2020. The municipal operations inventory includes GHG

[1] See discussion under "Standards of Significance" regarding history of judicial review of the BAAQMD CEQA Guidelines.

emissions from activities that are recorded for City accounts, such as energy use from water treatment and pumping, facility energy use, vehicle fleet gasoline and diesel consumption, employee commute trips, the electrical use of streetlights, and waste disposed, also in the year 2005 and as projected for 2020.

With a quantified GHG emissions inventory, the City of Pittsburg next plans to establish a reduction target and develop a climate action plan, which is under development at the time of this writing. Key climate action strategies will be assessed during the development of the climate action plan, which will suggest what degree of reduction is an appropriate target.

3.2.3 IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

Per Appendix G of the State CEQA Guidelines, the City considers impacts related to climate change significant if implementation of the proposed project would result in any of the following:

1) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

2) Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

As stated in Appendix G, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the above determinations. On June 2, 2010, the BAAQMD's Board of Directors unanimously adopted thresholds of significance to assist local jurisdictions during the review of projects that are subject to CEQA. These thresholds of significance were designed to establish the level at which the BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA. The BAAQMD's justification for the adopted thresholds of significance was incorporated into Appendix D of the BAAQMD's (2010) updated *California Environmental Quality Act Air Quality Guidelines*.

On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds. The court did not determine whether the thresholds were valid on the merits, but found that the adoption of the thresholds was a project under CEQA. The court issued a writ of mandate ordering the BAAQMD to set aside the thresholds and cease dissemination of them until the BAAQMD had complied with CEQA. The BAAQMD appealed the Alameda County Superior Court's decision. The Court of Appeal of the State of California, First Appellate District, reversed the trial court's decision. The Court of Appeal's decision was appealed to the California Supreme Court, which granted limited review, and the matter is currently pending further review.

In view of the trial court's order, which remains in place pending final resolution of the case, the BAAQMD is no longer recommending that the 2010 significance thresholds be used as a generally applicable measure of a project's significant impacts. Lead agencies will therefore need to determine appropriate thresholds of significance based on substantial evidence in the record. The 2010 significance thresholds, which include significance thresholds for GHG emissions, are based on substantial evidence, as identified in Appendix D of the BAAQMD's *California Environmental Quality Act Air Quality Guidelines*. Given that the trial court's judgment does not pertain to the scientific soundness of the 2010 significance thresholds and given that these thresholds are supported by substantial evidence, as provided by the BAAQMD in

Appendix D of the Air Quality Guidelines, these thresholds are used in this DEIR for the evaluation of operational GHG impacts, as noted below (BAAQMD 2010, 2012):

- Operational emissions from stationary sources: 10,000 metric tons (MT) of CO_2e per year
- Operational emissions from non-stationary sources: compliance with a Qualified GHG Reduction Strategy; or 1,100 $MTCO_2e$ per year; or 4.6 $MTCO_2e$ per service population

Operational GHG emissions from non-stationary sources, which include the operation of off-road heavy-duty equipment and on-road vehicle travel to and from the project site, exceeding the above significance threshold of 1,100 $MTCO_2e$ per year would be considered to contribute substantially to a cumulative impact and the impact would be considered significant. In addition, GHG emissions resulting from on-site stationary sources, which include the proposed Biomass Gasification Unit, exceeding the threshold of 10,000 $MTCO_2e$ would be considered to contribute substantially to a cumulative impact. If mitigation can be applied to reduce the emissions such that the proposed project meets its share of emission reductions needed to address the cumulative impact, the project would be considered less than significant. The BAAQMD does not have an adopted threshold of significance for construction-related GHG emissions. However, quantification and disclosure of construction-generated GHG emissions that would occur during construction is recommended. To be conservative, construction-generated GHG emissions were amortized over the estimated life of the project and included with operational emissions for comparison to the significance thresholds. A project life of 25 years was assumed for the proposed project, which is a typically applied assumption for nonresidential land uses.

METHODOLOGY

Greenhouse gas emissions-related impacts were assessed in accordance with methodologies recommended by the BAAQMD and in comparison to the recommended BAAQMD significance thresholds.

Short-term construction-generated GHG emissions associated with the proposed project were calculated using the California Emissions Estimator Model (CalEEMod), version 2013.2.2, based on default parameters contained in the model. Construction equipment requirements and phase schedules were based on project-specific information provided by the project applicant. Modeling assumptions and output files are included in **Appendix E**.

Long-term operational emissions of GHG emissions were derived from the *Analysis of Air Quality Impacts and Greenhouse Gas Emissions, Mount Diablo Resource Recovery Park*, prepared by Air Permitting Specialists (2014). Emissions from on-road motor vehicles and off-road equipment use were quantified for existing and proposed project conditions based, in part, on the operational characteristics previously discussed in Section 3.1, Air Quality. Emission factors were derived from the CalEEMod, OFFROAD, and EMFAC2011 computer programs. The proposed project would facilitate GHG emissions reductions by recycling the waste it manages and furnishing feedstock for composting and biomass energy. Recycling reduces the demand for raw or virgin materials, while remanufacturing with recycled materials generally reduces overall energy use. Recycling also results in increased carbon sequestration by forests since fewer trees need to be harvested for wood and paper products. In addition, well-managed composting ultimately results in increased soil carbon storage, and end use of compost results in reduced demand for water, fertilizer, and other soil inputs. Furthermore, the production of biomass energy reduces the demand for fossil fuels. GHG emission reductions resulting from these project features were derived from the *Mt. Diablo Resource Recovery Park Greenhouse Gas Impact Assessment for the City of Pittsburg Generated Waste Stream for the Baseline Scenario, 2020 and 2035*,

prepared by Edgar & Associates (2012) (see **Appendix E**). This analysis was peer reviewed by PMC prior to the release of this Draft EIR.

PROJECT IMPACTS AND MITIGATION MEASURES

AB 32 Compliance and GHG Emissions

Impact 3.2.1 Implementation of the proposed project would not result in a net increase in greenhouse gas emissions that could potentially conflict with the goals of AB 32 and thus would not result in a significant impact on the environment. The proposed project would result in the avoidance of 154,692 $MTCO_2e$ annually by the year 2020 and 213,697 $MTCO_2e$ annually by the year 2035. The proposed project would result in fewer GHG emissions compared with current conditions and the net greenhouse gas emissions from the proposed project are below the BAAQMD significance thresholds. The proposed project would be considered to have a **less than cumulatively considerable** impact on greenhouse gas emissions.

GHG emissions associated with the operation of the proposed project would include emissions from sources associated with human activity (i.e., anthropogenic), as well as sources associated with natural processes (i.e., biogenic). Anthropogenic emissions would include those associated with the operation of on-road motor vehicles and off-road equipment, whereas biogenic sources would include those associated with the decomposition of wood waste. The release of GHG emissions from anthropogenic sources is believed to increase global temperature by changing the radiative transfer properties of the atmosphere. GHG emissions consist primarily of CO_2 with trace amounts of CH_4 and N_2O. For the combustion of diesel, the primary fuel that will be used with on-site equipment and trucks, methane and nitrous oxide will contribute less than 0.5 percent to the overall greenhouse gases. Collectively, the total emissions of CO_2, CH_4, and N_2O are reported in terms of carbon dioxide equivalents or CO_2e.

Short-Term GHG Emissions

Estimated increases in GHG emissions associated with construction of the proposed project were quantified using the CalEEMod computer program based on default model parameters and construction equipment requirements and schedule durations provided by the project applicant. Based on the modeling conducted, annual emissions of greenhouse gases associated with construction of the proposed project would total approximately 12 to 665 $MTCO_2e$ per year. In total, project construction would generate approximately 707 $MTCO_2e$. When amortized over the assumed 25-year life of the project, annual GHG emissions would total approximately 28.3 $MTCO_2$ per year.

Long-Term GHG Emissions

The consumption and disposal of resources require energy and emit GHG emissions. As waste is sent to the landfill, it decomposes and emits methane gas. By providing additional opportunities to reduce waste generated and recycle or compost waste that cannot be eliminated, waste disposal trends within the community can be reduced. This decreased waste will in turn reduce GHG emissions associated with waste disposal. GHG emissions for existing and proposed project conditions, in comparison to BAAQMD-recommended significance thresholds, are summarized below. Emissions estimates are presented for both on-site stationary sources and non-stationary sources in comparison to applicable significance thresholds, as recommended by the BAAQMD.

On-Site Permitted Stationary Sources

Based on the modeling conducted, direct emissions associated with the operation of the proposed Biomass Gasification Unit would total approximately 7,818 $MTCO_2e$ per year. GHG emissions associated with the operation of the proposed Biomass Gasification Unit would not exceed the BAAQMD's significance threshold of 10,000 $MTCO_2e$ for permitted stationary sources. As a result, operation of the proposed Biomass Gasification Unit, in and of itself, would not contribute to a significant net increase of GHG emissions that would either directly or indirectly have a significant impact on the environment, or conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

Non-Stationary Sources

As noted in the analysis of air quality impacts and greenhouse gas emissions for the Mt. Diablo Resource Recovery Park (see **Appendix E**), the project would result in an increase of 17,629 $MTCO_2e$ emissions from non-stationary sources, including emissions from mobile sources and on-site material handling activities. However, this increase does not factor GHG emission reductions associated with project recycling activities and energy generated by the Biomass Gasification Unit. This analysis is provided below.

Project Greenhouse Gas Emission Reduction

Currently, recycling activities at the Mt. Diablo Resource Recovery Park result in a net reduction of statewide and global GHG emissions. The proposed project consists of an expansion of current recycling efforts, resulting in more recycled materials as well as a Biomass Gasification Unit that would generate 1 megawatt of electrical power. Both of these project components would reduce the amount of GHG emissions when compared with existing conditions as demonstrated below.

Biomass Gasification Unit

The project proposes to construct a Biomass Gasification Unit that would generate 1 megawatt of electrical power using 10,400 tons of waste wood per year (Edgar & Associates 2012). The parasitic energy requirements are 25 percent of the generated electricity, so 750 kilowatts (kW) would be available to offset utility-provided electricity, although downtime for maintenance is assumed to be 5 percent (Edgar & Associates 2012). The GHG emissions reduction benefits of generating on-site biogenic energy are estimated using the California Climate Action Registry emissions factor for utility-provided electricity in California. The balance of wood waste would be shipped to off-site biomass energy facilities, and the GHG impacts for those facilities are arrived at using CARB emission factors (Edgar & Associates 2012).

Utility-provided electric power in California has a carbon intensity of 309 kilograms CO_2e per megawatt-hour provided (Edgar & Associates 2012) and includes only anthropogenic power sources. Using this emission factor and considering that the power generated from the Biomass Gasification Unit is biogenic and would provide 750 kW of power to the grid, it would displace 1,929 $MTCO_2e$ of indirect anthropogenic electricity emissions per year (see **Table 3.2-2**) (Edgar & Associates 2012).

Avoided Landfill Emissions

The total emissions avoided by recycling are the avoided landfill methane emissions plus the emissions avoided by the use of recycled materials. According to Edgar & Associates (2012),

current recycling operations at the Mt. Diablo Resource and Recovery Park result in a reduction of 14,627 $MTCO_2e$ on an annual basis. Implementation of the proposed project would result in an even greater reduction of 154,692 $MTCO_2e$ on an annual basis by the year 2020 and 213,697 $MTCO_2e$ by the year 2035 (see **Table 3.2-2**) (Edgar & Associates 2012).

TABLE 3.2-2
SUMMARY OF GHG EMISSION REDUCTIONS

Scenario	GHG Emissions ($MTCO_2e$/year)
Current Facility Operations	
Existing GHG Reductions from End Use of Recycled Materials	-12,925
Existing GHG Reductions Resulting from Recycling as Opposed to Landfill Disposal	-1,702
Total Emissions	**-14,627**
Proposed Facility Operations – Year 2020	
2020 GHG Reductions from End Use of Recycled Materials	-141,903
2020 GHG Reductions Resulting from Recycling as Opposed to Landfill Disposal	-12,789
Total Emissions[1]	**-154,692**
Proposed Facility Operations – Year 2035	
2035 GHG Reductions from End Use of Recycled Materials	-195,133
2035 GHG Reductions Resulting from Recycling as Opposed to Landfill Disposal	-18,564
Total Emissions[1]	-213,697

Source: Edgar & Associates 2012

Note: [1] GHG emissions reductions include avoided emissions from the Biomass Gasification Unit. Note that this includes both on- and off-site biomass energy generation. For on-site biomass energy, only 449 $MTCO_2e$ per year is a result of City of Pittsburg waste.

Taking into account these avoided emissions, the proposed project would result in an overall net decrease in emissions from non-stationary sources of GHG emissions as depicted in **Table 3.2-2**. This table also depicts emissions associated with the beneficial landfill use of fines, landfilled waste, and recycling recovery emissions.[2] As shown, the proposed project would result in a substantial increase in avoided emissions due to an increase of material recycled.

It is also important to note that the proposed project would result in increased waste processing rates, which would require increased on-site retention of organic waste materials. The decomposition of organic waste materials may be a potential source of on-site GHG emissions, particularly when stored in exterior areas under anaerobic conditions. However, an Odor Impact Minimization Plan has been prepared for the proposed project, which includes various changes to existing on-site operations. These proposed changes in operations would limit the outdoor storage of co-collected waste materials to 48 hours in outdoor areas. In addition, no commercial food waste would be stored in outdoor areas. These operational changes would minimize the potential for anaerobic conditions and the on-site generation of GHG emissions associated with

[2] Fines are recovered from the construction and demolition facility and used beneficially at the landfill as alternative daily cover or as wet weather pad. In addition to providing materials for recycling, composting, and biomass energy feedstock, the Mt. Diablo Resource Recovery Park disposes of material that enters the transfer station and residuals from their recovery operations.

the decomposition of waste. As a result, the potential GHG emissions associated with the on-site decomposition of collected waste materials would be considered to result in a minimal contribution to overall GHG emissions. While short-term storage of the organic waste materials associated with project operations would generate some GHGs due to decomposition, these emissions would be less than if these materials were diverted to a composting facility or disposed in a landfill instead of being processed at the project.

Conclusion

With the inclusion of amortized construction-generated GHG emissions, implementation of the proposed project would result in increased emissions from on-site stationary sources and non-stationary sources totaling approximately 25,450 $MTCO_2e$ per year. However, these increases in GHG emissions would be more than offset by avoided emissions that would result with project implementation, including reductions in energy production emissions and avoided landfill emissions. As noted above, the proposed project would result in the avoidance of 154,692 $MTCO_2e$ annually by the year 2020 and 213,697 $MTCO_2e$ annually by the year 2035. The proposed project would therefore not result in a net increase in GHG emissions that would exceed the BAAQMD significance threshold of 1,100 $MTCO_2e$ annually. The proposed project would result in fewer GHG emissions compared with current conditions and is therefore a benefit to the environment. Therefore, the proposed project would not result in a cumulatively considerable contribution of greenhouse gas emissions.

Mitigation Measures

None required.

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