City of Piedmont
COUNCIL AGENDA REPORT

DATE: January 17, 2017

TO: Mayor and Council

FROM: Paul Benoit, City Administrator

SUBJECT: Consideration of the Establishment of a Climate Action Plan Task Force and Receipt of a Report on the 2015 Greenhouse Gas Emissions Inventory

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RECOMMENDATIONS:

1. Receive the informational update on the 2015 greenhouse gas emissions inventory.

2. Approve the attached resolution establishing a temporary Climate Action Plan Task Force, including an assignment of tasks to be completed, an estimated timeline, and setting the number of members.

BACKGROUND:

On May 19, 2008, Council established the Environmental Task Force (ETF) to work on the establishment of goals to reduce solid waste sent to landfill and community-wide greenhouse gas emissions. On January 4, 2010 Council adopted 31 actions recommended by the ETF for achieving the City's established goals. Periodic status reports have been provided to Council since 2010, most recently in July 2016. As has been reported, the majority of the achievable actions under the ETF recommendations have been achieved or partially achieved.

On March 15, 2010 Council adopted the Piedmont Climate Action Plan (CAP), which includes the goal of reducing greenhouse gas (GHG) emissions 15% below 2005 levels by 2020. On January 4, 2016 Council approved joining the Compact of Mayors, a global coalition of mayors and city officials with the mission to reduce local greenhouse gas emissions, enhance resilience to climate change, and track their progress publicly. The three-year commitment to the Compact of Mayors is broken down into four phases, including committing to the Compact, annual GHG inventories, assessing potential climate hazards and planning for adaptation, and the creation of an updated CAP and emissions reduction target.

This report provides a 2015 GHG inventory (Exhibit A, page 9), including estimates for both community and municipal emissions. Compiling regular GHG inventories allows Piedmont to track progress towards meeting its CAP goals and also fulfills Compact of Mayors reporting requirements. Previous inventories were completed in 2005, 2010, and 2014. This report also includes information on a proposed Climate Action Plan Advisory Task Force, a citizen advisory committee to be charged with aiding staff in the development of an updated CAP and emissions

reduction target for the year 2030, as well as a resolution for the Task Force's establishment (Exhibit B, page 19). The development of a new CAP is crucial given the timeline for the current plan and target (through the year 2020) and the Compact of Mayors requirement to have an updated Plan in place by 2019.

PREVIOUS GREENHOUSE GAS EMISSIONS INVENTORIES:

- **2005:** With funds provided by StopWaste.org, Piedmont completed a 2005 Greenhouse Gas Emissions inventory in 2006. The 2005 inventory is used as the City's baseline, against which later inventories are compared in order to measure the City's progress towards meeting its greenhouse gas emissions reduction goal. As data and methodologies pertaining to greenhouse gas emissions were revised and improved in subsequent years, the 2005 inventory was updated when the CAP was adopted in 2010 and again as part of the 2010 inventory. The inventory indicates that in 2005 greenhouse gas emissions in Piedmont totaled approximately 48,300 metric tons of carbon dioxide equivalents (CO2e).

- **2010:** With funds provided by PG&E's Green Community Program, the Alameda County Waste Management Authority (StopWaste) assisted its member local governments in the completion of municipal and community greenhouse gas emissions inventories for the calendar year 2010. Piedmont completed its 2010 GHG Emissions inventory at the close of 2013. As noted in the inventory, which is available on the City's website, Piedmont's GHG emissions in 2010 were 44,800 metric tons CO2e, a 7% reduction from 2005 levels. However, 2010 was a "wet" year in comparison to 2005. The greater rainfall provided PG&E with greater capacity for hydroelectric generation, which reduced PG&E's electricity GHG emissions factor for the year. This is the key factor accounting for a significant portion of Piedmont's 7% emissions reduction shown in that "snapshot." The transportation and residential sectors are responsible for the vast majority of Piedmont's GHG emissions, respectively accounting for 41% and 52% of the community's 2010 emissions. The three other CO2e-producing sectors in Piedmont – non-residential energy, water, and waste – contributed 7% of the community's 2010 emissions. This is a decrease from 9% of 2005's emissions, largely due to 698 fewer tons of waste generated in 2010.

- **2014:** Through the efforts of the City's 2016 CivicSpark Fellow, Piedmont finalized a 2014 GHG inventory for both community and municipal emissions in mid-2016. In 2014, Piedmont produced approximately 39,456 metric tons of CO2e, a reduction of 18% below 2005 levels. More than 85% of the GHG reductions between 2010 and 2014 can be attributed to reduced residential gas usage which corresponds closely with a decreased need for heating due to warmer weather. The City's municipal activities in 2014 resulted in approximately 1,076 metric tons of CO2e. This was a 24% increase over the previous inventory of 866 metric tons CO2e in 2010. This increase was driven by the addition of Aquatics Center and Center for the Arts to the city's municipal portfolio. In 2014, Piedmont tentatively reached the adopted goal of 15% reductions in 2005 GHG levels by 2020. It should be noted that the CAP goal is for an annual reduction, therefore in order to achieve the goal, Piedmont must maintain a 15% or greater reduction each year through 2020.

2015 GREENHOUSE GAS INVENTORY:

Piedmont completed the 2015 GHG Emissions inventory (Exhibit A, page 9) in the winter of 2016, which was again made possible through the City's participation in the CivicSpark program. In 2015, Piedmont produced approximately 38,852 metric tons of CO2e, a reduction of 19% below 2005 levels. This indicates that for the second year in a row Piedmont has reached its 2020 GHG reduction target. Both total municipal and community emissions decreased from 2014 to 2015. The reduction in emissions from the 2005 baseline is mostly the result of diminished natural gas usage, as observed in 2014.

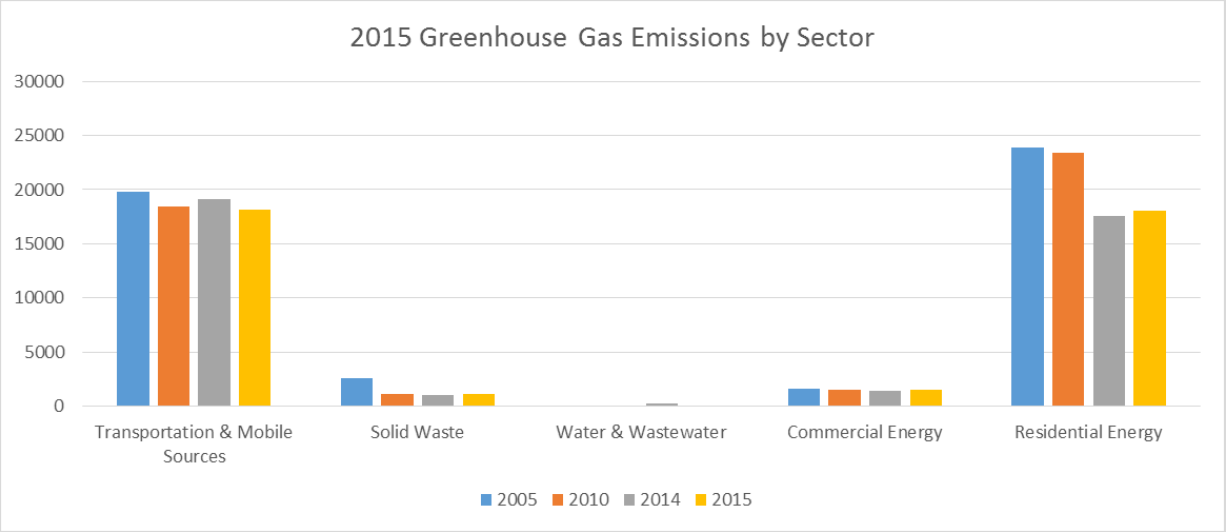

Figure 1.Yearly Community GHG emissions by Sector

Community Update

In 2016, City staff utilized the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories and ICLEI's U.S. Community Protocol to calculate Piedmont's 2015 community emissions. The sectors that contribute most to Piedmont's greenhouse gas emissions are Transportation & Mobile Sources (47%) and Residential Energy (46%). Commercial Energy is a distant third, making up only 4% of total emissions. Figure 1, below, breaks down emissions by sector and year. While there are reductions in all sectors since 2005, the most substantial change comes from the residential energy sector.

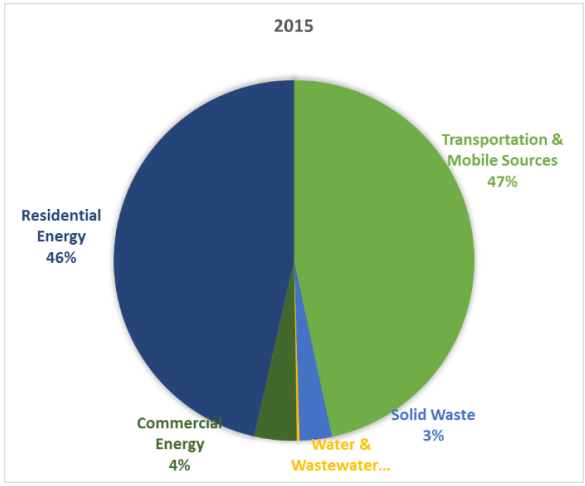

Figure 2. Community Emissions by Sector 2015

Emissions associated with residential electricity decreased from 5,463.8 to 5,314 metric tons of CO2e between 2014 and 2015. Changes in PG&E's energy portfolio, such as an increase in

renewable energy, accounts for a substantial portion of the reductions in Piedmont's electricity emissions. In addition, residential electricity use declined 15% since 2005. Many things could contribute to this including residential behavior, energy efficient appliances, energy efficiency programs, and solar photovoltaic (PV) installations.

The majority of emissions associated with residential energy come from natural gas consumed for heating. Residential heating alone makes up 32% of the total community GHG emissions. While electricity use appears to be declining, natural gas use often fluctuates based on weather; 26% less natural gas was used in 2015 than in 2010. In both 2014 and 2015, unusually low natural gas use was responsible for the City meeting its 2020 goal ahead of schedule. However, between 2014 and 2015, Piedmont's natural gas usage increased by 5%. This was the primary factor in Piedmont meeting its 2020 reduction target and can be seen in Figure 3 below.

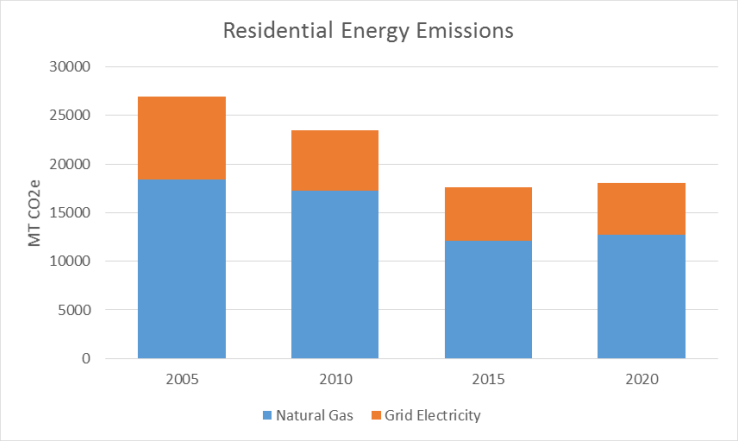

Figure 3. Residential Emissions over time

Emissions generated by the transportation sector come from vehicle miles traveled (VMT) and vehicle fuel efficiency, neither of which the City has much ability to control. While there were minor reductions from gasoline passenger vehicles in 2015, this was due to improvements in vehicle fuel efficiency rather than fewer miles driven. Modeled vehicle miles traveled for Piedmont are higher in 2015 than 2014. However, transportation emissions from Piedmont may be marginally lower than estimates provided by regional models. Piedmont residents are increasingly buying electric vehicles (EV). Based on the California Clean Vehicle Rebate Project, there have been 286 rebates redeemed for EVs in Piedmont between June 2011 and December 2016, equivalent to approximately 7.5% of Piedmont's households. The actual number of EVs in Piedmont is likely greater considering owners may choose not to redeem their rebates, were not eligible for rebates, or purchased their EVs outside the date range analyzed.

Commercial energy use, water consumption, and solid waste are minor contributors to Piedmont's greenhouse gas portfolio. Combined, these sources account for only 7% of total emissions. Commercial electricity use in 2015 was slightly below the 2005-2015 emissions average and commercial natural gas use data is currently unavailable. Piedmont consumed almost 20% less water in 2015 than in 2014. In total, the Piedmont community used 370 million gallons of water in 2015. Emissions associated with water use come from the transport, delivery, and treatment of wastewater and contribute 91 metric tons of CO2e. Solid waste emissions come from the breakdown of organic material in landfills. In 2015, Piedmont produced 2,319.6 tons of solid waste. Over the past seven years, Piedmont has consistently diverted a majority of its waste from the landfill to recycling and composting.

Municipal Update

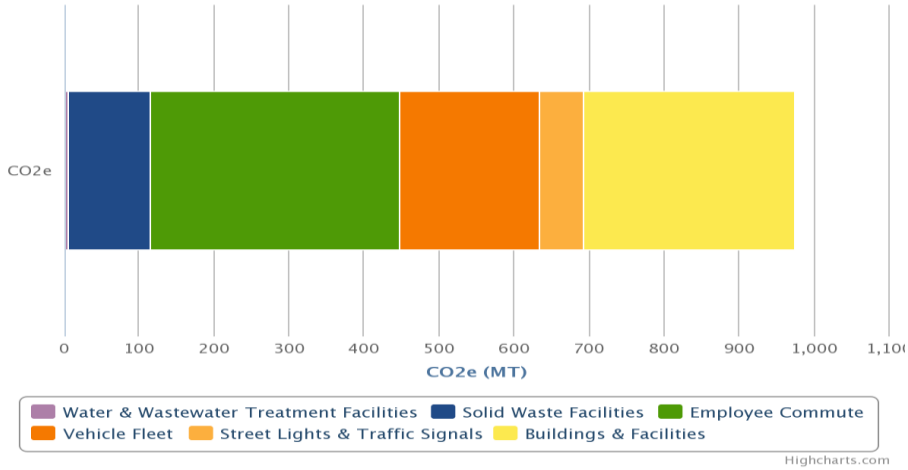

Figure 4. Municipal Emissions by Sector 2015

Municipal activities in 2015 resulted in approximately 976 metric tons of CO2e, contributing 2% of total community emissions. From 2014 to 2015 there was a 10% reduction in municipal emissions. This can likely be attributed to LED streetlight conversions, upgraded furnaces in municipal buildings, and reductions in emissions from the City's vehicle fleet. While both 2014 and 2015 have higher total emissions than 2005 and 2010, this is due to the addition of new buildings to the municipal portfolio rather than changes in city activities.

Transportation-based emissions come from the City's vehicle fleet and employee commute. The City of Piedmont's vehicle fleet produces 187 metric tons of CO2e. Within the municipal fleet, the Police Department accounted for 40% of the GHG emissions; the Public Works Department and Fire Department produced 28% and 21% respectively. Employee commute emissions contribute 332 metric tons of CO2e, making up 34% of total municipal GHGs.

Building and Streetlight Emissions (metric Tons CO2e) Over Time

	2005	2010	2014	2015
City Hall/Fire	66.05	61.32	52.2	53.65
Community Hall	22.5	19.99	16.35	15.37
Corporation Yard	11.91	13.76	12.85	11.65
Educational	7.03	4.01	7.06	4.59
Recreation	41.79	34.56	12.36	12.47
Streetlights	73.87	69.03	68.07	59.2
Water	5.73	3.25	4.18	3.65
Police/Vets	34.65	30.94	17.18	16.19
Center for the Arts	-	-	4.82	4.64
Aquatics Center	-	-	146.32	153.72
Grand Total	*263.53*	*236.86*	*341.39*	**335.13**

Figure 5. Building Emissions

Municipal building energy use has increased since 2005 due to the additions of the Aquatics Center and the Center for the Arts to the City's building portfolio. A comparison of municipal building emissions over time can be found in Figure 4. Excluding the new additions, there were reductions in all other buildings' energy use over the past ten years.

CLIMATE ACTION PLAN TASK FORCE:

Piedmont's current CAP is centered around policies that can help the City meet its 2020 emissions reduction target. As seen in the 2014 and 2015 inventories, Piedmont has tentatively achieved its current target of 15% below 2005 levels by 2020. As 2020 nears and new technologies and knowledge advance best practices in sustainability planning, Piedmont's CAP can be improved. Additionally, a new Plan and emissions reduction target are required within the next two years in order to comply with the Compact of Mayors.

With the help of Piedmont's CivicSpark Fellow, city Staff will draft an updated CAP, including an emissions reduction target, measures to reduce GHG emissions, and background information. However, public participation and input from Piedmont's residents are key to a successful CAP. Throughout the four GHG inventories compiled for the City, residential emissions are consistently a significant portion of total emissions. Therefore, staff recommends the formation of a Climate Action Plan Task Force ("Task Force") to advise on the development of a new CAP and GHG reduction target that will lay the groundwork for sustainability action within Piedmont through the year 2030. The Climate Action Plan Task Force shall be comprised of five voting members. Four members shall be residents appointed by the City Council. One member shall be a Piedmont High School student appointed by the Board of Education.

The Task Force will be advisory to staff and the City Council. The Task Force will review the draft CAP update, provide staff with comments and advice on how it might be improved before it is considered by Council, and will collaborate with staff to propose a target for 2030 emissions reductions. Consideration will be given to the feasibility and interest for suggested GHG emissions reductions measures. The public meetings held by the Task Force will provide an opportunity to engage the public in this decision-making process and for staff to better understand the behavior, priorities, and goals for citizens to reduce their residential energy consumption. Ultimately, the staff and the Task Force will present an updated Climate Action Plan and emissions reduction target to the City Council for adoption. Below is a proposed schedule for the formation and deliverables of the Task Force. More detailed information about the structure, timing, and composition of the Task Force can be found in the Resolution attached as Exhibit B on page 19.

Proposed Schedule

January/February 2017:

- Council approves the establishment of the Climate Action Plan Task Force; and
- Recruitment begins.

March 2017:

- Council and Board of Education appoint Task Force members;
- Task Force conducts introductory meeting on Tuesday, March 28, 2017 at 7:00 p.m. (tentative) where staff reviews the Task Force's timeline, responsibilities, and expectations.

April through September 2017:

- Task Force meets as necessary to provide advice and feedback on draft Climate Action Plan measures and GHG reduction target developed by staff. Suggested timeline as follows:
    - April: Discuss recommendations on 2030 GHG reduction target
    - May: Review proposed Building and Energy measures for emissions reductions
    - June: Review proposed Transportation and Land Use measures
    - July: Review proposed Water and Wastewater measures
    - August: Develop strategies for implementation of CAP measures to reduce emissions
    - September: Provide feedback on draft 2030 CAP prepared by staff

Fall/Winter 2017:

- Staff presents updated Climate Action Plan and GHG reduction target to Council for adoption.

CONCLUSION:

Compared to 2005 base year emissions, Piedmont demonstrated GHG emissions reductions of 7% in 2010, 18% in 2014, and 19% in 2015. In 2014 and 2015, these reductions were sufficient to meet the City's goal of 15% below 2005 levels by 2020. This achievement is encouraging, and great work has been made by residents and the municipality to reduce emissions, such as LED streetlights conversions, purchase of electric vehicles, and installation of residential solar. However, factors outside of the City's control are major contributors to community-wide reductions. Most recently, the bulk of emissions reductions in 2014 and 2015 were the result of warmer weather decreasing demand for residential heating and, consequently, natural gas usage.

Overall, there appears to be no significant change in Piedmont's GHG emissions from 2014 to 2015. Minor reductions in emissions are the result of changing methodology and availability of data. Potential future municipal projects including upgrades to the aquatic center, continued LED streetlights conversions, and rooftop solar may considerably lower municipal emissions. Without City and resident action, it's possible that emissions will continue to plateau or even increase in the coming years. In fact, if a colder winters require heating at 2005 or 2010 levels, it is likely that the City will fall short of meeting its 2020 goal. With an updated Climate Action Plan and GHG reduction target on the horizon, Piedmont should continue its successful decline in emissions while developing new strategies and policies to not only meet the current 2020 goal, but to begin making strides toward future targeted reductions. The establishment of a Climate Action Plan Task Force to work in collaboration with staff will better inform the policies and targets within a new CAP, enhancing Piedmont's ability to meet its goals.

ATTACHMENTS:

Exhibit A	Pages 9-18	City of Piedmont 2015 Greenhouse Gas Emissions inventory
Exhibit B	Pages 19-20	Resolution for the Establishment of a Climate Action Plan Task Force

By: Emily Alvarez, Assistant Planner
Olivia Ashmoore, CivicSpark Fellow

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City of Piedmont: 2015 Greenhouse Gas Emissions Inventory Update

Executive Summary

In 2010, the City of Piedmont set a goal of reducing greenhouse gas (GHG) emissions 15% below 2005 levels by 2020. A greenhouse gas inventory was conducted in 2005 in order to establish a baseline emissions level. Inventories were completed for the years 2010, 2014, and 2015 in order to determine progress towards meeting the 2020 goal. In 2014 and 2015, the City of Piedmont met its 15% reduction target, however in both years this was principally the result of extensive reductions in natural gas use in response to warmer weather.

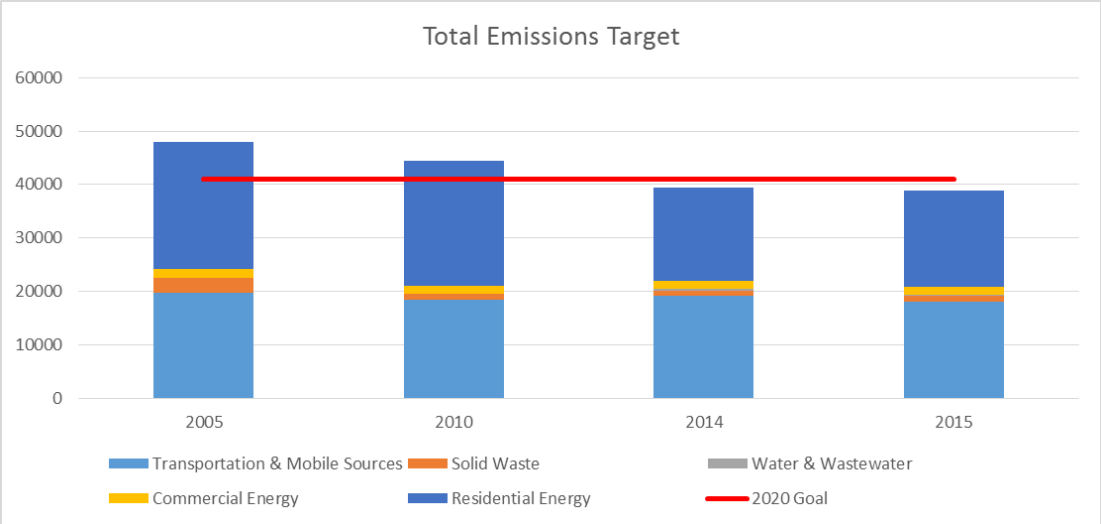

Figure 1. GHG Emissions by Sector

Climate Action Plan

On March 15, 2010 the City of Piedmont adopted a Climate Action Plan (CAP) that defined a GHG emissions reduction target of decreasing annual emissions 15% below 2005 levels by 2020. The CAP also outlined a series of strategies to achieve this goal, including addressing building energy efficiency, renewable energy, vehicle miles traveled, water conservation, recycling, and green infrastructure. City staff has been working to implement these strategies.

Tracking Progress

To measure progress toward achieving the adopted emissions reduction goal, the City of Piedmont performed a baseline and three subsequent GHG inventories. In addition, on January 4, 2016 the City has become a signatory to the Compact of Mayors to better identify the impact of individual measures and more accurately track progress toward achieving future Climate Action Plan goals. This three-year commitment, beginning in 2016, requires more frequent GHG inventory updates, a new GHG reduction target, and an updated CAP that includes new adaptation strategies for addressing climate hazards. Yearly GHG inventories satisfy the requirements of the Compact of Mayors and provides a record of Piedmont's emissions.

Previous Inventories

A base year GHG inventory for the City of Piedmont was completed by independent consultant AECOM for the year 2005. The results of this inventory indicated activities in the community of Piedmont resulted in approximately 48,300 metric tons of CO2e. As a primarily residential community, Piedmont's largest source of emissions was residential energy consumption. The second largest contributor was the transportation sector. Together, non-residential energy use, water consumption, and waste sent to landfills contributed less than 10% to the overall inventory.

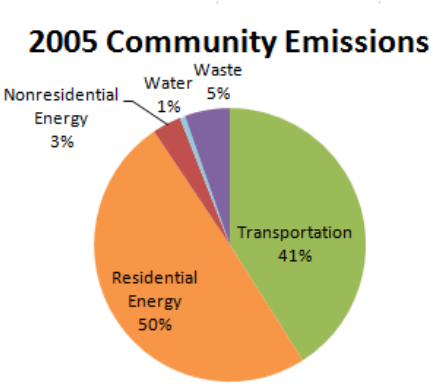

Figure 2. Community Emissions 2005

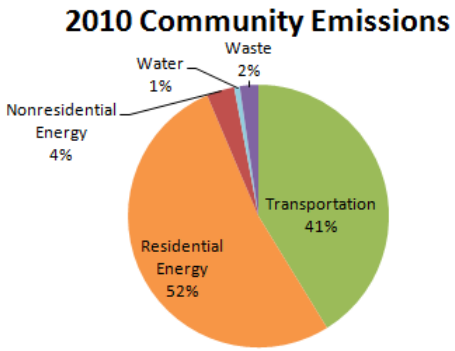

Figure 3. Community Emissions 2010

In 2010, a new methodology for inventorying government and community GHG emissions, the U.S. Community Protocols for Accounting and Local Government Operating Protocols, was adopted as the standard across the San Francisco Bay Area. The new methodology was applied to the 2005 inventory and baseline emissions were updated to 48,300 metric tons of CO2e. Using this calculation method in 2010, community activities resulted in approximately 44,750 metric tons of CO2e. This was an approximate 7% reduction in GHG emissions from 2005 levels and was largely attributed to an increase in hydropower in Pacific Gas and Electric Company's (PG&E) energy mix during this "wet" year. As seen in Figure 3, the distribution by sector was similar to 2005 with a slight decrease in waste produced by the community as a result of the 2008 roll-out of new recycling and organic waste programs.

In 2014, Piedmont produced 39,456 metric tons of CO2e, a reduction of 18% below 2005 levels. 2014's substantial drop in emissions was attributed to a reduction in natural gas usage throughout the City. Approximately 85% of the reductions were the result of decreased natural gas usage between 2010 and 2014. It is encouraging that Piedmont has tentatively reached its 2020 goal in 2014. However, emissions reductions dependent on weather fluctuations do not portend long term success.

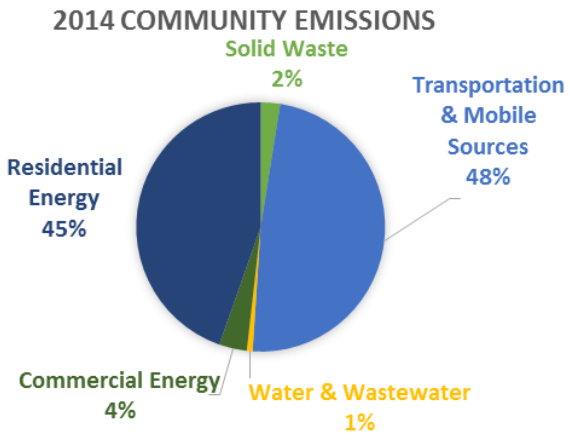

Figure 4. Community Emissions 2014

2015 Greenhouse Gas Inventory

38,852 Metric Tons of CO2e
1.5% decrease from 2014

Piedmont completed the 2015 GHG Emissions inventory (Exhibit X, page #) in the winter of 2016, once again made possible through the City's participation in the CivicSpark program. In 2015, Piedmont produced approximately 38,852 metric tons of CO2e, a reduction of 19% below 2005 levels. This indicates that for the second year in a row Piedmont has reached its 2020 GHG reduction target. Both total municipal and community emissions decreased from 2014 to 2015. The reduction in emissions from the 2005 baseline is mostly the result of the continued trend in decreased natural gas usage, as observed in 2014. However, it should be noted that Piedmont's natural gas usage did increase 5% from 2014.

To calculate emissions, City staff utilized ICLEI's U.S. Community Protocol and the Global Protocol for Community-Scale Emissions (GPC), as well as the greenhouse gas global warming potentials

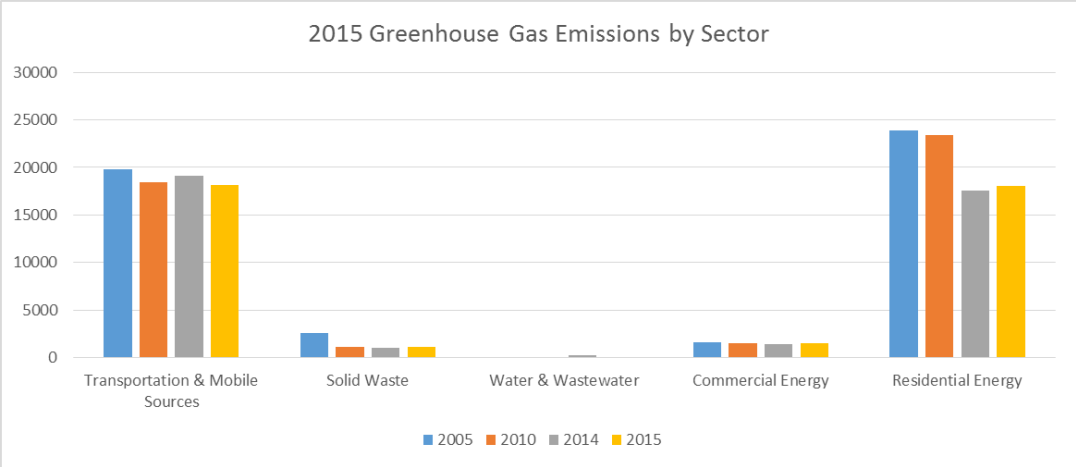

Figure 5. Community Emissions over Time

found in the most recent Intergovernmental Panel on Climate Change (IPCC) report.[1] In 2015, community emissions were 38,852 metric tons of CO2e and municipal activities contributed 976 metric tons of CO2e to the community's total. Municipal activities represent only about 2% of Piedmont's total emissions. As in the 2014 inventory, reductions in emissions from residential heating were essential to meeting the 2020 goal. The sectors that contribute the most to Piedmont's greenhouse gas emissions are Transportation & Mobile Sources (47%) and Residential Energy (46%). Commercial energy, water consumption, and solid waste are minor contributors, comprising only 7% of total emissions.

[1] The use of the most recent IPCC values is standard in the United States. The EPA uses the most recent, 100 year GWP values for greenhouse gas inventories. https://www.epa.gov/ghgemissions/understanding-global-warming-potentials

Community Emissions

Transportation

18,111 Metric Tons of CO2e
47% of 2015 total
5% decrease from 2014

Transportation sector emissions, modeled by Metropolitan Transit Commission (MTC), are the result of travel that begins or ends in the City, or is associated with Piedmont residents' activity. This includes personal vehicle travel, commercial transport within the City, and Piedmont residents' use of public transportation, AC Transit and BART. In both the 2014 and 2015 GHG inventories, transportation sector emissions contributed more to the community's total than any other sector. This is in contrast to years 2005 and 2010 where residential energy was the biggest contributor.

Transportation emissions come predominantly from personal vehicle travel. Gasoline passenger vehicles alone account for 15,172 metric tons of CO2e. Figure 6, below, shows the emissions contribution of each form of transportation. Public transit contributes very little to overall transportation-based emissions.[2]

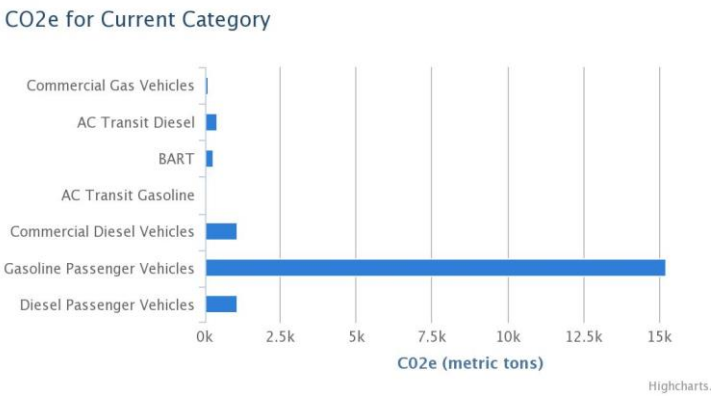

Figure 6. Transportation Emissions

The factors used to calculate vehicle emissions are vehicle miles traveled (VMT) and on-road emissions factors (grams CO2/mile). The reductions in transportation sector emissions from 2014 to 2015 were due to improvements in vehicle fuel efficiency (on-road emissions factors) rather than lower VMT. Piedmont's vehicle miles traveled, modeled by MTC, were actually higher in 2015 than 2014.

It should be noted that fuel efficiency emissions are based on county-wide vehicle portfolios. Piedmont's actual transportation emissions may be marginally lower due to high rates of electric vehicle ownership. Piedmont residents are increasingly buying electric vehicles (EV). Based on the California Clean Vehicle Rebate Project, there have been 286 rebates redeemed for EVs in Piedmont between June 2011 and Dec 2016, equivalent to 7.5% of Piedmont's households. The actual number of EVs in Piedmont is likely greater considering those car owners who chose not to

[2] While there is a visible drop in the transportation emissions from BART, this is due to changes in the accuracy of data rather than changes in behavior. Previously, BART emissions had been overestimated because there was little accurate data on actual station demographics. A 2015 study from BART indicates Piedmont residents are underrepresented in BART stations. This results in fewer BART emissions than previously estimated.

redeem their rebates, were not eligible for rebates, or purchased their EVs outside the date range analyzed.

Residential Energy

Greenhouse gas emissions associated with residential energy come from electricity and natural gas. These are measured in kilowatt hours for electricity and therms for natural gas.

18,042 Metric Tons of CO2e
46% of 2015 total
3% increase from 2014

Emissions from residential electricity went from 5,464 to 5,314 metric tons of CO2e between 2014 and 2015, equivalent to a 2% reduction.[3] The carbon intensity of electricity emissions are represented by PG&E's electricity Emissions Factor (EF). Over the past decade, PG&E has added more renewable electricity to its energy portfolio; this accounts for a substantial portion of reductions in Piedmont's residential emissions.

The residential sector's downward trend in electricity use is steady and substantial. From 2005-2015 electricity use declined by 15%. This can be attributed to changes in residential behavior, energy efficient appliances, energy efficiency programs, and solar photovoltaic (PV) installations.

As of December 2016 there were 312 permits issued for solar energy.[4] Out of a total of 3,801 households, this is 8.2% of Piedmont homes.[5] [6] By generating renewable energy, residents lower total community emissions.

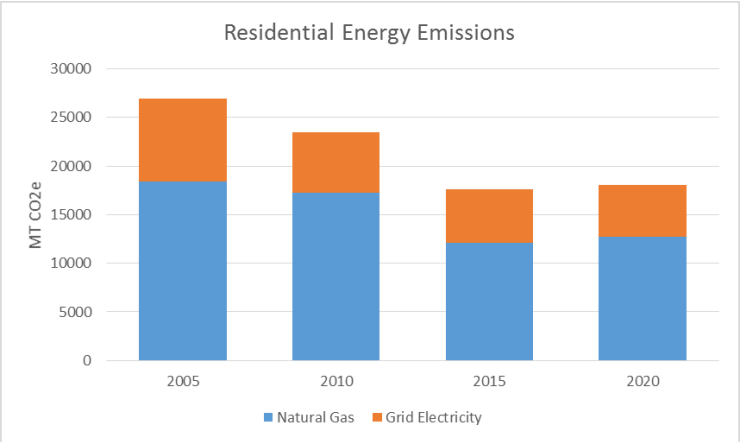

Figure 7. Residential Emissions over time

Residential heating alone makes up 32% of total GHG emissions. While electricity use appears to be declining, natural gas use often fluctuates based on weather. In 2014, unusually low natural gas use was responsible for the City meeting its 2020 goal ahead of schedule. This was again true in 2015. Figure 7 demonstrates the dramatic reduction in natural gas usage in 2014 and 2015 compared to the previous eight years.

[3] This is using the unverified PGE emissions factor. Currently based on 5 year average but EF will be updated and verified. Residential electricity use was 27,158,269 KWh in 2015, 27,683,440 in 2015, and 31,977,216 in 2015.
[4] From Solar Permits_excluding voided and expired Collected on December 13, 2016
[5] Household data from http://www.bayareacensus.ca.gov/cities/Piedmont.htm
[6] Household data from http://www.bayareacensus.ca.gov/cities/Piedmont.htm

It is likely that warmer weather resulted in the majority of the reductions in natural gas use. Heating degree days can be an indicator of the effect of weather on residential heating. Heating degree days are the number of estimated days a house will require heating based on the outside temperature. There were 15% fewer heating degree days in 2015 than in 2010.[7] This corresponds to 26% less natural gas used in 2015 than 2010. It is likely that the increase in warmer weather and corresponding fewer heating degree days was the primary factor in Piedmont meeting its 2020 reduction target.

Commercial Energy

Piedmont's nonresidential buildings include commercial, multi-family buildings, and schools. Commercial electricity use in 2015 was slightly below the 2005-2015 emissions average.[8]

1,480 Metric Tons of CO2e
4% of 2015 total
4% Increase from 2014

Data on actual 2015 commercial natural gas use is currently unavailable due to changes in PG&E's policy on releasing information.[9]

Solid Waste

Solid waste generates methane when organic material decomposes in anaerobic landfill settings. According to Republic Services' 2015 report, Piedmont produced 2,319.6 tons of waste.[10] Over the past seven years, Piedmont has consistently diverted a majority of its waste from landfill to recycling and composting facilities. In 2015, Piedmont diverted 74% of its waste, an all-time high.[11] As a result, the emissions associated with solid waste disposal remain low. The characterization of materials in Piedmont's waste comes from a 2008 StopWaste study.

1,128 Metric Tons of CO2e
3% of 2015 total
13% Increase from 2014

Water & Wastewater

The transportation, treatment, and delivery of potable water requires substantial energy input. While EBMUD boasts a low ratio of kilowatt-hours used per million gallons delivered, this process does generate greenhouse gas emissions. Piedmont consumed roughly 370 million gallons of water in 2015. The creation of wastewater also generates greenhouse gas emissions. While

91 Metric Tons of CO2e
0.2% of 2015 total
70% Decrease from 2014

[7] Total heating degree days in 2010 were 2,670 while in 2015 there were far fewer, only 2,263. https://www.wunderground.com/history/airport/KOAK/2015/1/1/CustomHistory.html?dayend=31&monthend=12&yearend=2015&req_city=&req_state=&req_statename=&reqdb.zip=&reqdb.magic=&reqdb.wmo=

[8] Average commercial electricity use for 2005-2015 is 4,837,245 kwh. Commercial electricity use for 2015 was 4,688,624 kwh.

[9] From Incorporated City of Piedmont Non-Residential Customer Segment Impact_Tableau file from PGE Green Communities Website

[10] From Republic Services 2015 Annual Report

[11] From "City of Piedmont Diversion Comparison 2009-2015" in Republic Services Annual Report

treating wastewater releases methane, this renewable energy can be put to good use. EBMUD has led the country in producing electricity through the anaerobic digestion of wastewater. As a result, the emissions associated with Piedmont's wastewater are minimal; they come from fugitive methane and nitrous oxide.[12] There is however, a noticeable difference between the 2014 and 2015 greenhouse gas emissions resulting from a change in methodology. In 2014, data from an EBMUD study was utilized to estimate emissions. In 2015, ICLEI's population-based estimate of wastewater emission was used. This accounts for the decrease in measured emissions.

Consumption Based Emissions Estimate

In 2016, the Bay Area Air Quality Management District and UC Berkeley released a consumption based greenhouse gas emissions inventory for all households in the Bay Area. The study used a life-cycle analysis of GHG emissions embodied in goods and services. Historically, the activity-based GHG emissions methodology has counted emissions from activities under the City's control or within its boundaries, including a limited set of emissions that occur outside of the City (power plants and landfills). A consumption-based approach expands the scope to more comprehensively include out-of-boundary emissions that are attributable to activities of the local community. It attributes GHG emissions produced across the world to the location of the consumer of the goods and services and places accountability for emissions with the source of the demand rather than the supplier. This perspective can incentivize and acknowledge green buying practices by revealing their potential to reduce GHGs. While both can provide useful insight, Piedmont will continue to utilize the activity-based model because it is what is standard regionally and internationally. However, there are indicators that GHG inventories in the future may include consumption emissions. The graphs below compare Piedmont's GHG emissions inventories with and without a consumption-based estimate.[13]

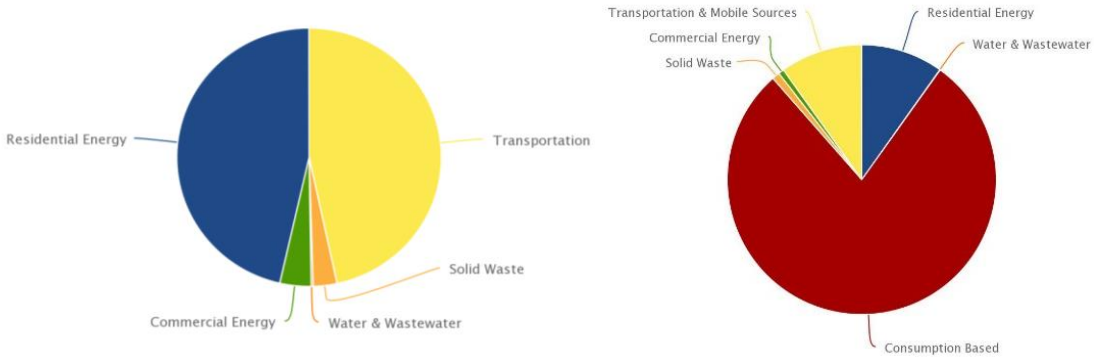

Figure 8. Consumption Based GHG Inventory

[12] Fugitive emissions are gasses that escape during processing. http://www.ebmud.com/wastewater/recycling-water-and-energy/

[13] Data from the study available for download here: http://www.baaqmd.gov/research-and-data/emission-inventory/consumption-based-ghg-emissions-inventory

Municipal

Municipal facilities, transportation, and waste contribute 976 metric tons of CO2e to total community emissions. These activities account for 2% of community emissions. This is a 10% reduction from 2014's municipal emissions.

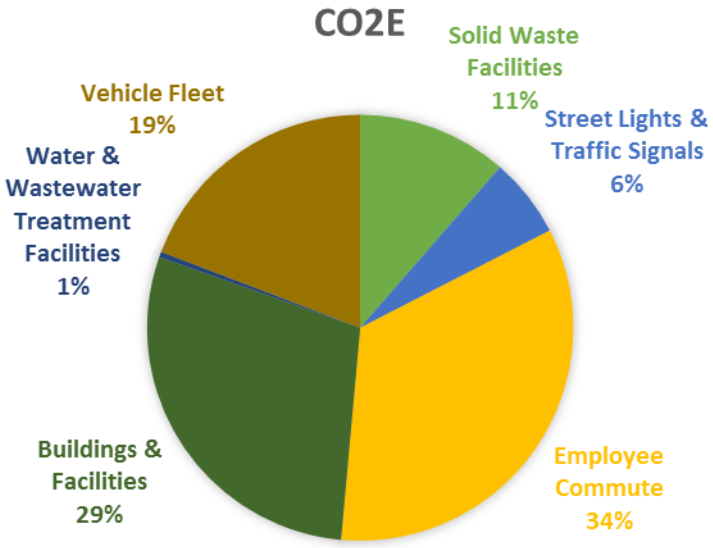

Figure 9. Municipal GHG Emissions

Energy consumption: Buildings and Lights

Municipal buildings emissions decreased between 2014 and 2015 despite a cooler winter requiring increased heating. There was, however, an overall increase in emissions since 2005. The 2014 and 2015 GHG inventories display a significant rise in building emissions. This is due to the addition of the Aquatics Center and the Piedmont Center for the Arts to the City's building portfolio. All other buildings have demonstrated substantial reductions in energy consumption from 2005. Evaluating years 2014 and 2015 provides the most accurate comparison.

Building and Streetlight Emissions (metric Tons CO2e) Over Time

	2005	2010	2014	2015
City Hall/Fire	66.05	61.32	52.2	53.65
Community Hall	22.5	19.99	16.35	15.37
Corporation Yard	11.91	13.76	12.85	11.65
Educational	7.03	4.01	7.06	4.59
Recreation	41.79	34.56	12.36	12.47
Streetlights	73.87	69.03	68.07	59.2
Water	5.73	3.25	4.18	3.65
Police/Vets	34.65	30.94	17.18	16.19
Center for the Arts	-	-	4.82	4.64
Aquatics Center	-	-	146.32	153.72
Grand Total	*263.53*	*236.86*	*341.39*	335.13

Figure 10. Building and Streetlight Emissions

Streetlight energy use declined by 13% in 2015. The City has continued its efforts to convert streetlights to LEDs, which is responsible for the decrease in emission observed. These conversions to less energy intensive LED light bulbs will continue throughout the upcoming years.

Vehicle Fleet

The vehicle fleet, made up of police, fire, public works, and recreation vehicles, continued to contribute a substantial portion of the City's GHG emissions. In addition, contractor vehicles, including services by the Cleary Brothers for landscape services and Richmond Sanitary Services for waste collection, contributed to vehicle fleet emissions. Combined, these vehicles account for 19% of total community emissions. Emissions estimates for these departments were calculated using vehicle fuel efficiency and miles driven.

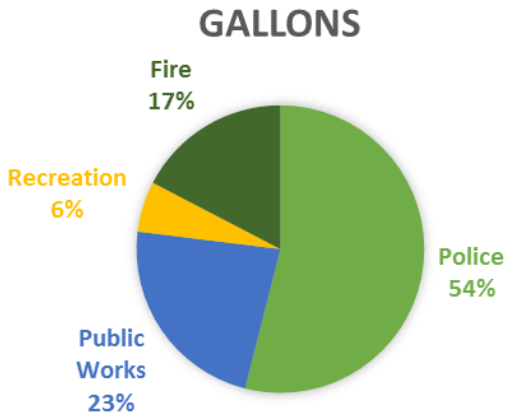

Figure 11. Fleet Vehicles

Employee Commute

Last year, a survey distributed to City employees gathered information on how employees transported themselves to work and how many miles were traveled. The results of this survey indicate there were approximately 331 metric tons of CO2e generated by employees' commutes. This is equivalent to a third of the municipal inventory.[14]

Solid Waste Facilities

The City created an estimated 261 tons of waste in the year 2015. This is based on the size of trash receptacles and rates of pick-up. The City as a whole continued to achieve a high diversion rate of 74% in 2015.

Conclusion

GHG Emissions Inventories going forward

Piedmont demonstrated GHG emissions reductions of 7% in 2010, 18% in 2014, and 19% in 2015. In 2014 and 2015, these reductions were sufficient to meet the City's goal of 15% below 2005 levels by 2020. This achievement is encouraging, and while great work has been made by residents and the municipality to reduce emissions, factors outside of the City's control have also made significant contributions to its success. Most recently, the bulk of emissions reductions in 2014 and 2015 were the result of decreased natural gas usage due to warm weather reducing the demand for residential heating.

[14] The employee commute data was the same in both the 2014 and 2015 inventory because the emissions recorded in 2014 were actually estimated based on 2015 behavior.

Aside from the increase due to adding two buildings to its portfolio, municipal GHG emissions indicate improvement between 2005 and 2015. City initiatives such as energy audits, streetlight conversions to LEDs, and pool covers at the swim center have contributed to this change. Potential future municipal projects including upgrades to the aquatic center, continued LED streetlights conversions, and rooftop solar may considerably lower municipal emissions.

Overall, there appears to be no significant change in Piedmont's GHG emissions from 2014 to 2015. Minor reductions in emissions are the result of changing methodology and availability of data, such as using an average for commercial natural gas usage due to changes in PG&E's privacy policy, an improvement in the data quality of BART emissions, using a population based model for wastewater. Many external factors contributed to the difference in emissions, like PG&E's electricity mix, more stringent vehicle fuel efficiency standards, and weather. This demonstrates that without City and resident action, it's possible that emissions will continue to plateau or even increase in the coming years. In fact, if a colder winter requires heating at 2005 or 2010 levels, it is likely that the City will fall short of meeting its 2020 goal. With an updated Climate Action Plan and GHG reduction target on the horizon, Piedmont should continue its successful decline in emissions while continuing to develop new strategies and policies to not only meet the current 2020 goal, but begin to make strides toward future targeted reductions.

Resolution No. _____

Establishing a Climate Action Plan Task Force

WHEREAS, the City of Piedmont and its residents are concerned about climate change and desire to develop initiatives to inspire, empower, and educate to create a community that promotes environmental sustainability; and

WHEREAS, the State of California has enacted Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006, which requires statewide greenhouse gas (GHG) emissions to be reduced to 1990 levels by 2020 and directs the California Air Resources Board (CARB) to develop and implement regulations that reduce statewide GHG emissions, institute a schedule to meet an emissions cap, and develop enforcement tools to ensure that the State achieves the required GHG emissions reductions; and

WHEREAS, in December 2008 the CARB approved the *Climate Change Scoping Plan* which contains the primary strategies the state will implement to achieve the GHG reductions required by AB 32, and which encourages local governments to adopt a reduction goal for municipal operations emissions and establish similar goals for community emissions that parallel the State commitment to reduce GHGs; and

WHEREAS, Executive Order B-30-15 proclaims that California is vulnerable to the effects of climate change, including reduced snowpack in the Sierra Nevada, exacerbation of California's existing air quality problems, and sea level rise and establishes targets for reducing GHG emissions to 40% below 1990 levels by 2030; and

WHEREAS, on March 15, 2010, the Piedmont City Council adopted a Climate Action Plan, detailing Piedmont's commitment and plan of action for achieving the goals set forth in AB 32 and Executive Order S-3-05 by 2020; and

WHEREAS, Piedmont has successfully achieved many targets set forth in the current Climate Action Plan and desires to create an updated Climate Action Plan detailing a path to achieving significant GHG reductions by 2030;

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Piedmont does hereby resolve, declare, determine, and order as follows:

SECTION 1. The Climate Action Plan Task Force is hereby established as a temporary task force of the City of Piedmont.

SECTION 2. The efforts of the Climate Action Plan Task Force shall be focused on assisting staff with the development of a 2030 Climate Action Plan, specifically in the following areas:

1. Examination of other municipal and organizational Climate Action Plans;
2. Establishment of a GHG emissions reduction target for the year 2030;

3. Review and advise updated Climate Action Plan policies and measures developed by City staff; and
4. Review and advise on implementation strategies to reduce Piedmont's GHG emissions.

SECTION 3. The Climate Action Plan Task Force shall be comprised of five voting members. Four members shall be residents appointed by the City Council. One member shall be a Piedmont High School student appointed by the Board of Education.

SECTION 4. The City Council shall appoint one Task Force member to serve as Task Force Chair.

SECTION 5. The Task Force shall meet on an as needed basis.

SECTION 6. The term of the Task Force shall extend from the date of establishment to one year from this date or the receipt of a Draft 2030 Climate Action Plan by the City Council, whichever is earlier.

SECTION 7. The Task Force shall comply with the Ralph M. Brown Act (Government Code §54950 et seq.) including, but not limited to notice, agenda posting, and public participation requirements.

SECTION 8. The Task Force is an advisory body to the City Council and is not an independent decision-making body. All of its recommendations are subject to approval of the City Council.

[END OF RESOLUTION]