Administrative Draft

County of Tulare
Dairy and Feedlot Climate Action Plan

Prepared for:
County of Tulare
Resource Management Agency
Visalia, California

Prepared by:
Ramboll Environ US Corporation
Los Angeles and San Francisco, California

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Acronyms and Abbreviations

Acronym	Definition
AB 32	Assembly Bill 32
AB 197	Assembly Bill 197
AB 1613	Assembly Bill 1613
ACFP	Animal Confinement Facilities Plan
AQMD	Air Quality Management District
ARB	Air Resources Board (California)
BAU	Business-as-Usual
BMPs	Best Management Practices
BPS	Best Performance Standards
CAP	Climate Action Plan
CAPCOA	California Air Pollution Control Officers Association
CAPs	USEPA Cap-and-Trade Program
CCAP	Climate Change Action Plan
CCR	Climate Change Research
CDFA	California Department of Food and Agriculture
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH4	methane
CNRA	California Natural Resources Agency
CO2	carbon dioxide
CO2e	carbon dioxide equivalent
Dairy CAP	Dairy and Feedlot Climate Action Plan
EIR	Environmental Impact Report
ENVIRON	ENVIRON International Corporation
EPIC	Electric Program Investment Charge
GHG	Greenhouse Gases
GPU	General Plan Update
GWPs	Global Warming Potentials
MT	metric tons
MWh	Megawatt-hour
N/A	Not Applicable
N2O	nitrous oxide
OPR	Office of Planning and Research
OR	Operational Research
PEIR	Program Environmental Impact Report
PhD	Doctor of Philosophy
PUC	Public Utilities Commission
SB 32	Senate Bill 32
SB 1383	Senate Bill 1383
SJVAPCD	San Joaquin Valley Air Pollution Control District
SLCPs	short-lived climate pollutants
TMR	total mixed ration
USDA	United States Department Of Agriculture
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compounds

1 Introduction

In August 2012, the County of Tulare (County) adopted an update of the County's General Plan, the 2030 General Plan Update (GPU). The Tulare County Climate Action Plan (Tulare CAP) released in February 2010 was adopted in conjunction with the GPU as an implementation measure to serve as a guiding document for County actions to reduce greenhouse gas (GHG) emissions and to adapt to the potential effects of climate change. The Tulare CAP was prepared to fulfill the requirements of the California Environmental Quality Act (CEQA) Guidelines for GHG emissions reduction plans developed by the California Governor's Office of Planning and Research (OPR) and adopted by the California Natural Resources Agency (CNRA).[1] The Tulare CAP was designed to provide a supporting framework to produce fewer GHG emissions during buildout under the GPU.

The GPU did not include an update of the Animal Confinement Facilities Plan (ACFP), the portion of the County's General Plan governing dairies and cattle feedlots (feedlots). The ACFP, adopted in 2001, contains the County's regulatory standards and procedures applicable to the development and operation of dairies and cattle feedlots, and was retained as Chapter 12 of the updated GPU. The GPU process provided for a separate subsequent process to update the ACFP (ACFP Update) with its own CEQA review and Environmental Impact Report. Under the GPU, the County directed the preparation of a separate climate action plan as part of the ACFP Update to specifically address dairies and feedlots. This Dairy and Feedlot Climate Action Plan (Dairy CAP) serves that purpose and is to be utilized in implementation of the ACFP Update and its application to new and expanding dairies and feedlots. This Dairy CAP presents information and analysis concerning dairy/feedlot GHG emissions from 2013-2023 and approaches for reducing dairy and feedlot-related emissions, as well as specific elements consistent with OPR guidance.

1.1 Dairy GHG Background Information

Similar to most sectors, dairies and feedlots emit GHGs from typical sources like vehicles (e.g., employee vehicle trips, delivery trucks), electricity usage, and water demand. These emissions are typically carbon dioxide emissions (CO_2) from combustion. However, dairies and feedlots also emit GHGs from the animals, manure management, crop production (i.e., fertilizer usage), and other associated activities. These emissions are predominantly methane and de minimis amounts of nitrous oxide (N_2O). This is important because the global warming potential (GWP) of methane and N_2O are 25 and 298 times larger, respectively, than for CO_2.[2]

Two of the largest sources of emissions at dairies and feedlots are methane emissions from enteric fermentation generated by the animals' digestive processes

[1] OPR. 2009. SB 97 CEQA Guidelines Amendments. Available at: http://resources.ca.gov/ceqa/docs/Adopted_and_Transmitted_Text_of_SB97_CEQA_Guidelines_Amendments.pdf Accessed April 2015.

[2] 40 CFR Part 98, Table A-1.

and from manure. As with all types of animal agriculture, manure is generated on dairies and feedlots as a by-product of raising animals. This manure is not a waste product; instead, it is a valuable resource full of nutrients and is treated as such by farmers. Manure has many different uses (e.g., fertilizer, soil amendment, compost feedstock, biogas feedstock, etc.) that can be used individually or in combination depending on the farm and types of potential beneficial end uses. It can be applied as a liquid or a solid to on-site fields to meet crop nutrient needs; it can be transported off-site to meet crop nutrient needs at a different facility; or it can be processed in an anaerobic digester to generate methane, among other options. The beneficial use of the manure is very site-specific and may vary from farm to farm. Any consideration of GHG reduction measures must be consistent with the eventual beneficial use of the manure.

Multiple CO_2-reduction measures that are typically used by industrial sectors[3] are not applicable to these methane sources, which are inherent to livestock operations, including dairies and cattle feedlots. Notably, at both the state and federal regulatory levels, GHG emissions reduction targets will not be imposed on livestock emissions through at least 2023.[4] This is due, in large part, to the unavailability of feasible means to substantially reduce livestock emissions. Consequently, livestock emissions reduction strategies are exclusively limited to voluntary and incentive-based programs.[5]

Historically, milk production in the United States (US) was pasture-based and resulted in relatively low milk production. Over the past decades, however, US dairies have transitioned to high input and high output systems. This transition has resulted in a decrease of GHG emissions per unit of milk produced.[6] The increased efficiency is largely due to improved efficiency in formulating total mixed ration (TMR) for the animals, i.e., feeding to the specific nutrient requirements of different breeds for optimal milk production and selectively breeding for greater milk production. California dairies typically have more productive animals (i.e., milk produced per animal) than the national average due to the more efficient systems used in the state (e.g., TMR formulation).[7] On average, California dairy cows annually produce 23,178 lbs of milk per cow compared to a nationwide annual value of 21,822 lbs of milk per cow. Tulare County, which produces the most milk in California, has slightly more efficient cows that annually produce 23,350 lbs of

[3] Examples of these measures can be found in: CAPCOA. 2010. Quantifying Greenhouse Gas Mitigation Measures. Available at: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf. Accessed April 2014.

[4] The USEPA also does not regulate livestock emissions; although the Mandatory Reporting Rule contains Subpart JJ for manure management, this provision is not currently being implemented (USEPA. 2015. Greenhouse Gas Reporting Program webpage. Resources by Subpart. Available at: http://www.epa.gov/ghgreporting/reporters/subpart/index.html. Accessed August 2015).

[5] Ibid.

[6] Capper, J.L., R.A. Cady, and D.E. Bauman. 2009. The environmental impact of dairy production: 1944 compared with 2007. *J. Anim. Sci.* doi. 10.2527/jas.2009-1781.

[7] U.S. Department of Agriculture (USDA). National Agricultural Statistics Service (NASS). http://www.nass.usda.gov/. Accessed May 2014.

milk per cow.[8,9] Correspondingly, California dairies are more efficient in terms of emitting less GHGs per unit of milk produced than average US dairies.

As of 2013, Tulare County had approximately 1,000,000 head of cattle (i.e., milking cows, heifers and other support animals, and feedlot cattle). Tulare County is projected to have approximately 1,200,000 head by the year 2023. The overwhelming majority of animals (97%) are dairy-related; feedlot cattle also produce far less manure than milking cows (approximately 40% less[10]). The vast majority of the dairies are "flushed-lane" dairies that periodically remove manure from dairy freestall areas, collecting manure in lagoons and recycling the flush water. Manure in the lagoons is then beneficially used, generally on local farmlands. Consistent with the history of dairying described above, many dairies already incorporate the enteric/manure-related GHG reduction measures described in this Dairy CAP.

1.2 CEQA Guidelines

CEQA Guidelines for GHG emissions reduction plans have been developed by OPR and adopted by the CNRA. CEQA Guidelines §15183.5 specifies that a plan for the reduction of GHG emissions should include or address specific elements. OPR is currently developing additional guidance with more details for climate action planning and the use of plans for the reduction of GHG emissions in a CEQA analysis.[11] While this guidance is being developed, OPR refers to a presentation provided during its Local Government Roundtable (June 20, 2011) regarding climate action planning[12] and to other recent climate action planning guidance documents, such as the San Joaquin Valley Air Pollution Control District's (SJVAPCD's) Climate Change Action Plan (CCAP).[13]

Table 1 below lists the elements to be included in a climate action plan pursuant to CEQA Guidelines §15183.5 and discusses how this Dairy CAP addresses each element as per current guidance cited above.

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[8] Total cattle (2013): Tulare = 484,845; California = 1,774,108. Milk production (2013): Tulare = 11,321,487 thousand lbs; California = 41,219,772 thousand lbs

[9] California Department of Food and Agriculture. 2014. California Dairy Statistics Annual – 2013 Annual Data. Available at: http://www.cdfa.ca.gov/dairy/pdf/Annual/2013/2013_Annual_2012_Data.pdf Accessed April 2015.

[10] USDA. Natural Resources Conservation Service. 2008. Agricultural Waste Management Field Handbook. Chapter 4. Agricultural Waste Characteristics. Available at: http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17768.wba Accessed April 2015.

[11] OPR. 2011. Climate Action Planning. Local Government Roundtable Questions and Answers. June 20. Available at: http://opr.ca.gov/docs/capfaqs.pdf. Accessed May 2014.

[12] OPR. 2011.

[13] SJVAPCD. 2009. Final Staff Report – Addressing Greenhouse Gas Emissions Impacts Under the California Environmental Quality Act. Available at: http://www.valleyair.org/Programs/CCAP/12-17-09/1%20CCAP%20-%20FINAL%20CEQA%20GHG%20Staff%20Report%20-%20Dec%2017%202009.pdf. Accessed April 2014.

Table 1. CEQA Guidelines for CAP Elements

CEQA Guideline Elements	Dairy CAP
1. Quantify GHG emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic range.	This Dairy CAP has prepared and documented GHG emissions inventories of Tulare County industry-wide emissions sources for a 2013 baseline and a 2023 future year. The GHG inventory documentation for animal-related sources is presented in **Appendix A** and for non-animal sources, is presented in **Appendix B**.
2. Establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable.	This Dairy CAP is consistent with the requirements of the Scoping Plan to meet Assembly Bill 32 (AB 32) statewide 2020 GHG emissions reductions, with Senate Bill 32 (SB 32), with the draft 2017 Scoping Plan Update, with Senate Bill 1383 (SB 1383), and with the SLCP Strategy to meet statewide 2030 GHG emissions reductions through 2023 (see **Section 2.2**).
3. Identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated within the geographic area.	The GHG emissions attributable to existing facilities and anticipated future projects have been identified and evaluated in the Tulare County inventory. The future year inventory accounts for projects – and potential growth – that are consistent with this Dairy CAP and the ACFP Update (see **Section 3**).
4. Specify measures or a group of measures, including performance standards, which substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level.	This Dairy CAP has identified readily implementable emissions reduction strategies to reduce GHG emission levels on a project-by-project basis (**Appendix C**). The emissions reduction strategies to achieve GHG emissions levels consistent with the Dairy CAP are discussed in **Section 4.1**. The emissions reduction strategies implementation process, including the incorporation of the measures in future projects, is addressed in **Section 6**.
5. Establish a mechanism to monitor the plan's progress toward achieving the specified emissions level and to require amendment if the plan is not achieving specified levels.	The Dairy CAP includes a monitoring plan for tracking emissions reduction strategies performance and overall Dairy CAP performance, and provides for a post-2023 examination to assess whether modifications to the Dairy CAP are needed to remain consistent with state level actions as presented in **Section 6**.
6. Adopt the GHG reduction strategy in a public process following environmental review.	This Dairy CAP has been developed in conjunction with the ACFP Update. It will undergo full CEQA review in the Program EIR (PEIR) in conjunction with the ACFP Update process.

The adoption of a Climate Action Plan with a certified analysis under CEQA provides a means to streamline the CEQA process as it relates to climate change for individual projects. Per CEQA Guidelines[14] §15183.5, a CAP can be utilized in the environmental review of future projects if it includes both the elements for a GHG emissions reduction plan specified in the CEQA Guidelines and has itself been evaluated and adopted under CEQA. Projects that are determined to be consistent with such a CAP will be presumed to have a less than cumulatively considerable impact on climate change.

[14] California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387.

2 Regulatory Setting

Multiple federal, state and local regulations are applicable to GHG and climate change in general, and to CAPs in particular. This section summarizes the regulatory setting of the Dairy CAP. (In addition to the GHG-specific regulations described below, dairy and feedlot GHG emissions are indirectly affected by SJVAPCD air quality regulation and permits and by CVRWQCB water quality regulations and permits).

2.1 Federal Regulations[15]

2.1.1 USEPA Mandatory Reporting of Greenhouse Gases

The United States Environmental Protection Agency's (USEPA's) Mandatory Reporting of Greenhouse Gas Rule (USEPA Mandatory Reporting Rule) became law on January 1, 2010 (40 CFR Part 98). Designed to cover 85 to 90 percent of the nation's GHG emissions, this law requires certain large emitters and suppliers to report their GHG data on an annual basis. Generally, facilities that emit 25,000 metric tons (MT) or more of carbon dioxide equivalent (CO_2e) per year are required to report. The purpose of the law is not to control GHG emissions, but to collect accurate and pertinent data to inform future GHG policies and programs.

The USEPA Mandatory Reporting Rule currently features a subpart for livestock facilities with manure management systems that emit 25,000 MT of CO_2e per year or more (Subpart JJ - Manure Management); this subpart is not being implemented currently.[16] In addition to an emissions threshold, the subpart identifies the animal population threshold below which facilities are not required to report emissions.[17] For dairies, this number is calculated to be 3,200 mature dairy cows, while for cattle feedlots, this number is calculated to be 29,300 cattle. Because the USEPA has not yet implemented Subpart JJ, dairy facilities and cattle feedlots are currently not subject to federal GHG reporting requirements.

2.2 State Regulations and Agreements

2.2.1 California State Executive Order S-3-05

Recognizing the threat that climate change poses to the state of California, Governor Arnold Schwarzenegger signed Executive Order S-3-05 on June 1, 2005, and established the following GHG reduction targets for the state:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels; and

[15] For additional information on specific regulations, see the Tulare CAP.
[16] The USEPA includes the following statement on their website regarding the implementation of Subpart JJ: "EPA will not be implementing subpart JJ of Part 98. The Consolidated Appropriations Act of FY 2014 (H. R. 3547, Page 339, Section 421) continues a provision prohibiting the expenditure of funds for this purpose." Available at: www.epa.gov/ghgreporting/reporters/subpart/index.html. Accessed April 2014.
[17] 40 CFR Part 98, Subpart JJ, Table JJ-1.

- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

2.2.2 California Global Warming Solutions Act of 2006 (Assembly Bill 32)

In response to Executive Order S-3-05, the California legislature drafted the California Global Warming Solutions Act of 2006, commonly known as AB 32, which was signed into law on September 27, 2006.[18] The law requires the California Air Resources Board (ARB) to adopt rules and regulations to reduce statewide greenhouse gas emissions to 1990 levels by 2020. The law emphasizes that in adopting these regulations the ARB shall, to the extent feasible, minimize "leakage".[19] For example, regulations that result in dairy relocations outside of California would not reduce global GHGs. The law also requires the ARB to prepare a scoping plan to identify and make recommendations on the emission reduction measures, compliance mechanisms, and incentives that are necessary or desirable to achieve the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions by 2020.

The initial AB 32 Climate Change Scoping Plan (AB 32 Scoping Plan) was approved by the ARB in 2008.[20] The AB 32 Scoping Plan was supplemented on August 24, 2011, and the First Update to the Scoping Plan was issued in May 2014 (2014 Scoping Plan Update).[21,22] The AB 32 Scoping Plan highlights the various measures that will be used to achieve the goals of AB 32. One of the plan's proposed strategies is to establish a cap-and-trade program for the economic sectors responsible for the majority of California's GHG emissions. The AB 32 Scoping Plan recognizes that some sectors (e.g. agriculture) are currently not suitable for inclusion in the cap-and-trade program and, as a result, instead recommends separate complementary voluntary strategies for those sectors.

For the dairy industry, ***no reductions from animal-related emissions are required in the AB 32 Scoping Plan and no targets for animal-related emissions are imposed to meet AB 32's 2020 reductions***. Instead, the AB 32 Scoping Plan includes the installation of manure digester systems to capture methane emissions as a voluntary strategy for the agricultural sector, recognizing that economic incentives will be needed in order to make the strategy effective. The 2011 supplement to the AB 32 Scoping Plan specifically highlights that most dairies in California are located in the San Joaquin Valley and are consequently subject to strict smog standards for new equipment. These strict standards apply to new equipment such as manure digester systems. Because of the low quality of the biogas produced in the manure digester systems, it is either technologically infeasible or cost prohibitive to meet SJVAPCD's emissions standards (e.g., nitrous

[18] http://www.arb.ca.gov/cc/docs/ab32text.pdf
[19] "Leakage" is defined in AB 32 as "a reduction in emissions of greenhouse gases within the state that is offset by an increase in emissions of greenhouse gases outside of the state."
[20] http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf
[21] http://www.arb.ca.gov/cc/scopingplan/document/final_supplement_to_sp_fed.pdf
[22] http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf

oxide) without financial incentives.[23] The 2014 Scoping Plan Update acknowledges that the voluntary installation of manure digesters has not advanced as anticipated and identifies the challenges to the voluntary installation of manure digester systems, including the economic recession, increased feed and fuel prices, lack of sufficient financial incentives, and insufficient utility contracts. However, on a positive note, the 2014 Scoping Plan Update indicates that, in response, ARB is continuing to work with other agencies to remove economic obstacles to digester installations, to evaluate the co-benefits, and to examine the potential for voluntary efforts to be more widely adopted. In addition, ARB plans to work with stakeholders to determine whether and how the program should become mandatory and/or more strongly incentivized.[24] The AB 32 Scoping Plan includes a voluntary incentive program, described in Section 2.2.4.1 below, as one potential monetary incentive. In addition, the 2014 Scoping Plan Update incorporates a list of key recommended actions for the agriculture sector, including the following:

> "In 2014, convene an interagency workgroup that includes CDFA, ARB, CEC, CPUC, and other appropriate State and local agencies and agriculture stakeholders to:
>
> – Establish agriculture sector GHG emission reduction planning targets for the mid-term time frame and 2050.
>
> – Expand existing calculators and tools to develop a California-specific agricultural GHG tool for agriculture facility operators to use to estimate GHG emissions and sequestration potential from all on-farm sources. The tool would include a suite of agricultural GHG emission reduction and carbon sequestration practices and would allow users to run different scenarios to determine the best approach for achieving on-farm reductions.
>
> – Make recommendations on strategies to reduce GHG emissions associated with the energy needed to deliver water used in agriculture based on the evaluation of existing reporting requirements and data.
>
> – Conduct research that identifies and quantifies the GHG emission reduction benefits of highly efficient farming practices, and provide incentives for farmers and ranchers to employ those practices."[25]

2.2.3 California's Mandatory Reporting Rule

The state of California has its own mandatory reporting regulation, the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (California Mandatory Reporting Rule) (17 CCR §§95100-95157). The California Mandatory Reporting Rule, approved in 2007, is similar to the USEPA Mandatory Reporting Rule in that it requires certain large emitters and suppliers to report their GHG data on an annual

[23] *Id.* at page 72.
[24] http://www.arb.ca.gov/cc/scopingplan/document/updatedscopingplan2013.htm.
[25] *Id.* Page 57.

basis; however, the California emissions threshold is lower at only 10,000 MT of CO_2e per year. The California Mandatory Reporting Rule currently excludes GHG emissions related to livestock manure management systems.

2.2.4 California Greenhouse Gas Cap-and-Trade Program

To comply with the recommendations outlined in the AB 32 Scoping Plan, the ARB established the California Greenhouse Gas Cap-and-Trade Program (Cap-and-Trade Program) (17 CCR §§95800-96023),[26] which took effect on January 1, 2012. From the ARB's web site: "Cap-and-trade is a market based regulation that is designed to reduce greenhouse gases (GHGs) from multiple sources. Cap-and-trade sets a firm limit or "cap" on GHGs and minimize the compliance costs of achieving AB 32 goals … Trading creates incentives to reduce GHGs below allowable levels through investments in clean technologies … Market forces spur technological innovation and investments in clean energy. Cap-and-trade is an environmentally effective and economically efficient response to climate change."[27] The first phase of the Cap-and-Trade Program only applies to in-state electrical generating facilities and large industrial facilities that emit over 25,000 MT of CO_2e per year. Compliance obligations for this first phase began on January 1, 2013, after which covered entities are required to remain at or below their respective established emissions caps. The second phase of the program began on January 1, 2015, and will extend to fuel distributors.

2.2.4.1 Dairies and Cap-and-Trade

One way the Cap-and-Trade Program allows covered entities to meet their established emissions cap is through the purchase of emission offset credits. Per the Cap-and-Trade Program regulation, an offset credit must represent a GHG emission reduction that is "real, additional, quantifiable, permanent, verifiable, and enforceable" and must result from the use of an established offset protocol (17 CCR §95970). Per 17 CCR §95972 of the regulation, in order to be approved by the ARB, a compliance offset protocol must conservatively account for activity-shifting leakage and market-shifting leakage for the offset project type.[28]

The AB 32 Scoping Plan to meet AB 32's 2020 reduction goals as well as SB 1383 and the SLCP Strategy as to 2030 reduction goals (see Section 2.2.11) require no GHG emissions reductions from animal-related sources on a dairy or feedlot prior to 2024. Instead, voluntary incentive-based approaches are encouraged. Specifically, under the Cap and Trade Program, the Compliance Offset Protocol for Livestock Projects is one of the four protocols for voluntary activities that have been

[26] http://www.arb.ca.gov/regact/2010/capandtrade10/finalrevfro.pdf.
[27] http://www.arb.ca.gov/cc/capandtrade/capandtrade.htm.
[28] "Activity-Shifting Leakage" is defined in §95802 of the regulation as "increased GHG emissions or decreased GHG removals that result from the displacement of activities or resources from inside the offset project's boundary to locations outside the offset project's boundary as a result of the offset project activity." "Market-Shifting Leakage" is defined as "increased GHG emissions or decreased GHG removals outside an offset project's boundary due to the effects of an offset project on an established market for goods or services."

approved by the ARB to date.[29] This protocol provides the procedures necessary for quantifying and reporting GHG emission reductions associated with the installation of a biogas control system (e.g. a digester) for manure management on dairy cattle and swine farms. The protocol is designed to ensure accurate, transparent, and verifiable quantification of GHG emissions reductions associated with a digester project for generating offsets. Emission reductions quantified through the procedures outlined in the protocol can be sold in the market as emission offset credits. This arrangement can provide a financing tool that may assist in making the voluntary installation of a manure digester system feasible. In this context, feasibility depends upon achieving compliance with required emissions standards, economic viability, utility infrastructure support, and site suitability. Consequently, a proposed digester installation that is feasible for one farm may not be deemed feasible at another farm.

2.2.5 California Environmental Quality Act (CEQA) and California Senate Bill 97

Adopted in 1970, CEQA requires California lead agencies to assess the potential environmental impacts of proposed projects within their jurisdiction. However, when CEQA was first established, lead agencies were not required to assess the environmental impacts of a project's GHG emissions. In 2007, this changed with the passage of Senate Bill 97 (SB 97), which required OPR to develop amendments to the CEQA Guidelines that would specifically address the analysis and mitigation of GHG emissions. The resulting amendments to the CEQA Guidelines were adopted and became effective in March 2010. Lead agencies are now required to incorporate the analysis of GHG emissions into their CEQA reviews. Specifically, the amendments require the following, as described in the CEQA Guidelines (§15064.4):

- Quantify the GHG emissions from the project;
- Determine if the emissions exceed a significance threshold the lead agency determines to apply to the project; and
- Determine the extent to which the project complies with applicable regulations, requirements, or plans.

This Dairy CAP provides the required analysis for the ACFP Update to Chapter 12 of the Tulare County General Plan 2030. Additionally, new or expanding dairies and feedlots may be able to rely upon this Dairy CAP to demonstrate compliance with CEQA Guidelines (§15183.5). See Section 5 for details.

2.2.6 California Senate Bill 700

California Senate Bill 700 (SB 700) was signed into law on September 22, 2003 and effectively replaced the existing blanket exemption from air permits for agriculture with narrower, more limited exemptions in state law.[30] As a result, the ARB and

[29] http://www.arb.ca.gov/regact/2010/capandtrade10/coplivestockfin.pdf.
[30] http://www.arb.ca.gov/ag/sb700/sb700.pdf.

local air agencies such as the SJVAPCD are now required to regulate air pollution from agricultural sources. Since the adoption of SB 700, SJVAPCD has established a permitting program for large dairies and cattle feedlots and has also implemented several rules that apply to the agricultural industry such as Rule 4550, *Conservation Management Practices*, which aims to limit fugitive dust emissions from agricultural operation sites, and Rule 4570, *Confined Animal Facilities*, which aims to limit emissions of volatile organic compounds (VOCs) from confined animal facilities.[31] Neither of these rules currently addresses GHG gas emissions.

2.2.7 California Senate Bill 605

California Senate Bill 605 (SB 605) was signed into law on September 21, 2014 and requires the ARB to develop a comprehensive strategy to reduce statewide emissions of short-lived climate pollutants (SLCPs).[32] SLCPs, such as methane, have relatively high potency compared to carbon dioxide, even though they remain in the atmosphere a short amount of time. Specifically, SB 605 requires the ARB to inventory the sources and emissions of these pollutants, identify research gaps, identify existing and potential reduction measures, prioritize the development of new measures, and develop a comprehensive strategy for dealing with SLCPs.[33] ARB adopted the SLCP Strategy on March 23, 2017 (SLCP Strategy), which addresses animal-related methane emissions from dairies, as more fully described in Section 2.2.11.

2.2.8 California State Executive Order B-30-15

Governor Edmund G. Brown Jr. issued Executive Order B-30-15 on April 29, 2015, and identified an interim benchmark to maintain California's reduction efforts on the path to achieving the 2050 goal to reduce GHG emissions to 80 percent below 1990 levels, which was contained in the previous executive order.

- By 2030, reduce GHG emissions to 40 percent below 1990 levels.

As discussed in Section 2.2.9 below, on September 8, 2016, California Senate Bill 32 was signed into law to implement the 2030 emissions reduction goal established by Executive Order B-30-15. In addition, a draft update to the AB 32 Scoping Plan to meet the 2030 reduction target under SB 32 (2017 Scoping Plan Update) was issued by ARB on January 20, 2017.[34]

[31] Note that dairies with fewer than 500 milking cows are exempt from the provisions of the rule except for the recordkeeping requirements.
[32] http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB605.
[33] ARB. 2017. Short-Lived Climate Pollutant Reduction Strategy. Available at: https://www.arb.ca.gov/cc/shortlived/meetings/03142017/final_slcp_report.pdf. Accessed April 2017.

2.2.9 California Senate Bill 32

California Senate Bill 32 (SB 32) was signed into law on September 8, 2016.[35] SB 32 builds upon AB 32, adopting the 2030 goal under California Executive Order B-30-15 to reduce GHG emissions to at least forty percent below 1990 levels and directing ARB to adopt regulations to achieve such reductions by December 31, 2030.

On January 20, 2017, ARB released for public review and comment the draft 2017 Scoping Plan Update: The Proposed Plan for Achieving California's 2030 Greenhouse Gas Target (2017 Scoping Plan Update).[36] The 2017 Scoping Plan Update is ARB's proposed plan to reduce greenhouse gas emissions by forty percent below 1990 levels by 2030. The 2017 Scoping Plan Update, which was required under California Executive Order B-30-15, updates the existing AB 32 Scoping Plan to address SB 32's 2030 emissions reduction goal. It is expected to be considered and approved in final form in 2017.

2.2.10 California Assembly Bill 197

California Assembly Bill 197 (AB 197) was signed into law on September 8, 2016 as a companion bill to AB 32.[37] AB 197 expands ARB's membership to include two non-voting members from the Legislature; creates a Joint Legislative Committee on Climate Change Policies to make recommendations to the Legislature concerning climate change policies; provides for annual reporting of GHG emissions from sectors covered by the AB 32 Scoping Plan (reporting is not required for dairies and feedlots) as well as evaluations of regulatory requirements and other programs that may affect GHG emissions trends; and specifies that the adoption of GHG emissions reduction rules and regulations shall consider the social costs. In addition, AB 32 Scoping Plan updates are required to identify the range of potential GHG emissions reductions and the cost-effectiveness for each emissions reduction measure, compliance mechanism and incentive.

2.2.11 California Senate Bill 1383

Senate Bill 1383 (SB 1383) was signed into law on September 19, 2016.[38] SB 1383 updates the initiatives of SB 605, which required ARB to develop a comprehensive strategy to reduce statewide emissions of short-lived climate pollutants (SLCPs), including methane (SLCP Strategy). SB 1383 adopts SLCP reductions targets, including a forty percent reduction in statewide methane emissions below 2013 levels by 2030. The SLCP Strategy, which was adopted by ARB on March 23, 2017, addresses methane emissions in particular.

Under the legislation, methane emissions from the dairy sector are singled out for specialized treatment. ARB is directed to coordinate with the Department of Food and Agriculture (CDFA), the Public Utilities Commission (PUC) and the State Energy

[35] https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB32
[36] https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf
[37] https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB197
[38] https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB1383

Resources Conservation and Development Corporation (CEC) in adopting regulations to reduce methane emissions from dairy manure management operations by up to forty percent below the dairy sector's 2013 levels by 2030. Notably, prior to adopting such regulations, ARB must complete a number of steps, including working with stakeholders, such as dairy representatives, energy agencies, environmental stakeholders and project developers, to identify and address technical, market, regulatory and other challenges to development of dairy methane emissions reductions projects; conducting or considering dairy operation research on dairy emissions reduction projects, including scrape manure management systems, solids separation systems and enteric fermentation; and considering the development and adoption of methane emissions reduction protocols. Such regulations are to be implemented and go into effect no sooner than January 1, 2024, and then only in the event that ARB, in consultation with CDFA, determines the regulations to be technologically feasible, economically feasible (taking into consideration milk prices, public and private funding commitments, whether markets exist for the biomethane and other products generated by dairy manure management reduction projects, and access to common carrier pipelines and electrical interconnection for dairy digesters), and cost-effective and are additionally found to include provisions to minimize potential leakage to other jurisdictions and to evaluate the achievements made by incentive-based programs.

By January 1, 2018, other actions required to be performed by ARB include establishment of energy infrastructure policies to encourage dairy manure digester projects; development of a pilot financial mechanism to reduce the economic uncertainty associated with the value of credits for dairy manure digester projects producing low-carbon transportation fuels; issuance of directives to gas corporations to implement at least five dairy manure digester pilot projects to demonstrate interconnection to the common carrier pipeline system; provision of guidance on credits generated pursuant to market-based compliance mechanisms developed from methane reduction protocols under the SLCP Strategy; and provision for the availability of at least a ten-year credit for projects pre-dating regulations, as well as eligibility for available extensions of credits.

By July 1, 2020, ARB and DFA are to evaluate the dairy sector's progress towards meeting the SLCP 2030 reduction goal on a voluntary basis, and, if sufficient progress has not been attained due to insufficient funding or market or technical barriers, ARB may reduce the SLCP Strategy's methane emission reduction goal for dairies. SB 1383 specifies that enteric emissions reductions are to be voluntary, through incentive-based programs, until such time that ARB determines that a cost-effective and scientifically proven method of reducing such emissions is available that would not damage animal health, public health or consumer acceptance. No methane emissions reduction regulations for the dairy sector are to be adopted to meet AB 32 or SB 32 goals other than pursuant to SB 1383's requirements and standards. The proposed 2017 Scoping Plan Update is consistent with SB 1383 and its timetable relative to addressing GHG emissions from the dairy sector.

To tackle the barriers to biomethane use, SB 1383 also provides that the CEC, in consultation with ARB and the PUC, is required to develop recommendations for the use of biomethane as part of its 2017 Integrated Energy Policy Report, including the identification of cost-effective strategies by considering priority uses of biomethane in the context of state policy objectives to reduce SLCPs and to promote alternative energy uses. Based on such recommendations, state agencies shall, as appropriate, adopt policies and incentives to significantly increase sustainable production and use of biomethane.

2.2.12 California Assembly Bill 1613

In recognition of the need for public funding sources to subsidize voluntary dairy methane emissions reduction projects, the Budget Act of 2016, AB 1613, allocates $50 million from the Greenhouse Gas Reduction Fund to be administered by CDFA to support early and extra methane emissions reductions from dairy livestock operations.[39] The particular value of this subsidy is that it provides funding to offset capital costs for construction. CDFA anticipates that approximately $36 million will be used for constructing digesters, $9 million for other dairy methane reduction projects and the remaining $5 million for state administrative costs.[40]

2.3 Local Regulations, Ordinances, and Agreements

2.3.1 Tulare County

Tulare County is processing the ACFP Update as a proposed amendment to the Tulare County General Plan. This Dairy CAP is being prepared in conjunction with the ACFP Update process which will update the approval process for new and expanding dairies and feedlots. It is noted that the County's land use authority is limited to new and expanding facilities and does not extend to requiring changes to existing facilities.

2.3.2 San Joaquin Valley Air Pollution Control District (SJVAPCD)

In August 2008, the Governing Board of the SJVAPCD adopted the CCAP in response to a perceived need for definitive guidance on how to address greenhouse gas emission impacts under CEQA. Specifically, the CCAP instructed the SJVAPCD Air Pollution Control Officer to develop guidance to assist both District staff and local land-use agencies (and other permitting bodies) in determining the significance of project-related impacts on global climate change under CEQA. The CCAP is generic for all land uses and is not specific to dairies.

In compliance with the CCAP, on December 17, 2009, the District issued the guidance document, *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA*, and adopted the policy, *District Policy – Addressing GHG Emission Impacts for Stationary Source Projects under*

[39] http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB1613.
[40] California Department of Food and Agriculture, "Dairy Digester Research and Development Program, 2016-17, Public Stakeholder Listening Session," accessed December 14, 2016 at https://www.cdfa.ca.gov/oefi/ddrdp/docs/2016 DDRDP-ListeningSessions.pdf

CEQA When Serving as the Lead Agency.[41,42] Both documents propose an approach that centers on the use of performance based standards, referred to as Best Performance Standards (BPS), to determine project significance and streamline the CEQA process. Best Performance Standards are defined in these documents as "the most effective Achieved-in-Practice means of reducing or limiting GHG emissions from a GHG emissions source" and are intended to represent pre-approved, pre-quantified emissions reductions. Projects that implement BPS in accordance with the District guidance are said to have a less than significant individual and cumulative impact on global climate change. Alternatively, projects that do not implement BPS are required to quantify project specific greenhouse gas emissions and, to obtain a less than significant impact determination, must demonstrate a reduction or mitigation of greenhouse gas emissions by 29% from the 2020 business-as-usual scenario.[43]

A staff report, released concurrently with the District guidance and policy documents, presents examples of industry-specific BPS, including several for livestock operations. ***However, the report notes that the example BPS are "for illustrative purposes only, and should not be used by any lead agency as District-approved or sanctioned standards."*** [44] To date, the District has not approved any BPS that are applicable to livestock operations, including dairies and cattle feedlots. In the absence of the adoption of such BPS by the District, this Dairy CAP incorporates potential GHG reduction strategies as set forth in Section 4.

2.4 Funding Opportunities

Resulting from the need for financial incentives to support the voluntary installation of manure digester systems, as referenced in the 2014 Scoping Plan Update, certain governmental funding opportunities have been available from time to time. The reasons that such programs are needed include the extensive capital and operating costs required for an anaerobic digester. The cost of an anaerobic digester varies based on the number of animals (i.e., amount of manure sent to the digester), location of the dairy, type of digester, and end-use of the digester gas. For example, the cost of installing a digester is estimated to be $1.15 million for a 1,000 cow dairy farm producing 744 Megawatt-hours (MWh) of electricity while the estimated digester cost is $11.2 million for a 10,000 cow dairy farm producing 94.4 million cubic feet (12,600 MWh) of biogas.[45] In addition to this initial large capital cost, there are annual operating and maintenance costs. As an operation beyond

[41] http://www.arb.ca.gov/cc/scopingplan/2013_update/draft_proposed_first_update.pdf.
[42] http://www.valleyair.org/programs/CCAP/12-17-09/2%20CCAP%20-%20FINAL%20District%20Policy%20CEQA%20GHG%20-%20Dec%2017%202009.pdf.
[43] Per the District, this level is set at 29% to be "consistent with GHG emission reduction targets established in ARB's AB 32 scoping plan." It should be noted that the May 2014 Update to the AB 32 Scoping Plan features revised 2020 baseline and target emissions levels, so that the required percent reduction in emissions is now approximately 15%.
[44] http://www.valleyair.org/programs/CCAP/12-17-09/1%20CCAP%20-%20FINAL%20CEQA%20GHG%20Staff%20Report%20-%20Dec%2017%202009.pdf.
[45] ESA. 2011. Economic Feasibility of Dairy Manure Digester and Co-Digester Facilities in the Central Valley of California; Prepared for the California Regional Water Quality Control Board, Central Valley Region.

dairying itself, the farmer may need to hire outside operators and/or consultants to successfully and effectively run the digester.

Due to the high capital costs and ongoing operating and maintenance costs, a digester would be cost-prohibitive for a farmer without incentives, grants, or other cost-sharing programs. Several funding opportunities have been, or are, available and have encouraged the construction of digesters. These funding opportunities include the following:

- 1603 Program: The U.S. Federal Government established the 1603 Program as part of the American Recovery and Reinvestment Act of 2009 (Recovery Act). The 1603 Program: Payments for Specified Energy Property in Lieu of Tax Credits reimbursed eligible projects for a portion of the cost of installing specified energy properties or for the production of income. Digester projects were one of the eligible projects. Out of almost 9,800 projects nationwide, 98 digester projects received funding; 5 of these projects were in California. This program is no longer providing funding for digesters.
- Cap-and-trade funds: ARB has developed an investment plan to inform how cap-and-trade auction proceeds should be spent. The document identifies priority investments that are intended to further the state's GHG reduction goals. As described in this document, cap-and-trade funds have been allocated to incentivize digesters in California. Through the Dairy Digester Research & Development Program, AB 1613 allocates $50 million from the Greenhouse Gas Reduction Fund to support voluntary dairy methane reduction projects, including digesters and alternative manure management practices, as discussed in Section 2.2.12. Although the California State Budget will allocate cap-and-trade funds every year, the status and scope of ongoing allocations for digesters and other manure management practices to reduce methane emissions cannot be assured.
- California Energy Commission (CEC): The CEC has awarded $4 million each to two dairy farms to install and demonstrate dairy digesters.[46] In addition, CEC's Electric Program Investment Charge (EPIC) program allocates up to $9 million a year to a competitive program for renewable energy projects including dairy digesters.
- Digester "hubs": An economic feasibility study was done on constructing a centralized digester project that would accept manure from a cluster of nearby dairy farms. This type of cost-sharing would encourage the construction of dairy digesters and spread the cost over multiple farms.[47]

[46] California Energy Commission (CEC). 2015. Press release March 11, 2015. Energy Commission Approves Grants for Energy Storage, Biofuel, Efficiency and Transportation Programs. Available at: http://www.energy.ca.gov/releases/2015_releases/2015-03-11_approved_grants_nr.html Accessed April 2015.

[47] California Dairy Campaign. 2013. Economic Feasibility of Dairy Digester Clusters in California: A Case Study. Available at: http://www.epa.gov/region9/organics/symposium/2013/cba-session2-econ-feas-dairy-digester-clusters.pdf Accessed April 2015.

3 GHG Emissions Overview: Baseline and Future

As described in Section 1.2, CEQA Guidelines for GHG emissions reduction plans, such as this Dairy CAP, have been developed by OPR and adopted by the CNRA. The guidelines (CEQA Guidelines §15183.5) specify that a plan for the reduction of GHG emissions should include or address specific elements. Two of these elements include:

- Quantify GHG emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic range, and
- Identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated within the geographic area.

To address these two elements for this plan, GHG inventories were prepared using a baseline year of 2013 and a future year of 2023. The future year of 2023 is consistent with the ACFP Update and the PEIR. The inventories consist of industry-specific activity (e.g., animal emissions) and other general sources (e.g., energy, transportation). Animal-related sources include enteric fermentation and manure management. Other sources include equipment exhaust, agricultural soil management, electricity use, vehicle emissions (on-farm trucks, employee vehicles), and refrigeration. Animal-related sources were estimated using methodology developed by the Intergovernmental Panel on Climate Change (IPCC) and used by ARB for quantifying annual statewide GHG emissions. All other sources were obtained from estimates developed for the Tulare County AFCP Update EIR.[48] Table 2 summarizes the major assumptions that were used in this Dairy CAP.

[48] See Appendix B.

Table 2. Information Used in Animal-Related Inventory Calculations

Data	Baseline (2013)	Future (2023)
Animal head counts	Tulare County Data Data reported for 2011[a]	Assumed annual growth of 1.5%[b]
Manure Decomposition and Enteric Fermentation methodologies	IPCC[c],[d]	IPCC[c],[d]

[a] Although the baseline used is 2013, animal head counts from 2011 were used, because the numbers were slightly greater in that year and to be consistent with the PEIR and the ACFP Update.

[b] The assumed annual growth rate of 1.5% is consistent with the assumptions under the PEIR, the ACFP Update, and the AB 32 Scoping Plan.

[c] 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4, Chapter 10. Available at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/. Accessed May 2014.

[d] Manure decomposition emissions were calculated using the methodology developed by IPCC. Statewide enteric fermentation emissions were obtained from ARB and prorated by the animal head counts assumed in Tulare. Because ARB uses the IPCC methodology as implemented in the Cattle Enteric Fermentation Model (CEFM), this approach and the emissions are consistent with IPCC and ARB methodologies.

The baseline year used in this Dairy CAP is 2013, consistent with the ACFP Update and PEIR (as described above), and includes emissions estimates from all activities at the facilities based on known data. The future year, 2023, estimates are projected from the baseline by estimating the impacts of future growth and projected increases in production. It should be noted that most dairies likely already incorporate several GHG reduction strategies as part of their standard operations and therefore, baseline emissions would reflect those reductions to the extent that the current emissions estimation methodology reflects those strategies.

Table 3. Baseline and Projected Emissions in Metric Tons CO_2e/year		
Source[a][b]	**Baseline (2013) GHG emissions[c]**	**Future (2023) GHG emissions[c]**
Farm Equipment Exhaust	38,129	52,195
Farm Agricultural Soil	812,050	1,111,838
Farm Electricity Consumption	79,480	108,763
Dairy Equipment Exhaust	99,406	135,478
Truck Trips	23,137	28,493
Dairy Employee and Visitor Trips	15,851	16,282
Dairy Electricity Consumption	145,335	171,566
Dairy Refrigeration	63,640	85,840
Dairy Manure Decomposition	3,496,077	4,057,340
Dairy Enteric Digestion	2,463,071	2,858,495
Feedlot Manure Decomposition	29,598	34,350
Feedlot Enteric Digestion	227,068	263,522
Total	**7,492,843**	**8,924,162**

[a] Emission estimates for all source categories except for manure decomposition and enteric digestion have been taken from analyses completed for the Tulare County ACFP Update EIR. See Appendix B.

[b] Details regarding the manure decomposition and enteric digestion emission estimates can be found in Appendix A.

[c] CO2e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWPs are 1 for CO2, 25 for CH4, 298 for N2O, and 14,800 for HFC-23 (40 CFR Part 98, Table A-1).

As shown in Table 3, most of the GHG emissions at dairies and feedlots in Tulare County are animal-related emissions (i.e., manure decomposition and enteric digestion). The future year emissions estimates are based on assumptions about the future consistent with those used in related plans (see below). For example, the animal-related emissions assume a certain percentage growth in dairy and beef cattle population.

It is noted that 2023 has been utilized as the future projected year for a number of reasons. AB 32 and the AB 32 Scoping Plan establish regulations and requirements to meet the statewide reductions proscribed to be achieved by 2020, and SB 32 and SB 1383 address emissions reduction targets through 2030. To date, the AB 32 Scoping Plan meets the 2020 reduction requirements of AB 32, and the subsequent legislation and SLCP Strategy for 2030 reductions require no animal-related emissions reductions from the dairy sector prior to 2024. This Dairy CAP is

consistent with the AB 32 Scoping Plan for 2020, with the SLCP Strategy, and with the draft 2017 Scoping Plan Update to meet 2030 reduction targets as related to animal-related dairy emissions. Given the evolving nature of information concerning climate change, effective GHG emissions reduction strategies, and technological and practical advances regarding feasible emissions reductions protocols, as well as anticipated regulatory actions under SB 1383, the Dairy CAP in Section 8 provides for a post-2023 examination of the Dairy CAP to determine whether the Dairy CAP has been superseded by the enactment of state regulations that mandate emissions reductions, and to assess whether modifications are needed in order to reduce the possibility of duplication of or conflicts with state level actions. Projections for a more extended horizon (i.e., beyond 2023) are speculative at this time given the numerous variables associated with SB 1383 and SLCP Strategy's research and analysis as to the feasibility and effectiveness of animal-related emissions reductions as well as projections of manure and enteric emissions, animal herd counts, the anticipated growth of dairy operations in Tulare County, and the availability of established programs to foster feasible emissions reduction approaches.

4 GHG Emissions Reduction Strategies Evaluated

4.1 GHG Emissions Reduction Strategies

The process of identifying and evaluating GHG reduction strategies is consistent with the fourth CEQA Guideline element for climate action planning under §15183.5, as discussed in Section 1. Furthermore, a primary purpose of this Dairy CAP is to maintain the efficiency (i.e. GHG emissions/unit milk produced) achieved by California dairies over the past decades and, to the extent possible, identify approaches that could possibly be implemented at dairies to achieve additional reductions. These potential reduction strategies are discussed below. It is noted that these reduction strategies apply only to new or expanding dairies applying for discretionary county permitting that require analysis under CEQA. For expanding dairies, the measures are applicable only to the expansion, i.e., the dairy would not be required to retrofit existing equipment and/or operating procedures. As noted in Section 2.3.1 above, the County's land use authority is limited to proposed new and expanding facilities and does not extend to requiring changes to existing facilities.

Why the Focus on Dairies?
Feedlot-related cattle emissions are much lower than dairies in Tulare. In contrast to dairies, beef manure is collected in feedlots. Beef animals are fed a different ration, with the focus on increasing animal bulk. As a result, some dairy emissions reduction strategies will not be applicable to beef feedlots.

As a sector, dairies and feedlots are inherently different from other industrial sectors. The majority of emissions from dairies and feedlots are animal-related emissions (i.e., manure decomposition and enteric digestion), as shown in Table 3, rather than process or combustion-related equipment typically associated with regulated industrial sectors. Under statewide legislation, including AB 32, SB 32 and SB 1383, reductions of methane emissions from dairy operations will continue to be voluntary at least through 2023. This is due to the fact that relatively few emissions reduction strategies have been identified or accepted as feasibly reducing GHG emissions from animal-related sources. Under SB 1383, such dairy methane emissions reduction strategies are to continue to be voluntary in order to ensure that incentives, subsidies and market-based mechanisms remain available.

However, there are some GHG reduction strategies that may have the potential to reduce emissions from the future year scenario presented in Section 2. The policies and GHG reduction strategies considered for inclusion in the Dairy CAP were drawn from GHG emission reduction guidelines completed by the California Air Pollution Control Officer's Association (CAPCOA) as well as guidance set forth by local agencies. There are currently no existing CAPs specific for the agricultural sector and thus this Dairy CAP was unable to draw on policies and reduction strategies used previously. The analysis of potential reduction strategies takes into consideration the feasibility of a given practice as to the sector overall and as to individual farms. These sources for this analysis include the following:

- CAPCOA: Quantifying Greenhouse Gas Mitigation Measures[49]
- SJVAPCD: Final Staff Report – Addressing Greenhouse Gas Emissions Impacts Under the California Environmental Quality Act[50]
- CNRA: CEQA Guidelines, Appendix F – Energy Conservation[51]
- SLCP Strategy
- October 2015 Policy Memorandum submitted to ARB by the California Climate & Agriculture Network, entitled "Diversified Strategies for Reducing Methane Emissions from Dairy Operations"[52] also referred to as the CalCAN memo.

The feasibility of these reduction strategies is highly dependent on the management practices being used at a specific farm; a reduction strategy that is easily implemented at one dairy may be infeasible at another. Management practices are frequently chosen due to site-specific conditions that are unable to be changed. For example, a dairy in a location with crop land is unlikely (except in very specific circumstances) to adopt manure GHG reduction strategies that would require transporting the manure to an off-site facility for processing and then transporting it back to the farm. It would also be contraindicated to use any manure GHG

[49] CAPCOA. 2010. Quantifying Greenhouse Gas Mitigation Measures. Available at: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf. Accessed April 2014.

[50] SJVAPCD. 2009. Final Staff Report – Addressing Greenhouse Gas Emissions Impacts Under the California Environmental Quality Act. Available at: http://www.valleyair.org/Programs/CCAP/12-17-09/1%20CCAP%20-%20FINAL%20CEQA%20GHG%20Staff%20Report%20-%20Dec%2017%202009.pdf. Accessed April 2014.

[51] California Natural Resources Agency. 2009. CEQA Guidelines Amendments. Appendix F – Energy Conservation. Available at: http://resources.ca.gov/ceqa/docs/Adopted_and_Transmitted_Text_of_SB97_CEQA_Guidelines_Amendments.pdf Accessed April 2015.

[52] California Climate and Agriculture Network (CalCAN). 2015. Diversified Strategies for Reducing Methane Emissions from Dairy Operations. Available at: http://calclimateag.org/wp-content/uploads/2015/11/Diversified-Strategies-for-Methane-in-Dairies-Oct.-2015.pdf. Accessed April 2017.

reduction strategy that would impair or limit the end-use of the manure. As such, the GHG reduction strategies discussed herein are grouped into three categories:

- Category A (In Dairy CAP)

  Although there is no typical dairy or feedlot, there are practices that are common to many facilities. Reduction strategies in this category are more likely to be feasible at a greater number of facilities due to the expected commonalities at farms. However, because of the varying nature of dairies and feedlots, the actual reduction in emissions that can be achieved will also be variable and site-dependent. Note that it is possible that reduction strategies in this category may not be applicable at certain facilities due to the specific management practices used.

  A new or expanding dairy implementing all applicable Category A reduction strategies would be consistent with the Dairy CAP. If a particular Category A strategy would be infeasible or impracticable based on the specifics as to their farm, a Category B strategy may be substituted, in which case the dairy project would also be consistent with the Dairy CAP.

- Category B (Optional/Substitute Strategies in Dairy CAP)

  Reduction strategies in this category may be implemented on some farms, but are not necessarily expected to be practicable or feasible at the majority of facilities. In addition, the actual reduction in emissions that can be achieved will also be variable and site-dependent. Reduction strategies in this category are considered equivalent to and can be substituted for specific Category A strategies; a new or expanding dairy implementing a Category B strategy as a substitute for a Category A strategy would be consistent with the Dairy CAP.

- Category C (Rejected as infeasible)

  Reduction strategies in this category were considered for dairies and feedlots but ultimately rejected. A comprehensive list of the strategies considered, along with an explanation as to why Category C strategies were rejected, is provided in Appendix C.

4.2 Reduction Strategies by Source

Table 4 lists Category A and Category B GHG reduction strategies, and provides references to accepted methodologies to quantify the emission reductions that can be achieved with the reduction strategies discussed below:

Dairy Operation Strategies (designated “D”)

This category of reduction strategies focuses on implementing practices designed to reduce animal- and manure-related emissions. Strategies include feed additives, ration formulation, and manure management approaches. Multiple methods exist to quantify reductions from these strategies.

Energy Conservation and Efficiency (designated "E")

Energy conservation and efficiency reduction strategies focus on decreasing the energy required during production. These strategies may include more efficient boilers and other energy systems, as well as replacing more fossil-fuel based energy sources with renewable energy.

Transportation (designated "T")

Transportation strategies include practices to reduce emissions from fossil-fuel based transportation. Strategies may reduce emissions off-site (e.g., employee trips) or on-site (e.g., farm equipment).

Water, Solid Waste, and Recycling (designated "R")

This category of reduction strategies focuses on practices designed to reduce GHG emissions related to water demand, solid waste processing, and use of other resources.

Miscellaneous (designated "M")

This category of reduction strategies represents additional reduction practices that are not otherwise included in the previous categories. These strategies range from simple practices such as planting trees (M1) to more extensive approaches such as innovative methods for reducing GHGs (M12).

Table 4. Potential GHG Reduction Strategies[53,54]

Dairy CAP Strategy #	Quantification Reference Strategy #[1]	Additional Details
Dairy Operations		
D1[55]	C9.1.5	Implement environmentally responsible purchasing of feed additives (i.e. use locally sourced materials and/or agricultural by-products such as citrus pulp and almond hulls, when available). This strategy must be consistent with total mixed ration (TMR) or other efficient feeding practices, as well as animal health and efficient milk production requirements. Multiple methodologies exist to calculate potential reductions from this strategy. These methodologies include, but are not limited to, a life cycle analysis of feed additives or an assessment of GHG emissions associated with the transportation of a specific feed mixture.

[53] Table 4 includes strategies grouped as Categories A and B; thus, this table includes all strategies included in Tables 5 and 6.
[54] Potential reduction strategies only apply to new dairies or the new area of expanding dairies. The County land use authority does not extend to existing dairy operations, and existing dairy operations are not required to implement reduction strategies.

Table 4. Potential GHG Reduction Strategies[53,54]		
Dairy CAP Strategy #	**Quantification Reference Strategy #[1]**	**Additional Details**
D2[55]	C9.1.5	Use a TMR or other efficient feeding strategy intended to maximize feed-to-milk production efficiency in lactating cows. Improving feed ration efficiency and advanced breeding has led to the production of milk at up to four times higher per cow than in the developing world, with much less methane produced per gallon of milk. Multiple methodologies exist to calculate potential reductions from this practice. These methodologies include, but are not limited to, calculating enteric GHG emissions resulting from a specific feed mixture.
D3	C9.1.4	Comply with nutrient management plans to reduce fertilizer requirements.[2],[3]
D4	C9.1.4	Comply with air and water quality plans to achieve GHG benefits.[2],[4]
D5[56]	S9(3)	Use a digester, designed and operated per applicable strategies, and the captured methane for energy use to displace fossil fuel use. Approaches include participation in centralized co-digestion facilities for processing dairy manure and landfill waste or in a digester project utilizing biomethane as a transportation fuel or for injection into natural gas pipelines or for electrical energy use on-site or off-site. The ARB provides a Cap-and-Trade offset protocol to calculate the emissions reductions potential from digesters.[57]
D6	O(1)	Use of scrape systems to divert manure from lagoon to another part of the storage system, including composting for on-site or off-site use.
D7	O(2)	Increase solids separation to reduce loading.
D8	11	Use pasture-based management practices. May be feasible for individual dairies or feedlots, but not as a County-wide approach.

[55] Changing the diet fed to animals is not always feasible or warranted. As described in Section 1.1, Tulare County dairies average high efficiency levels in milk production per cow. Altering animal diet may have little effect on GHG emissions, particularly GHG emissions per unit of milk.

[56] The economic and technological feasibility of digesters are highly dependent on the number of head and location of the farm, among other factors. Thus, a digester may not be feasible for a particular dairy.

[57] ARB. 2014. Compliance Offset Protocol – Livestock Projects Webpage. Available at: http://www.arb.ca.gov/cc/capandtrade/protocols/livestock/livestock.htm. Accessed August 2015.

Table 4. Potential GHG Reduction Strategies[53,54]		
Dairy CAP Strategy #	**Quantification Reference Strategy #[1]**	**Additional Details**
Energy Conservation and Efficiency		
E1	C2.1.1	The facility must meet or exceed Title 24 standards in climate-controlled buildings. (e.g., not barns)
E2	C2.1.3	Provide verification of energy savings (e.g., electric bills or third-party verification)
E3	C2.1.5	Install energy efficient boilers
E4	C2.1.4	Install energy efficient appliances (e.g., for milk cooling)
E5	C2.2.1	Install energy efficient area lighting
E6	C2.3.1	Establish onsite renewable or carbon-neutral energy systems – generic
E7	C2.3.2	Establish onsite renewable energy systems - solar power
E8	C2.3.3	Establish onsite renewable energy systems - wind power
E9	C2.3.4	Utilize a combined heat and power system
E10	C2.3.6	Establish methane recovery on digester for power production
Transportation [20 or more new employees]		
T1	C3.2.6	Provide bike parking if requested by employees
T2	C3.4.5	Provide end of trip facilities if requested by employees (e.g., shower for people biking)
T3	C3.4.11	Provide employer-sponsored vanpool/shuttle
T4	C3.1.5	Increase transit accessibility if adjacent to public transportation
T5	C3.4.12	Implement intra-farm bike-sharing
T6	C3.7.2	Utilize alternative fueled vehicles on-site
T7	C3.7.3	Utilize electric or hybrid vehicles on-site
Water, Solid Waste [NOT Manure Management], and Recycling		
R1	C4.2.2	Adopt a water conservation practice (e.g., maximizing water reuse, leak checking/fixing, low flow fixtures, etc.). The expected water reduction as compared to no action should be documented.
R2	C4.2.3	Design water-efficient landscapes (decorative landscaping only)

Table 4. Potential GHG Reduction Strategies[53,54]		
Dairy CAP Strategy #	**Quantification Reference Strategy #[1]**	**Additional Details**
R3	C4.2.4	Use water-efficient landscape irrigation systems (decorative landscaping only)
R4	C4.2.5	Reduce turf in landscapes and lawns (decorative landscaping only)
R5	C4.2.6	Plant native or drought-resistant trees and vegetation (decorative landscaping only)
R6	C6.1.1	Institute or extend recycling and non-manure composting services
R7	C4.1.3	Use locally sourced water supply
R8	C4.2.1	Install low-flow water fixtures (decorative landscaping only)
R9	C6.1.2	Recycle demolished construction material
Miscellaneous		
M1	C7.1.1	Plant trees
M2	C8.1.1	Use alternative fuels for construction equipment (construction only)
M3	C8.1.2	Use electric and hybrid construction equipment (construction only)
M4	C8.1.3	Limit construction equipment idling beyond regulation requirements (construction only) or limit idling by delivery and other operational vehicles
M5	C8.1.4	Institute a heavy-duty off-road vehicle plan
M6	C8.1.5	Implement a construction vehicle inventory tracking system (construction only)
M7	C9.1.3	Use local and sustainable building materials (construction only)
M8	C9.1.4	Additional BMPs in agriculture and animal operations[2]
M9	C9.1.5	Environmentally responsible purchasing[2]
M10	C9.1.6	Implement an innovative strategy for GHG reductions[2]
M11	C9.1.7	Implement within the existing portion of a facility a Category A strategy or a Category B strategy to the same or greater extent as would have been done for the expanded portion.

Table 4. Potential GHG Reduction Strategies[53,54]		
Dairy CAP Strategy #	**Quantification Reference Strategy #[1]**	**Additional Details**

[1] Reference reduction strategies beginning with "C" refer to CAPCOA's Quantifying Greenhouse Gas Mitigation Measures, which includes detailed emission reduction methodology.

[2] Calculated on a case-by-case basis.

[3] An example is minimizing additional manmade fertilizer usage.

[4] Examples of reduction strategies in air and water quality plans with GHG reduction co-benefits include: recycling flush lane water, BMPs designed to reduce water leaks (and corresponding reduction in indirect GHG emissions from water usage).

4.3 Feasibility Assessment Considerations

As discussed in the above sections, reduction strategies that are feasible or practicable for one farm may be infeasible or impracticable for another farm; that is why a range of categorized strategies was included in the above tables. Although the feasibility or practicability assessment will be dependent on the specific reduction strategy and farm, there are several aspects that will likely be taken into account for all reduction strategies. These considerations include, but are not limited to, the following:

- Economics: Does implementing the reduction strategy place a financial burden on the farmer without sufficient benefits?
- Size: Does the reduction strategy make sense for the size of the farm?
- Consistency with existing management practices (expanding dairies): Is the reduction strategy consistent with the existing practices used on the farm so that animal health, efficient milk production, manure reuse potential, etc. are not compromised and that operational changes are not so burdensome as to be impracticable or infeasible?

4.4 Additional Considerations

Greenhouse gases are a global pollutant. As such, GHG emissions – and reductions – on a global scale must be considered; a reduction in California that results in a corresponding or greater increase elsewhere does not produce benefits on a global scale. This concept, referred to as "leakage", refers to "a reduction in emissions of [GHGs] within the state that is offset by an increase in emissions of [GHGs] outside the state."[58] One of the main considerations of AB 32, SB 32 and SB 1383 is

[58] AB 32. §38505(j).

minimizing leakage. In fact, the text of AB 32 commits ARB to minimize leakage when adopting regulations pursuant to the goals of the original regulation.[59,60]

California dairies are more efficient in terms of GHG emissions per unit of milk than average U.S. dairies elsewhere (see Section 1.1). In addition, manure management policies mandated by the SJVAPCD and the Regional Water Quality Review Board result in less time for manure to remain in anaerobic conditions that are conducive to methane formation during decomposition than most other operations outside of California. Thus, if policies or other factors encourage dairies to move out of California or increase operations outside of California, then it is likely to result in an artificial decrease in the state inventory as the associated GHG emissions would simply shift to out-of-state facilities. Any regulations, practices, or programs that force dairies to move out of the state, thereby shifting the corresponding GHG emissions out of the state, would result in leakage and would conflict with the objectives of AB 32, SB 32 and SB 1383. This same consideration applies to regulations, practices, or programs that force dairies to move out of Tulare County, thereby shifting the corresponding GHG emissions to other counties.

All currently available emissions reduction strategies have been considered and analyzed. As discussed in Section 8, the Dairy CAP provides for a post-2023 examination of the Dairy CAP, consistent with funding availability, to reflect new developments. If new feasible methods of reducing GHG emissions from dairies and feedlots become available (e.g., new offset protocols), these new emissions reduction strategies will be considered and may be incorporated into future Dairy CAP updates as appropriate.

[59] AB 32. §38562(b)(8).
[60] SLCP Strategy, pages 64, 67, and 138. Available at: https://www.arb.ca.gov/cc/shortlived/meetings/03142017/final_slcp_report.pdf. Accessed April 2017.

5 CEQA Implications

As discussed above in Section 2.2.5, any project that requires discretionary action in California (defined in CEQA Guidelines §15378) is required to undergo a CEQA evaluation, with the corresponding requirements to assess impacts of GHGs. Any new or expanding dairy or feedlot requiring a discretionary action will be required to demonstrate that the facility has fulfilled CEQA requirements, including the requirements related to GHGs. This section discusses the requirements of new or expanding facilities and how they can use this Dairy CAP to fulfill CEQA requirements related to GHGs.

5.1 Approach to Cumulatively Considerable Level Assessment

One criterion used to assess potential significance of GHG emissions from projects is whether the project would "conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of [GHGs]."[61] This Dairy CAP was designed specifically to reduce GHG emissions from dairies and feedlots and to be consistent with State and Federal plans, policies, and regulations. Any new or expanding facility that can demonstrate consistency with this Dairy CAP can be expected to have less than significant impacts related to GHGs. Specifically, the approach proposed by this Dairy CAP is that a facility can fulfill CEQA requirements related to GHG emissions under one of two approaches:

1. Streamlined analysis: The facility (other than a new facility) has emissions that are below the streamlined analysis level and is implementing Dairy CAP GHG emission reduction strategies consistent with the Dairy CAP. An analysis must be done to determine consistency with this Dairy CAP. If the facility can demonstrate consistency with the Dairy CAP by showing that it has implemented reduction strategies from a defined checklist of GHG reduction practices (or demonstrated why a specific applicable Category A reduction strategy would be impracticable or infeasible for the specific facility expansion and implements a substitute Category B reduction strategy), then the facility expansion does not need to undergo further analysis and the project is considered to have less than cumulatively considerable GHG impact. The proposed checklist will include reduction strategies in Category A (see Section 4).

2. Project analysis: If the facility is a new dairy OR it is facility expansion with emissions in excess of the streamlined analysis level OR the facility is a facility expansion with emissions that are less than the streamlined analysis level and does not provide justification as to why the facility expansion cannot incorporate the applicable Dairy CAP-defined GHG reduction strategies (i.e., Category A strategies) or provides a justification but does not

[61] Office of Planning and Research (OPR). 2014. CEQA checklist. Section VII.b. Greenhouse Gases. Available at http://resources.ca.gov/ceqa/docs/2014_CEQA_Statutes_and_Guidelines.pdf. Appendix G. Environmental Checklist Form. Accessed April 2014.

substitute a Category B reduction strategy for the applicable Category A strategy, then the facility expansion must perform additional individualized analyses to indicate whether the project has cumulatively significant impacts related to GHGs. All new facilities will be required to perform an individualized analysis of GHG emissions.

5.2 Cumulatively Considerable Streamlined Analysis Level Determination

An element of a CAP is to establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable. The determination of a level of cumulative contribution due to GHG emissions from dairies and feedlots is informed by the statewide AB 32 Scoping Plan for 2020 and the 2017 Scoping Plan Update and the SLCP Strategy, which are designed to identify the sources of GHG emissions reductions that will achieve the reductions mandated by AB 32, SB 32 and SB 1383. SB 1383 takes into consideration the GHG emissions from the dairy sector through the year 2023 and requires no reductions in animal-related emissions prior to 2024.

For purposes of the Dairy CAP, a list of emissions reductions approaches has been formulated to address GHG emissions from new and expanding dairies. A streamlined climate change evaluation under CEQA would be applied to those projects (other than a new facility) with emissions below a certain level of GHG emissions and which also incorporate available feasible GHG reductions approaches consistent with the Dairy CAP. All new dairies, as well as any facility expansions that either exceed the streamlined analysis level or that fail to incorporate the applicable emissions reduction approaches, would be required to perform an individualized CEQA review.

In order to define the emissions level for purposes of performing an individualized CEQA review, a review was performed of existing CEQA significance thresholds as well as criteria for other GHG programs. Note that this streamlined analysis level is not intended to constitute a threshold for determining significance of GHGs under CEQA. Instead, this streamlined analysis level is designed to be one aspect of an approach to determining the level of analysis required under CEQA. This review and proposed definitions are discussed below.

5.2.1 Existing Criteria and Thresholds

Thresholds for GHGs have been identified for significance under CEQA as well as for other programs requiring reporting. These thresholds can generally be grouped into three categories: numerical thresholds, efficiency metrics, and improvements over a Business-as-Usual (BAU) scenario.

- Numerical thresholds – This type of threshold is often referred to as a “bright-line threshold” and consists of a specific numerical threshold that applies to certain types of projects. For example, the South Coast Air Quality Management District (AQMD) has defined a numerical threshold of 10,000 MT

CO_2e/year applicable for stationary source projects. Any relevant project with GHG emissions above this threshold is considered to have significant impacts from GHGs. Numerical thresholds have been defined by multiple AQMDs and considered applicable primarily to industrial stationary source projects. There are also several numerical thresholds that have been specifically defined for land use projects.

In addition to CEQA significance thresholds, there are multiple numerical thresholds used to determine inclusion in other GHG-related programs, such as ARB's Cap-and-Trade Program and Mandatory Reporting Program.

- Efficiency metrics – This type of threshold compares project emissions normalized over a service population to a defined threshold. For example, the Bay Area AQMD has defined a service population efficiency metric of 4.6 MT CO_2e/service population/year. The efficiency metric is calculated by quantifying the project's annual GHG emissions and normalizing by the service population (typically residents and employees). If the project's calculated metric is greater than the defined threshold, then the project is considered to have significant impacts from GHGs. The efficiency metrics thresholds defined by AQMDs to date have only been applied to land use development projects; no efficiency metrics thresholds have been defined for industrial projects.

  Because these thresholds have only been defined for land use development projects, these thresholds were rejected for purposes of this Dairy CAP.

  Although these thresholds are rejected for purposes of this Dairy CAP, efficiency metrics could serve a useful role in the dairy industry. As discussed in Section 1.1, one type of efficiency metric, e.g., GHG emissions per unit of milk produced, provides useful information on how farms have improved over time. These efficiency metrics will continue to provide useful information and future Dairy CAPs may wish to consider their use. However, they are not used for purposes of this Dairy CAP.

- Improvements compared to BAU – This type of threshold requires that a project show a defined percent reduction compared to a BAU scenario for a determination of less than significant. For example, the SJVAPCD has set a 29% reduction compared to BAU as the threshold for significance for CEQA projects that do not meet other requirements. This requires that a project proponent define a BAU scenario and calculate expected emissions from this scenario. If the project emissions demonstrate a 29% reduction as compared to BAU emissions, then the project is considered to be less than significant for GHG emissions.

  A BAU scenario is the set of conditions reasonably expected to occur, taking into account current laws and regulations, but in the absence of additional GHG reduction measures. In addition, as discussed in Section 3, the majority of emissions from dairies and feedlots are animal-related whereas the majority of potential reduction measures focus on other emissions sources. Livestock-

related emissions reductions strategies under the AB 32 Scoping Plan for 2020 and the 2017 Scoping Plan Update include no required reductions and are limited exclusively to voluntary, incentive-based programs through at least 2023 due to the unavailability of feasible measures to reduce these types of emissions. Because of the lack of feasible emissions reduction strategies for livestock-related emissions as well as the consequent difficulty in defining a BAU scenario for a dairy or feedlot, defined percent reduction thresholds were rejected for the purposes of this Dairy CAP.

A summary table of the existing criteria and thresholds discussed above are provided in Appendix D.

5.2.2 Streamlined Analysis Level

As described in Section 1.2, CEQA Guidelines for GHG emissions reduction plans, such as this Dairy CAP, have been developed by OPR and adopted by the CNRA. The guidelines (CEQA Guidelines §15183.5) specify that a plan for the reduction of GHG emissions should include or address specific elements. One of these elements includes:

- Establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable.

As discussed above, both the efficiency metrics thresholds and BAU thresholds were rejected, and the review focused on the numerical thresholds. A streamlined analysis level of 25,000 MT CO_2e/year was chosen because:

- It is consistent with ARB's Cap-and-Trade program as well as with USEPA's Mandatory Reporting Rule;
- Per the USEPA's Mandatory Reporting Rule, it covers approximately 85 to 90% of emissions and the majority of large emitters;
- ARB's Mandatory Reporting Rule (10,000 MT CO_2e/year) currently excludes emissions from livestock manure management (Of note, the USEPA's Mandatory Reporting Rule also currently excludes emissions from livestock manure management (Subpart JJ));
- A threshold of 10,000 MT CO_2e/year has been defined as a CEQA significance threshold in other jurisdictions. As stated above, the streamlined analysis level in this Dairy CAP is not intended, nor is it meant to be used, as a significance threshold under CEQA. Using a threshold that has instead been used to determine applicability of other GHG emissions reduction programs, such as ARB's Cap-and-Trade program and USEPA's Mandatory Reporting Rule, was deemed to be more consistent with the CEQA Guidelines streamlining process.

5.3 Proposed CEQA Checklist

Table 5 lists the Category A reduction strategies, which new or expanding dairies or feedlots must (1) incorporate into their facility to the extent applicable based on the

or (2) provide justification as to why the given strategy is impracticable or infeasible for the facility.

Table 6 lists the Category B reduction strategies, which new or expanding dairies or feedlots must consider for implementation at the facility. It is anticipated that a facility may choose to replace a reduction strategy in Table 5 with a strategy in Table 6 to provide operational flexibility in reducing GHG emissions. In addition, if expanding facilities are not able to implement Category A reduction strategies, or substitute Category B strategies, in the expansion, the facility may choose to utilize strategy M11 to implement an equal number of Category A or B strategies within the **existing** portion of the facility to the same or greater extent as would have been done for the expanded portion.

Table 5. Category A Reduction Strategies for Implementation at New or Expanding Facilities Consistent with the Dairy CAP

Checklist #	Reference # (Appendix C)	Reduction Strategies
Dairy Operations		
D1	C9.1.5	Implement environmentally responsible purchasing of feed additives (i.e. use locally sourced materials and/or agricultural by-products such as citrus pulp and almond hulls, when available). This measure must be consistent with TMR or other efficient feeding strategies, as well as animal health and efficient milk production requirements.
D2	C9.1.5	Use a TMR or other efficient feeding strategy intended to maximize feed-to-milk production efficiency in lactating cows.
D3	C9.1.4	Comply with nutrient management plans to reduce fertilizer requirements (i.e., GHG emissions associated with fertilizer production and transportation)
D4	C9.1.4	Comply with air and water quality plans to achieve GHG benefits (e.g., less water usage)
Energy		
E1	C2.1.1	The farm must meet or exceed Title 24 standards in climate-controlled buildings (e.g., not barns)
E2	C2.1.3	Provide verification of energy savings (e.g., electric bills or third-party verification)
E3	C2.1.5	Install energy efficient boilers
E4	C2.1.4	Install energy efficient appliances (e.g., for milk cooling)
E5	C2.2.1	Install energy efficient area lighting
Transportation [20 or more new employees]		
T1	C3.2.6	Provide bike parking if requested by employees

Table 5. Category A Reduction Strategies for Implementation at New or Expanding Facilities Consistent with the Dairy CAP		
Checklist #	**Reference # (Appendix C)**	**Reduction Strategies**
T2	C3.4.5	Provide end of trip facilities if requested by employees (e.g., shower for people biking)
Water, Solid Waste, and Recycling (if available and not prohibited by USDA, CDFA, or other government agencies)		
R1	C4.2.2	Adopt a water conservation strategy
R2	C4.2.3	Design water-efficient landscapes (decorative landscaping only)
R3	C4.2.4	Use water-efficient landscape irrigation systems (decorative landscaping only)
R4	C4.2.5	Reduce turf in landscapes and lawns (decorative landscaping only)
R5	C4.2.6	Plant native or drought-resistant trees and vegetation (decorative landscaping only)

Table 6. Category B Reduction Strategies for Consideration at New or Expanding Facilities (may be used as substitutes for Category A Strategies)		
Checklist #	**Reference # (Appendix C)**	**Reduction Strategies**
Dairy Operations		
D5	S9(3)	Use a digester, designed and operated per applicable standards, and the captured methane for energy use to displace fossil fuel use. Approaches include participation in centralized co-digestion facilities for processing dairy manure and landfill waste or in a digester project utilizing biomethane as a transportation fuel or for injection into natural gas pipelines or for electrical energy use on-site or off-site.
D6	O(1)	Use scrape systems to divert manure from lagoon to another part of the storage system, including composting for on-site or off-site use.
D7	O(2)	Increase solids separation to reduce loading.
D8	11	Use pasture-based management practices. May be feasible for individual dairies or feedlots, but not as a Countywide approach.
Energy		
E6	C2.3.1	Establish onsite renewable or carbon-neutral energy

Table 6. Category B Reduction Strategies for Consideration at New or Expanding Facilities (may be used as substitutes for Category A Strategies)		
Checklist #	**Reference # (Appendix C)**	**Reduction Strategies**
		systems - generic
E7	C2.3.2	Establish onsite renewable energy systems - solar power
E8	C2.3.3.	Establish onsite renewable energy systems - wind power
E9	C2.3.4	Utilize a combined heat and power system
E10	C2.3.6	Establish methane recovery on digester
Transportation		
T3	C3.4.11	Provide employer-sponsored vanpool/shuttle
T4	C3.1.5	Increase transit accessibility if adjacent to public transportation
T5	C3.4.12	Implement intra-farm bike-sharing
T6	C3.7.2	Utilize alternative fueled vehicles on-site
T7	C3.7.3	Utilize electric or hybrid vehicles on-site
Water, Solid Waste, and Recycling		
R6	C6.1.1	Institute or extend recycling and composting services
R7	C4.1.3	Use locally sourced water supply
R8	C4.2.1	Install low-flow water fixtures (decorative landscaping only)
R9	C6.1.2	Recycle demolished construction material
Miscellaneous		
M1	C7.1.1	Plant trees
M2	C8.1.1	Use alternative fuels for construction equipment (construction only)
M3	C8.1.2	Use electric and hybrid construction equipment (construction only)
M4	C8.1.3	Limit construction equipment idling beyond regulation requirements (construction only) or limit idling by delivery and other operational vehicles
M5	C8.1.4	Institute a heavy-duty off-road vehicle plan (construction only)
M6	C8.1.5	Implement a construction vehicle inventory tracking system (construction only)

Table 6. Category B Reduction Strategies for Consideration at New or Expanding Facilities (may be used as substitutes for Category A Strategies)		
Checklist #	**Reference # (Appendix C)**	**Reduction Strategies**
M7	C9.1.3	Use local and sustainable building materials (construction only)
M8	C9.1.4	Additional BMPs in agriculture and animal operations
M9	C9.1.5	Environmentally responsible purchasing
M10	C9.1.6	Implement an innovative strategy for GHG reductions
M11	C9.1.7	Implement within the existing portion of a facility a Category A strategy or a Category B strategy to the same or greater extent as would have been done for the expanded portion.

6 Implementation and Monitoring

The Tulare CAP discusses implementation and monitoring, and this Dairy CAP will be subject to the relevant provisions in that document pertaining to operational activities common to any use or industry. As discussed throughout this document, because of the differences inherent in the dairy sector that have been described previously in the document, a mandated reduction target would be inconsistent with the state legislation that provides for only voluntary reductions in animal-related emissions prior to 2024. However, it is important to track the progress of the dairy industry related to the goal of this Dairy CAP, namely maintaining the efficiency of milk production and, when possible, implementing GHG emissions reduction strategies. As such, this document proposes using a voluntary benchmark to track the progress of the County's dairy sector in that regard. This approach is consistent with the continued voluntary nature of emissions reduction strategies for dairies under state law.

Voluntary benchmarks have been formulated in recognition of the voluntary reductions under state law and the availability of new funding opportunites to support and incentivize those voluntary efforts. For example, existing state subsidies and incentive-based programs (e.g., AB 1613, which allocates $50 million to support voluntary emissions reductions projects) provide opportunities for voluntary animal-related emissions reductions for new and expanding dairies as well as existing dairies. These voluntary benchmarks have been devised based upon emissions reduction projects that may be funded through available state incentives and subsidies and are dependent on voluntary efforts by dairies and project developers.

Any numerical target for such a voluntary benchmark is difficult to project given the variables likely to affect the number and scope of emissions reduction projects within the County through 2023. Recognizing these difficulties, the voluntary benchmark target for this Dairy CAP has been based upon existing funding opportunities, the assumed percentage of funding available to Tulare County, and assumed GHG emissions reductions per dollar of funding, as described below. Monitoring progress compared to the voluntary benchmark target would be a useful measure of the effectiveness of subsidies and incentives in realizing potential reductions.

While the $50 million earmarked under AB 1613 for projects to reduce animal-related emissions provides initial funding, it is possible that such funding for construction of dairy digester and other projects will continue in future years.[62] It is reasonable to assume that Tulare County dairies and project developers will compete effectively to qualify for a significant share of any such funds for specific

[62] SLCP Strategy, pages 67-68. Available at: https://www.arb.ca.gov/cc/shortlived/meetings/03142017/final_slcp_report.pdf. Accessed April 2017.

projects. In fact, if Tulare County's share is commensurate with its ratio of dairy cows, which is approximately 27.3% of the state's dairy cattle population according to CDFA's "California Dairy Statistics Annual 2015 Data," it could garner more than a quarter of the AB 1613 funds to reduce emissions from dairies.[63] This would significantly boost opportunities to see reductions in dairy GHG emissions from existing dairies (as well as dairy expansions and new dairies).

Digester projects are anticipated to compete for this funding more favorably than other methane reduction projects due to the high methane emissions reductions return on each dollar invested. Based on a 2015 analysis by Ramboll Environ, emissions reductions from dairy digesters over the first ten years of operation are estimated to occur at approximately one metric ton of carbon dioxide equivalent per $7 of public funds invested.[64] Stated another way, each $70 invested in digester projects would enable the reduction of the dairy GHG emissions inventory by one metric ton per year.

The initial benchmark target through 2023 has been projected based on the following assumptions: (a) the continuation of similar annual amounts of state funding in years 2017 to 2021, for total funding of $300 million (including the initial $50 million under AB 1613), which is not a certainty; (b) such state funding has a 10% administrative cost, (c) Tulare County projects receiving a 27.3% share of those funds, a ratio consistent with its share of the total statewide dairy cow population; (d) the construction, completion and operation of those funded projects by no later than 2023, and (e) each $70 invested enables the reduction of GHG emissions by one metric ton per year.

Applying these assumptions above, the benchmark target for these voluntary emissions reductions within the County by 2023 would be approximately 1.05 million metric tons of GHG emissions per year. If those same metrics are applied solely to the initial 2016 funding of $50 million under AB 1613, the annual emissions reductions within the County would approximate 176,000 metric tons of GHG emissions.

The initial voluntary benchmark target utilizes both of these projections. That initial voluntary benchmark target is subject to possible review to reflect the actual pace and number of voluntary projects that are initiated and implemented as these subsidy programs evolve and, as noted, may be adjusted over the course of time as these voluntary efforts progress.

Although this Dairy CAP focuses on new and expanding dairies, the County will also track the implementation of Category A and B reduction strategies on *existing*

[63] California Department of Food and Agriculture. 2015. California Dairy Statistics Annual. 2015 Annual Data. Available at: https://www.cdfa.ca.gov/dairy/pdf/Annual/2015/2015_Statistics_Annual.pdf. Accessed April 2017.

[64] "Overview of Dairy Digester Greenhouse Gas Reduction Cost-Benefit Analysis," by Ramboll Environ, December 2015, http://dairycares.com/sites/default/files/Digester%20memo%20151216.pdf

dairies. Often, existing, well-established dairies are in better financial condition to implement new practices that are outside the purview of "typical" operating scenarios on a dairy. It is important to account for reductions that occur at existing dairies, even if the existing dairies are not required to implement any of the reduction strategies discussed herein. Thus, monitoring will apply to existing dairies as well as new and expanding dairies.

The following are suggestions for periodic monitoring and review of the implementation of the Dairy CAP:

- Number of dairy permitting projects: A review of dairy permitting projects in Tulare County will be completed every five years, consistent with funding availability but in no event later than 2024. This review will monitor the number of new and expanding dairies that are permitted using the two possible approaches described in Section 5.1.
- Ease of permitting approaches: As part of the review described above, an evaluation of the ease of using the two possible approaches will be obtained from the perspective of the County's permitting section as well as the project applicant.
- Analysis of reduction strategies: As part of that review, Tulare County staff will enumerate the number of Category A and B strategies that have been implemented on new, expanding, and existing dairies, based upon a review of ACFP Annual Compliance Reports for existing dairies and Mitigation Monitoring and Reporting Programs for new dairies and dairy expansions. To the extent possible and subject to funding availability, staff will also estimate the potential reductions that have been achieved by using site-specific information when available from the farmer. Those estimates of quantified emissions reductions will be utilized to gauge the progress in meeting the voluntary emissions reduction benchmark targets.

In addition, consistent with the timetable established under SB 1383 and the SLCP Strategy, the County will re-examine the Dairy CAP post-2023 as provided in Section 8.

7 Future Project GHG and Climate Change Evaluations

This Dairy CAP is intended to serve as a GHG reduction plan for the purpose of evaluating and addressing impacts of GHG emissions and climate change from future projects (CEQA Guidelines §15183.5). Because the Dairy CAP is intended to reduce the climate change impacts from new or expanding dairies and feedlots to a less than cumulatively considerable level, consistency of a future project with the Dairy CAP may be used to evaluate a project's GHG-related impacts. Projects that are determined to be consistent or in compliance with the emissions reduction strategies and policies of the Dairy CAP, as discussed in Section 5, are presumed to have a less than significant impact on climate change. (See CEQA Guidelines §15064.4(b)(3))

Thus, a new or expanding dairy classified as requiring a project analysis (i.e., not eligible for streamlined CEQA compliance) must complete a site-specific GHG evaluation that complies with the applicable CEQA requirements, including the extent to which the project complies with Dairy CAP requirements (CEQA Guidelines section 15064.4(b)). (The project analysis would be performed consistent with the requirements of ACFP Policy 2.5.4). As described in Section 5.1, a facility is classified as requiring a project analysis if:

- The facility is a new dairy or feedlot, OR
- The facility expansion has emissions above the streamlined analysis level of 25,000 $MTCO_2e$, OR
- The facility expansion does not provide justification for why the facility expansion cannot incorporate the applicable Category A GHG reduction strategies based on the scope of the expansion, or provides a justification but does not implement a substitute Category B reduction strategy for each such Category A strategy.

This classification indicates that the project MAY have cumulatively considerable impacts related to GHGs and additional CEQA analysis must be done.

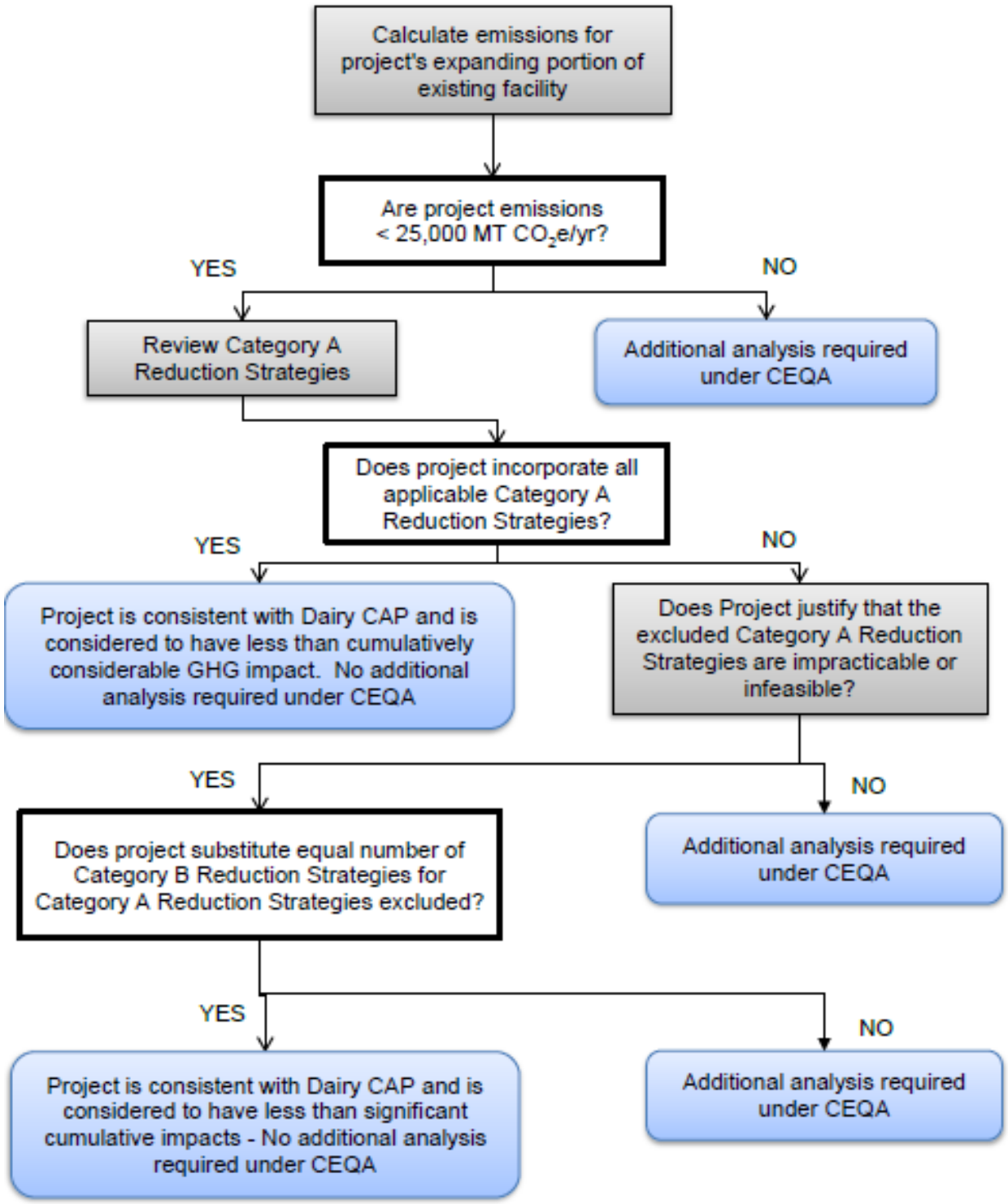
A proposed project's CEQA environmental review that utilizes this Dairy CAP for GHG emissions and climate change impact analysis for streamlined CEQA compliance must identify the requirements specified in the Dairy CAP that apply to the project. If the applicable reduction strategies are not otherwise binding and enforceable, they would be incorporated as conditions of approval for the project. (The streamlined CEQA compliance procedures would be consistent with the requirements of ACFP Policy 2.5.3.)

If Tulare County initially determines that a proposed project is not consistent with the Dairy CAP, it will be necessary to evaluate other project design and/or mitigation measures to make the project consistent with the Dairy CAP, or further

analyze climate change impacts for significance. If a project cannot be shown to be consistent with the Dairy CAP, an environmental impact report (EIR) analysis (i.e., alternatives discussion and analysis, additional mitigation assessment, etc.) may be required.

Figure 1 illustrates this approach to determining whether an expansion facility is consistent with the Dairy CAP or would require additional CEQA analysis. All new dairies will be required to perform a project analysis under CEQA.

Figure 1. Flow Chart Illustrating Method of Determining Required Level of Analysis for CEQA for Facility Expansions.



8 Future Related Actions

At this time, the feasible approaches to reducing animal-related GHG emissions are limited. The County, as the location of a significant portion of dairy production operations statewide and, indeed, nationwide, is, consistent with funding available, committed to participating at all levels in promoting and developing programs to facilitate feasible GHG emissions reductions strategies for the dairy sector.

The most promising technology for addressing animal-related GHG emissions is the implementation of digesters. Under the AB 32 Scoping Plan for 2020 reductions and the SLCP Strategy for SB 32 and AB 1383 2030 reductions, dairy digesters are identified as a voluntary approach to reduce GHG emissions until at least 2024 in large part due to economic infeasibility in the absence of significant subsidies, cooperation from local utilities in providing feasible and extended energy purchase terms, and infrastructure coordination and bundling of individual dairies. As noted in Section 6, state subsidies and incentive-based programs, including AB 1613, provide funding sources for both dairy digesters and other animal-related emissions reduction strategies.

Consistent with the funding availability, the County is committed to spearheading efforts to tap into state and federal subsidy programs, to monitor new developments at the state level relative to dairy emissions and emissions reduction strategies, to provide support and education to promote the opportunities presented by state funding and to optimize participation by dairies within the County, to establish pilot programs, to streamline permitting requirements for digester projects and other emissions reduction strategies, to track and document the GHG emissions reductions and effectiveness of digesters, and to solicit and maintain an inventory of interested dairies. Specific initiatives by the County may include the following:

- Incentivize Funding – Consideration of County policies by resolution to actively coordinate with ARB, CEC, and CDFA to encourage continued and increased availability of incentive funding (via cap-and-trade revenues, including AB 1613 funding sources) to allow construction of dairy digesters in the County, to identify appropriate incentives for dairy digester projects in the County, and to ensure that dairies within the County have maximum access to these opportunities.
- Dairy Digester Information Officer – Designate within the County's Resource Management Agency a Dairy Digester Information Officer whose duties will include:
  - Maintaining an inventory of operating dairy digesters in the County;
  - Maintaining current information on dairy digester incentive programs, opportunities, and application deadlines;
  - Distributing via email to interested parties updates on dairy digester and other emissions reduction strategies incentives; and

- Co-sponsoring with Dairy Cares, Tulare County Farm Bureau, University of California Cooperative Extension, and other organizations an annual fair or symposium for dairy farmers that provides up-to-date information on digesters and other emissions reduction strategies and related technologies and incentives, while providing access to digester developers, lenders, investors, utilities, engineering firms, and energy companies.

These efforts are designed to promote the County and its dairy sector as an optimal location for digester investment and development.

In addition, consistent with funding availability, the County will monitor the implementation of the 2016 legislation as it relates to dairy methane emissions and will conduct a post-2023 examination of the Dairy CAP to determine whether the Dairy CAP has been superseded by the enactment of state regulations that mandate emissions reductions, and to assess whether modifications are needed in order to reduce the possibility of duplication of or conflicts with state level actions. To the extent that the Dairy CAP may be superseded by state regulations, the Conformance Checklist in Appendix A of the ACFP may be modified to reflect the state regulations in order to reduce the possibility of duplication of or conflicts with state level actions, and the County may continue to implement Policies 2.5-3 and 2.5-4 of the ACFP.

9 References

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Appendix A

Emission Calculations

Dairy and Feedlot Emissions Calculations for Manure Decomposition and Enteric Fermentation

Table A-1. Feedlot Cattle Head counts

Category	Total Cattle	Other Cattle[a]
California (2012)[b]	5,350,000	1,816,164
Base Year (2012)[b]	1,030,000	133,886
Future Year (2023)[c]	1,195,357	155,380

Notes:

[a] This category is assumed to include all cattle other than milking cows, replacement dairy heifers (0-24 months), and dairy calves (see Table A-3).

[b] California Agricultural Statistics for 2013. Available at:
http://www.nass.usda.gov/Statistics_by_State/California/Publications/California_Ag_Statistics/index.asp

[c] The Future Year population is projected from the Base Year assuming a 1.5% annual growth rate.

Table A-2. Methane and Nitrous Oxide Emissions Beef Cattle - Enteric Digestion and Manure Management

Source	Enteric Digestion	Manure Management	
	CO_2e (MMT CO_2e/yr)		
California (2012)[a]	3.1	0.40	
	CH_4 (MT CH_4/yr)	CH_4 (MT CH_4/yr)	N_2O (MT N_2O/yr)
California (2012)[a]	123,207	5,269	905
Base Year (2013)[b]	9,083	388	67
Future Year (2023)[b]	10,541	451	77
	CO_2e (MT CO_2e/yr)[c]	CO_2e (MT CO_2e/yr)[c]	
California (2012)[a]	3,080,184	401,499	
Base Year (2013)[b]	227,068	30,399	
Future Year (2023)[b]	263,522	35,279	

[a] California populations and methane emissions are from the CARB 2000-2012 GHG Inventory for the year 2012. Data available here: http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_by_ipcc_00-12_2014-03-24.xlsx Accessed April 2015.

[b] CARB uses the same methodology that EPA uses to estimate emissions from enteric fermentation and manure management. As such, this table assumes that Tulare emissions are proportional to the California emissions based on population.

[c] CO_2e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWP is 25 for CH_4 and 298 for N_2O (Table A-1, 40 CFR Part 98).

Abbreviations:
CFR - Code of Federal Regulations
CH_4 - methane
CO_2e - carbon dioxide equivalents
GWP - global warming potential
IPCC - Intergovernmental Panel on Climate Change
lbs - pounds
MT - metric tonne
yr - year

Table A-3. Dairy Cattle Head Counts

Category	Dairy Cows	Dairy Heifers 0-12 mo	Dairy Heifers 12-24 mo	Dairy Calves
California (2012)[a]	1,780,000	245,322	588,161	920,353
Base Year (2013)[b]	543,431	137,985	148,928	65,770
Future Year (2023)[b]	630,674	160,137	172,837	76,329

Notes:

[a] California populations and methane emissions are from the CARB 2000-2012 GHG Inventory.

[b] The Base Year cattle populations are assumed to be the 2011 Tulare cattle populations. The Future Year cattle populations are projected assuming a 1.5% annual growth rate.

Table A-4. Methane Emissions from Enteric Fermentation - Dairy Cattle

Category	Dairy Cows	Dairy Heifers 0-12 mo	Dairy Heifers 12-24 mo	Dairy Calves
CO_2e (MMT CO_2e/yr)				
California (2012)[a]	6.641	0.281	1.017	0.282
CH_4 (kg CH_4/yr)				
California (2012)[a]	265,623,543	11,240,117	40,681,265	11,270,084
Base Year (2013)[b]	81,094,420	6,322,171	10,300,886	805,379
Future Year (2023)[b]	94,113,385	7,337,137	11,954,599	934,676
CO_2e (MT CO_2e/yr)[c]				
California (2012)	6,640,589	281,003	1,017,032	281,752
Baseline (2013)	2,027,360	158,054	257,522	20,134
Future Year (2023)	2,352,835	183,428	298,865	23,367

Notes:

[a] California populations and methane emissions are from the CARB 2000-2012 GHG Inventory for the year 2012. Data available here: http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_by_ipcc_00-12_2014-03-24.xlsx Accessed April 2015.

[b] CARB uses the same methodology that EPA uses to estimate emissions from enteric fermentation. As such, this table assumes that Tulare methane emissions are proportional to the California methane emissions based on population.

[c] CO_2e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWP is 25 for CH_4 (Table A-1, 40 CFR Part 98).

Abbreviations:
CARB - California Air Resources Board
CFR - Code of Federal Regulations
CH_4 - methane
CO_2e - carbon dioxide equivalents
GHG - greenhouse gas
GWP - global warming potential
kg - kilogram
mo - months old
MT - metric tonne
yr - year

Table A-5. Dairy Cattle Head Counts

Category	Dairy Cows	Dairy Heifers
Base Year (2013)[a]	534,633	352,683
Future Year (2023)[a]	620,463	409,303

Notes:

[a] The Base Year cattle populations are assumed to be the 2011 Tulare cattle populations. The Future Year cattle populations are projected assuming a 1.5% annual growth rate.

Table A-6. Methane Emissions from Manure Management - Dairy Cows

	Base Year (2013)			Future Year (2023)						
	$CH_{4,man}$ (kg CH_4/yr)[a]	V_{ex} (kg/yr)[b]	$WMS*N_{animals}$ (animal)[c]	$CH_{4,man}$ (kg CH_4/yr)[a]	V_{ex} (kg/yr)[b]	$WMS*N_{animals}$ (animal)[c]	VS (kg VS/animal/yr)[d]	B_0 (m^3 CH_4/kg VS)[e]	MCF (%)[f]	c_1 (kg/m^3)[g]
Anaerobic digester	519,273	18,057,107	6,374	602,638	20,956,010	7,397	2,833	0.24	0.181	0.662
Anaerobic lagoon	104,734,878	881,293,371	311,081	121,549,102	1,022,776,936	361,023	2,833	0.24	0.748	0.662
Daily spread	126,968	159,828,502	56,417	147,351	185,487,502	65,474	2,833	0.24	0.005	0.662
Deep pit	82,721	1,568,222	554	96,001	1,819,986	642	2,833	0.24	0.332	0.662
Dry lot	0	0	0	0	0	0	2,833	0.24	0.015	0.662
Liquid/slurry	16,133,214	305,853,583	107,961	18,723,253	354,955,570	125,293	2,833	0.24	0.332	0.662
Pasture	24,229	10,166,642	3,589	28,119	11,798,804	4,165	2,833	0.24	0.015	0.662
Solid storage	876,051	137,847,860	48,658	1,016,693	159,978,070	56,469	2,833	0.24	0.04	0.662
Total	122,497,334	--	534,633	142,163,157	--	620,463	--	--	--	--
Total (MMT CO_2e/yr)[h]	3.1			3.6						

Table A-7. Methane Emissions from Manure Management - Dairy Heifers

	Base Year (2013)			Future Year (2023)						
	$CH_{4,man}$ (kg CH_4/yr)[a]	V_{ex} (kg/yr)[b]	$WMS*N_{animals}$ (animal)[c]	$CH_{4,man}$ (kg CH_4/yr)[a]	V_{ex} (kg/yr)[b]	$WMS*N_{animals}$ (animal)[c]	VS (kg VS/animal/yr)[d]	B_0 (m^3 CH_4/kg VS)[e]	MCF (%)[f]	c_1 (kg/m^3)[g]
Anaerobic digester	0	0	0	0	0	0	1,255	0.17	0.181	0.662
Anaerobic lagoon	0	0	0	0	0	0	1,255	0.17	0.748	0.662
Daily spread	26,903	47,811,006	38,096	31,222	55,486,624	44,212	1,255	0.17	0.005	0.662
Deep pit	0	0	0	0	0	0	1,255	0.17	0.332	0.662
Dry lot	653,028	386,842,083	308,241	757,866	448,946,030	357,726	1,255	0.17	0.015	0.662
Liquid/slurry	144,546	3,868,660	3,083	167,751	4,489,738	3,577	1,255	0.17	0.332	0.662
Pasture	6,913	4,095,416	3,263	8,023	4,752,897	3,787	1,255	0.17	0.015	0.662
Solid storage	0	0	0	0	0	0	1,255	0.17	0.04	0.662
Total	831,391	--	352,683	964,863	--	409,303	--	--	--	--
Total (MMT CO_2e/yr)[h]	0.02			0.02						

Notes:

[a] Methane emissions estimated using Equation 1 (see below).

Equation 1 $$CH_{4,man} = V_{ex} \times B_0 \times MCF \times c_1$$

[b] Volatile solids excreted estimated using Equation 2 (see below).

Equation 2 $$V_{ex} = VS \times (WMS \times N_{animals})$$

[c] Number of animals per waste management system. Assumes Tulare has the same distribution of waste management systems as California does (CARB Annex III.B.)

[d] Volatile solids excreted per animal (CARB Annex III.B.)

[e] Maximum methane producing capacity (CARB Annex III.B.)

[f] Methane conversion factor (CARB Annex III.B.)

[g] Conversion factor representing density of methane at 25°C (CARB Annex III.B.)

[h] CO_2e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWP is 25 for CH_4 (Table A-1, 40 CFR Part 98).

Abbreviations:

B_0 - maximum methane producing capacity
c_1 - density of methane at 25°C
CARB - California Air Resources Board
CFR - Code of Federal Regulations
$CH_{4,man}$ - methane emissions from manure management
CO_2e - carbon dioxide equivalents
GWP - global warming potential
kg - kilogram
m^3 - cubic meters
MCF - methane conversion factor
MMT - million metric tonnes
$N_{animals}$ - animal population
V_{ex} - amount of volatile solids excreted in each WMS
VS - volatile solids production rate
WMS - waste management system
yr - year

Table A-8. Nitrous Oxide Emissions from Manure Management - Dairy Cows

	Dairy Cow Parameters						Base Year (2013)		Future Year (2023)	
	N_{ex} (g/yr)[a]	Direct N as N_2O (g N_2O-N/g)[b]	Volatilization fraction[c] (fraction)	Indirect N as N_2O, volatilized[d] (g N_2O-N/g)	Runoff fraction[e] (fraction)	Indirect N as N_2O, runoff[f] (g N_2O-N/g)	$WMS*N_{animals}$ (animal)[g]	N_2O_{man}[h] (kg N_2O/yr)	$WMS*N_{animals}$ (animal)[g]	N_2O_{man}[h] (kg N_2O/yr)
Anaerobic digester	157,605	0	0.43	0.01	0.008	0.0075	6,374	6,881	7,397	7,986
Anaerobic lagoon	157,605	0	0.43	0.01	0.008	0.0075	311,081	335,841	361,023	389,758
Daily spread	157,605	0	0.10	0.01	0	0.0075	56,417	13,970	65,474	16,212
Deep pit	157,605	0.002	0.24	0.01	0	0.0075	554	603	642	700
Dry lot[i]	157,605	0.02	0.15	0.01	0.02	0.0075	0	0	0	0
Liquid/slurry	157,605	0.005	0.26	0.01	0.008	0.0075	107,961	204,772	125,293	237,646
Pasture	157,605	0	0.00	0.01	0	0.0075	3,589	0	4,165	0
Solid storage	157,605	0.005	0.27	0.01	0	0.0075	48,658	92,772	56,469	107,666
Total	--	--	--	--	--	--	534,633	654,839	620,463	759,967
						Total (MMT CO_2e/yr)[j]		0.20		0.23

Table A-9. Nitrous Oxide Emissions from Manure Management - Dairy Heifers

	Dairy Heifer Parameters						Base Year (2013)		Future Year (2023)	
	N_{ex} (g/yr)[a]	Direct N as N_2O (g N_2O-N/g)[b]	Volatilization fraction[c] (fraction)	Indirect N as N_2O, volatilized[d] (g N_2O-N/g)	Runoff fraction[e] (fraction)	Indirect N as N_2O, runoff[f] (g N_2O-N/g)	$WMS*N_{animals}$ (animal)[g]	N_2O_{man}[h] (kg N_2O/yr)	$WMS*N_{animals}$ (animal)[g]	N_2O_{man}[h] (kg N_2O/yr)
Anaerobic digester[k]	69,044	0	0.43	0.01	0.008	0.0075	0	0	0	0
Anaerobic lagoon[k]	69,044	0	0.43	0.01	0.008	0.0075	0	0	0	0
Daily spread	69,044	0	0.10	0.01	0	0.0075	38,096	4,133	44,212	4,796
Deep pit[k]	69,044	0.002	0.24	0.01	0	0.0075	0	0	0	0
Dry lot	69,044	0.02	0.15	0.01	0.02	0.0075	308,241	723,898	357,726	840,114
Liquid/slurry	69,044	0.005	0.26	0.01	0.008	0.0075	3,083	2,561	3,577	2,973
Pasture	69,044	0	0.00	0.01	0	0.0075	3,263	0	3,787	0
Solid storage[k]	69,044	0.005	0.27	0.01	0	0.0075	0	0	0	0
Total	--	--	--	--	--	--	352,683	730,592	409,303	847,882
						Total (MMT CO_2e/yr)[j]		0.22		0.25

Notes:

[a] Nitrogen excreted per animal (CARB Annex III.B.)

[b] Emission factor representing direct nitrogen as N_2O-N for the particular waste management system (CARB Annex III.B.)

[c] Volatilization fraction of N for the animal group (CARB Annex III.B.)

[d] Emission factor representing indirect nitrogen as N_2O-N for re-deposited volatilized N (CARB Annex III.B.)

[e] Runoff fraction of N for the animal group (CARB Annex III.B.)

[f] Emission factor representing indirect nitrogen as N_2O-N for runoff N (CARB Annex III.B.)

[g] Number of animals per waste management system. Assumes Tulare has the same distribution of waste management systems as California does (CARB Annex III.B.)

[h] N_2O emissions estimated using Equation 1 (see below).

Equation 1 $$N_2O = W_{ms} \times N_{animals} \times N_{excreted} \times \left[D_{EF} + \left(V_{frac} \times V_{EF}\right) + \left(R_{frac} \times R_{EF}\right)\right] \times 1.5711$$

[i] Data were not provided for dairy cows: dry lot; instead the data for heifers: dry lot were used.

[j] CO_2e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWP is 25 for CH_4 and 298 for N_2O (Table A-1, 40 CFR Part 98).

[k] Data were not provided for dairy heifers: anaerobic digester, anaerobic lagoon, deep pit, or solid storage; instead the corresponding data for dairy cows were used.

Abbreviations:

CARB - California Air Resources Board
CFR - Code of Federal Regulations
CO_2e - carbon dioxide equivalents
g - gram
GWP - global warming potential
kg - kilogram
MMT - million metric tonnes
N - nitrogen
N_2O - nitrous oxide
N_2O_{man} - nitrous oxide emissions from manure management
$N_{animals}$ - animal population
N_{ex} - nitrogen excreted per animal
WMS - waste management system
yr - year

Appendix B

Values Extracted from Analyses Completed for the Tulare County ACFP Update EIR

Table B-1. Project Level GHG Emissions without Mitigation (Metric Tons/Year)

Source	CO_2	CH_4	N_2O	HFC-23	CO_2e
Farm Equipment Exhaust	38,054	3	0	0.0	38,129
Farm Agricultural Soil	0	0	2,725	0.0	812,050
Farm Electricity Consumption	79,107	3	1	0.0	79,480
Dairy Equipment Exhaust	99,106	12	0	0.0	99,406
Truck Trips	23,137	0	0	0.0	23,137
Dairy Employee and Visitor Trips	14,882	3	3	0.0	15,851
Dairy Electricity Consumption	144,792	6	1	0.0	145,335
Dairy Refrigeration	0	0	0	4.3	63,640
Total	**399,078**	**27**	**2,730**	**4.3**	**1,277,028**

Notes:

1. Project level conditions represent existing conditions relative to a zero baseline. Existing conditions are from 2013 for Dairy Electricity Consumption and 2009 for all other sources.
2. Dairy emissions include support stock at heifer and calf ranches.
3. Farm emissions are associated with dairy and cattle ranch support crops.
4. Metric Ton = 1,000 kg = 1.1 short tons
5. CO_2e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWPs are 1 for CO_2, 25 for CH_4, 298 for N_2O, and 14,800 for HFC-23 (Table A-1, 40 CFR Part 98).

Table B-2. Cumulative GHG Emissions without Mitigation (Metric Tons/Year)

Source	CO_2	CH_4	N_2O	HFC-23	CO_2e
Farm Equipment Exhaust	52,145	2	0	0.0	52,195
Farm Agricultural Soil	0	0	3731	0.0	1,111,838
Farm Electricity Consumption	108,340	5	1	0.0	108,763
Dairy Equipment Exhaust	135,303	7	0	0.0	135,478
Truck Trips	28,493	0	0	0.0	28,493
Dairy Employee and Visitor Trips	14,692	4	5	0.0	16,282
Dairy Electricity Consumption	170,925	7	2	0.0	171,566
Dairy Refrigeration	0	0	0	5.8	85,840
Total	**509,898**	**25**	**3,739**	**5.8**	**1,710,455**

Notes:

1. Cumulative conditions represent (10 year horizon) build out conditions with a 1.5% growth rate relative to a zero baseline.
2. Dairy emissions include support stock at heifer and calf ranches.
3. Farm emissions are associated with dairy and cattle ranch support crops.
4. Metric Ton = 1,000 kg = 1.1 short tons
5. CO_2e = carbon dioxide equivalent emissions, which is the sum of all emissions after multiplying by their global warming potentials (GWPs). GWPs are 1 for CO_2, 25 for CH_4, 298 for N_2O, and 14,800 for HFC-23 (Table A-1, 40 CFR Part 98).

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
GHG - greenhouse gas
GWP - global warming potential
HFC-23 - fluoroform
kg - kilogram
N_2O - nitrous oxide

Appendix C

Summary of Potential Emissions Reduction Strategies

Appendix C: Potential Reduction Strategies

Categorization	A: Likely feasible, variable efficacy B: To be considered, variable efficacy C: Rejected as Infeasible		
Strategies	**Category**	**Notes**	**Checklist #**
California Air Pollution Control Officers Association (CAPCOA)[1]			
2.0 Energy[2]			
2.1 Building Energy Use			
2.1.1 Buildings Exceed Title 24 Building Envelope Energy Efficiency Standards By X%	A	See details in checklist	E1
2.1.2 Install Programmable Thermostat Timers	C	This strategy is applicable to residences, not dairies/feedlots, and is rejected.	NA
2.1.3 Obtain Third-party HVAC Commissioning and Verification of Energy Savings	A	See details in checklist	E2
2.1.4 Install Energy Efficient Appliances	A	See details in checklist	E4
2.1.5 Install Energy Efficient Boilers	A	See details in checklist	E3
2.2 Lighting			
2.2.1 Install Higher Efficacy Public Street and Area Lighting	A	See details in checklist	E5
2.2.2 Limit Outdoor Lighting Requirements	C	Outdoor lighting at dairies/feedlots is based on operational needs. Because of the lack of flexibility, this is rejected.	NA
2.2.3 Replace Traffic Lights with LED Traffic Lights	C	This strategy is related to public infrastructure and is rejected.	NA
2.3 Alternative Energy Generation			
2.3.1 Establish Onsite Renewable or Carbon-Neutral Energy Systems-Generic	B	See details in checklist	E6
2.3.2 Establish Onsite Renewable Energy Systems-Solar Power	B	See details in checklist	E7
2.3.3 Establish Onsite Renewable Energy Systems-Wind Power	B	See details in checklist	E8
2.3.4 Utilize a Combined Heat and Power System	B	See details in checklist	E9
2.3.5 Establish Methane Recovery in Landfills	C	Dairies/feedlots will not have a landfill and this strategy is rejected.	NA
2.3.6 Establish Methane Recovery in Wastewater Treatment Plants	B	See details in checklist	E10
3.0 Transportation			
3.1 Land Use/Location			
3.1.1 Increase Density	C	This strategy is expected to have a "[n]egligible impact in a rural context" and is rejected.	NA
3.1.2 Increase Location Efficiency	C	This strategy is expected to have a "[n]egligible impact in a rural context" and is rejected.	NA
3.1.3 Increase Diversity of Urban and Suburban Developments (Mixed Use)	C	This strategy is expected to have a "[n]egligible impact in a rural context" and is rejected.	NA
3.1.4 Increase Destination Accessibility	C	This strategy is expected to have a "[n]egligible impact in a rural context" and is rejected.	NA
3.1.5 Increase Transit Accessibility	B	See details in checklist	T4

Strategies		Category	Notes	Checklist #
	3.1.6 Integrate Affordable and Below Market Rate Housing	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and primarily "[a]ppropriate for residential and mixed-use projects". This strategy is rejected.	NA
	3.1.7 Orient Project Toward Non-Auto Corridor	C	This strategy is expected to be applicable in an "[u]rban and suburban context". This strategy is rejected.	NA
	3.1.8 Locate Project near Bike Path/Bike Lane	C	This strategy is expected to be applicable in an "[u]rban and suburban context". This strategy is rejected.	NA
	3.1.9 Improve Design of Development	C	This strategy is expected to have a "[n]egligible impact in a rural context" and is rejected.	NA
3.2 Neighborhood/Site Enhancements				
	3.2.1 Provide Pedestrian Network Improvements	C	Dairies/feedlots have very limited pedestrian traffic and this strategy is rejected.	NA
	3.2.2 Provide Traffic Calming Strategies	C	Dairies/feedlots have very limited pedestrian traffic and this strategy is rejected.	NA
	3.2.3 Implement a Neighborhood Electric Vehicle (NEV) Network	C	This strategy is primarily "[a]ppropriate for mixed-use projects" and is rejected.	NA
	3.2.4 Create Urban Non-Motorized Zones	C	This strategy is expected to be applicable in an "[u]rban context". This strategy is rejected.	NA
	3.2.5 Incorporate Bike Lane Street Design (on-site)	C	This strategy is expected to be applicable in an "[u]rban and suburban context". This strategy is rejected.	NA
	3.2.6 Provide Bike Parking in Non-Residential Projects	A	See details in checklist	T1
	3.2.7 Provide Bike Parking with Multi-Unit Residential Projects	C	This strategy is "[a]ppropriate for residential projects" and is rejected.	NA
	3.2.8 Provide Electric Vehicle Parking	C	This strategy would have only a negligible effect and is rejected as infeasible.	NA
	3.2.9 Dedicate Land for Bike Trails	C	This strategy is unrealistic, as dairies/feedlots are unlikely to be part of an adopted bikeway plan. This strategy is rejected.	NA
3.3 Parking Policy/Pricing				
	3.3.1 Limit Parking Supply	C	This strategy is expected to have a "[n]egligible impact in a rural context" and is rejected.	NA
	3.3.2 Unbundle Parking Costs from Property Cost	C	This strategy is expected to have a "[n]egligible impact in a rural context" and is rejected.	NA
	3.3.3 Implement Market Price Public Parking (On-Street)	C	This strategy is expected to have a "[n]egligible impact in a rural context" and is rejected.	NA
	3.3.4 Require Residential Area Parking Permits	C	This strategy is expected to be applicable in an "[u]rban context". This strategy is rejected.	NA

Strategies		Category	Notes	Checklist #
3.4 Commute Trip Reduction Programs				
	3.4.1 Implement Commute Trip Reduction Program - Voluntary	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]egligible in a rural context". This strategy is rejected.	NA
	Implement Commute Trip Reduction Program – Required	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]egligible in a rural context". This strategy is rejected.	NA
	3.4.2 Implementation/Monitoring	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]egligible in a rural context". This strategy is rejected.	NA
	3.4.3 Provide Ride-Sharing Programs	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]egligible in a rural context". This strategy is rejected.	NA
	3.4.4 Implement Subsidized or Discounted Transit Program	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]egligible in a rural context". This strategy is rejected.	NA
	3.4.5 Provide End of Trip Facilities	A	See details in checklist	T2
	3.4.6 Encourage Telecommuting and Alternative Work Schedules	C	Typical operations at dairies/feedlots do not allow for telecommuting or alternative work schedule. This strategy is rejected.	NA
	3.4.7 Implement Commute Trip Reduction Marketing	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]egligible in a rural context". This strategy is rejected.	NA
	3.4.8 Implement Preferential Parking Permit Program	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and is rejected.	NA
	3.4.9 Implement Car-Sharing Program	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]egligible in a rural context". This strategy is rejected.	NA
	3.4.10 Implement a School Pool Program	C	This strategy is "[a]ppropriate for residential and mixed-use projects" and is rejected for dairies/feedlots.	NA
	3.4.11 Provide Employer-Sponsored Vanpool/Shuttle	B	See details in checklist	T3
	3.4.12 Implement Bike-Sharing Programs	B	See details in checklist	T5
	3.4.13 Implement School Bus Program	C	This strategy is primarily "[a]ppropriate for residential and mixed-use projects" and is rejected.	NA
	3.4.14 Price Workplace Parking	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]egligible in a rural context". This strategy is rejected.	NA
	3.4.15 Implement Employee Parking “Cash-Out”	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]egligible in a rural context". This strategy is rejected.	NA

Strategies		Category	Notes	Checklist #
3.5 Transit System Improvements				
	3.5.1 Provide a Bus Rapid Transit System	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and to be "[n]egligible in a rural context". It is "[a]ppropriate for specific or general plans" and is rejected.	NA
	3.5.2 Implement Transit Access Improvements	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and is rejected.	NA
	3.5.3 Expand Transit Network	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and is "[a]ppropriate for specific or general plans". This strategy is rejected.	NA
	3.5.4 Increase Transit Service Frequency/Speed	C	"Urban and suburban context" "Appropriate for specific or general plans"	NA
	3.5.5 Provide Bike Parking Near Transit	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and is rejected.	NA
	3.5.6 Provide Local Shuttles	C	This strategy is expected to be applicable in an "[u]rban and suburban context" and is rejected.	NA
3.6 Road Pricing/Management				
	3.6.1 Implement Area or Cordon Pricing	C	This strategy is applicable in a "[c]entral business district or urban center only" and is rejected for dairies/feedlots.	NA
	3.6.2 Improve Traffic Flow	C	Dairies/feedlots are primarily located in rural areas and do not impact the overall traffic flow. This strategy is not applicable for an individual facility and is rejected.	NA
	3.6.3 Required Project Contributions to Transportation Infrastructure Improvement Projects	C	Dairies/feedlots are primarily located in rural areas and do not impact large sections of the transportation infrastructure. This strategy is not applicable for an individual facility and is rejected.	NA
	3.6.4 Install Park-and-Ride Lots	C	Dairies/feedlots are primarily located in rural areas and do not require sufficient employees to justify a park-and-ride lot. This strategy is not applicable for an individual facility and is rejected.	NA
3.7 Vehicles				
	3.7.1 Electrify Loading Docks and/or Require Idling-Reduction Systems	C	Dairies/feedlots require the use of multiple delivery vehicles (e.g., animal feed, milk transportation, etc.). However, an individual facility often does not purchase or operate these vehicles and has no control over the selection of electric vehicles and thus the use of electrified loading docks. This strategy is not applicable for an individual facility and is rejected.	NA
	3.7.2 Utilize Alternative Fueled Vehicles	B	See details in checklist	T6
	3.7.3 Utilize Electric or Hybrid Vehicles	B	See details in checklist	T7

Strategies		Category	Notes	Checklist #
4.0 Water				
4.1 Water Supply				
	4.1.1 Use Reclaimed Water	C		NA
	4.1.2 Use Gray Water	C	Dairies/feedlots do not produce a large quantity of gray water and this strategy is rejected.	NA
	4.1.3 Use Locally Sourced Water Supply	B	See details in checklist	R7
4.2 Water Use				
	4.2.1 Install Low-Flow Water Fixtures	B	See details in checklist	R8
	4.2.2 Adopt a Water Conservation Strategy	A	See details in checklist	R1
	4.2.3 Design Water-Efficient Landscapes	A	See details in checklist	R2
	4.2.4 Use Water-Efficient Landscape Irrigation Systems	A	See details in checklist	R3
	4.2.5 Reduce Turf in Landscapes and Lawns	A	See details in checklist	R4
	4.2.6 Plant Native or Drought-Resistant Trees and Vegetation	A	See details in checklist	R5
5.0 Area Landscaping				
5.1 Landscaping Equipment				
	5.1.1 Prohibit Gas Powered Landscape Equipment	C	The equipment needed for landscaping at dairies/feedlots is minimal and this strategy is rejected.	NA
	5.1.2 Implement Lawnmower Exchange Program	C	This strategy is not applicable for an individual facility and is rejected.	NA
	5.1.3 Electric Yard Equipment Compatibility	C	The equipment needed for landscaping at dairies/feedlots is minimal and this strategy is rejected.	NA
6.0 Solid Waste				
6.1 Solid Waste				
	6.1.1 Institute or Extend Recycling and Composting Services	B	See details in checklist	R6
	6.1.2 Recycle Demolished Construction Material	B	See details in checklist	R9
7.0 Vegetation				
7.1 Vegetation				
	7.1.1 Urban Tree Planting	B	See details in checklist	M1
	7.1.2 Create New Vegetated Open Space	C		NA

Strategies	Category	Notes	Checklist #
8.0 Construction			
8.1 Construction			
8.1.1 Use Alternative Fuels for Construction Equipment	B	See details in checklist	M2
8.1.2 Use Electric and Hybrid Construction Equipment	B	See details in checklist	M3
8.1.3 Limit Construction Equipment Idling beyond Regulation Requirements	B	See details in checklist	M4
8.1.4 Institute a Heavy-Duty Off-Road Vehicle Plan	B	See details in checklist	M5
8.1.5 Implement a Construction Vehicle Inventory Tracking System	B	See details in checklist	M6
9.0 Miscellaneous			
9.1 Miscellaneous			
9.1.1 Establish a Carbon Sequestration Project	C	This strategy is not applicable for an individual facility and is rejected.	NA
9.1.2 Establish Off-Site Mitigation	C		NA
9.1.3 Use Local and Sustainable Building Materials	B	See details in checklist	M7
9.1.4 Require Best Management Practices in Agriculture and Animal Operations	A/B	See details in checklist	D3, D4, M8
9.1.5 Require Environmentally Responsible Purchasing	A/B	See details in checklist	D1, D2, M9
9.1.6 Implement an Innovative Strategy for GHG Mitigation	B	See details in checklist	M10
9.1.7 Implement a Category A or Category B strategy within existing portion of expansion project	B	See details in checklist	M11
10.0 General Plans			
10.1 General Plans			
10.1.1 Fund Incentives for Energy Efficiency	C	This strategy is at the General Plan level and is not applicable to an individual facility. This strategy is rejected.	NA
10.1.2 Establish a Local Farmer's Market	C	This strategy is at the General Plan level and is not applicable to an individual facility. This strategy is rejected.	NA
10.1.3 Establish Community Gardens	C	This strategy is at the General Plan level and is not applicable to an individual facility. This strategy is rejected.	NA
10.1.4 Plant Urban Shade Trees	C	This strategy is at the General Plan level and is not applicable to an individual facility. This strategy is rejected.	NA
10.1.5 Implement Strategies to Reduce Urban Heat-Island Effect	C	This strategy is at the General Plan level and is not applicable to an individual facility. This strategy is rejected.	NA

Strategies		Category	Notes	Checklist #
San Joaquin Valley Air Pollution Control District (SJVAPCD)[3], [4]				
9(1)	All ruminant animal feed shall include at least 6% cottonseed, or, upon District approval, based on sufficient demonstration that use of cottonseed is not feasible, an equivalent substitute	C	The SJVAPCD specifies "that these examples of BPS are for illustrative purposes only, and should not be used by any lead agency as District-approved or sanctioned standards." In addition, this strategy is not feasible in practice and would create a fixed market for cotton seed. This strategy is rejected.	NA
9(2)	Manure from animal housing areas for mature cows shall be removed and transferred into appropriate treatment facilities at least four times a day…	C	Increasing the frequency at which barns are flushed or scraped has the potential to increase energy use by farm equipment. It also transports organic materials into treatment facilities (i.e. lagoons) more quickly, where they are more likely to produce methane sooner. This strategy is rejected.	NA
9(3)[2]	Collected manure shall be treated anaerobically in digesters or covered lagoons, designed and operated per NRCS standards, with captured methane used for energy recovery in a method that displaces current or required fossil fuel use…	B	See details in the checklist.	D5
Additional Measures[5]				
O(1)	Conversion of manure handling to scrape system.	B	Scrape systems divert manure from lagoons to another type of storage system, which can potentially reduce GHG emissions.	D6
O(2)	Increase solids separation	B	Mechanical separation of the solids from the manure has the potential to reduce GHG emissions.	D7
O(3)	Pasture-based management practices	B	See details in checklist	D8

Notes:

[1] CAPCOA. 2010. Quantifying Greenhouse Gas Mitigation Measures. August. Accessed at: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf. Accessed on December 12, 2013.

[2] This strategy is also consistent with CEQA, Appendix F: Energy Conservation.

[3] SJVAPCD. 2009. Final Staff Report - Addressing Greenhouse Gas Emissions Impacts Under the California Environmental Quality Act. December 17. Accessed at: http://www.valleyair.org/programs/CCAP/12-17-09/1%20CCAP%20-%20FINAL%20CEQA%20GHG%20Staff%20Report%20-%20Dec%2017%202009.pdf. Accessed on December 12, 2013.

[4] Note that the staff report states "that these examples of BPS are for illustrative purposes only, and should not be used by any lead agency as District-approved or sanctioned standards."

[5] The additional measures are based on recent advances in the scientific understanding of methods to reduce GHGs on dairies.

Appendix D

Summary of Significance Thresholds

Appendix D: Summary of Potential CEQA Significance Thresholds

Category	Jurisdictional Body	Bright-Line Limit ($MT CO_2e/yr$)	Service Population Efficiency Metric ($MT CO_2e/sp/yr$)	Improvement Over BAU Conditions	Significance for Threshold Basis	References
State	ARB (Cap & Trade)	25,000	N/A	N/A	This applicability threshold is primarily for large industrial source categories. [§ 95811] The threshold of 25,000 MT CO2e/yr is designed to 1) be consistent with USEPA's Mandatory Reporting Rule (which covers approximately 85-90% of emissions) and 2) cover the majority of large emitters.	17 CCR §§ 95810-95814
State	ARB (Mandatory Reporting)	10,000	N/A	N/A	This threshold applies to specific industrial source categories. Note that some industrial source categories must report regardless of emissions level. The following emission source is listed as an exclusion, "Fugitive methane and fugitive nitrous oxide emissions from livestock manure management systems described in 40 CFR Part 98, Subpart JJ, regardless of the magnitude of emissions produced." [§ 95101]. This exclusion is consistent with US EPA's current exclusion of manure management from mandatory reporting.	17 CCR § 95101
Air District	Antelope Valley	100,000	N/A	N/A	Doesn't specify.	2011. Antelope Valley AQMD. California Environmental Quality Act (CEQA) and Federal Conformity Guidelines. August. Accessed online at: http://www.avaqmd.ca.gov/Modules/ShowDocument.aspx?documentid=2908.
Air District	Bay Area	1,100 - land use development projects 10,000 - stationary source projects	4.6 - land use development projects	N/A	Thresholds were removed from the 2012 updated CEQA Guidelines. Thresholds listed here are from the 2010 draft CEQA Guidelines. Excerpt from BAAQMD's website dated January 16, 2014 and checked on August 13, 2015, "…the Air District has been ordered to set aside the Thresholds and is no longer recommending that these Thresholds be used as a general measure of a project's significant air quality impacts." The Alameda County Superior Court issued a writ of mandate ordering BAAQMD to set aside these Thresholds. The writ and decision was overturned by the Court of Appeal of the State of California, although an appeal of the Court of Appeals decision is currently pending in the California Supreme Court. There is no ruling as of yet. In the interim, many Bay Area agencies continue to use the 2014 draft guidelines.	2012. Bay Area AQMD. California Environmental Quality Act Air Quality Guidelines. May. Accessed online at: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_Final_May%202012.ashx?la=en. 2010. Bay Area AQMD. California Environmental Quality Act Air Quality Guidelines. May. Accessed online at: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Draft_BAAQMD_CEQA_Guidelines_May_2010_Final.ashx?la=en. Excerpt: http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines

Category	Jurisdictional Body	Bright-Line Limit (MT CO_2e/yr)	Service Population Efficiency Metric (MT CO_2e/sp/yr)	Improvement Over BAU Conditions	Significance for Threshold Basis	References
Air District	Eastern Kern	25,000 - stationary source projects	N/A	20%	Thresholds apply to stationary source projects. [page 4]	2012. Eastern Kern APCD. Eastern Kern Air Pollution Control District Policy. Addendum to CEQA Guidelines Addressing GHG Emission Impacts for Stationary Source Projects when Serving as Lead CEQA Agency. March 8. Accessed online at: http://www.kernair.org/Documents/CEQA/EKAPCD%20CEQA%20GHG%20Policy%20Adopted%203-8-12.pdf.
Air District	San Diego County	2,500 - land use development projects 10,000 - stationary source projects	4.32 - land use development projects	16% (updated for recession, but including RPS and Pavley in the BAU)	Per Table 4 in the guidelines, agriculture projects have the option of using the land use development threshold or the performance threshold. The stationary source threshold should be used for the portions of the project that involve stationary source emissions.	2013. San Diego County. County of San Diego Guidelines for Determining Significance and Report Format and Content Requirements. Climate Change. November 7. Accessed online at: http://www.sdcounty.ca.gov/pds/advance/Guidelines_for_Determining_Significance_Climate_Change.pdf.
Air District	San Joaquin Valley	N/A	N/A	29% (based upon a point system)	Performance threshold applies to both stationary source and land use development projects. The District's approach relies on the use of performance based standards (Best Performance Standards [BPS]) to determine the significance of project specific GHG emission impacts. Note that no BPS have been defined specific to dairies.	2009. San Joaquin Valley APCD. District Policy. Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA when Serving as the Lead Agency. December 17. Accessed online at: http://www.valleyair.org/Programs/CCAP/12-17-09/2%20CCAP%20-%20FINAL%20District%20Policy%20CEQA%20GHG%20-%20Dec%2017%202009.pdf. 2009. San Joaquin Valley APCD. Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA. December 17. Accessed online at: http://www.valleyair.org/Programs/CCAP/12-17-09/3%20CCAP%20-%20FINAL%20LU%20Guidance%20-%20Dec%2017%202009.pdf.
Air District	San Luis Obispo	1,150 - land use development projects 10,000 - stationary source projects	4.9 - land use development projects	N/A	Land use development includes the following project types: residential, commercial, and public land uses and facilities. Stationary source projects include land uses that would accommodate processes and equipment that emit GHG emissions and would require a permit to operate. [page 3-6]	2012. San Luis Obispo APCD. CEQA Air Quality Handbook. A Guide for Assessing the Air Quality Impacts for Projects Subject to CEQA Review. April. Accessed online at: http://www.slocleanair.org/images/cms/upload/files/CEQA_Handbook_2012_v1.pdf.
Air District	Santa Barbara	10,000 - stationary source projects	N/A	N/A	Threshold is for stationary source projects. [page 1]	Santa Barbara County APCD. CEQA Significance Thresholds for GHGs - Questions and Answers. Accessed online at: http://www.sbcapcd.org/apcd/ceqa-ghg-faq.pdf.
Air District	South Coast (draft)	3,000 - mixed use residential/commercial 10,000 - industrial projects (FINAL)	2020 Target: 4.8 2035 Target: 3.0	No recommendation as of September 2010	3,000 MT CO_2e/yr for mixed use (3,500 MT CO_2e/yr for residential; 1,400 MT CO_2e/yr for commercial). 10,000 MT CO_2e/yr for mixed use.	2008. South Coast AQMD. Draft Guidance Document - Interim CEQA Greenhouse Gas (GHG) Significance Threshold. October. Accessed online at: http://www.aqmd.gov/hb/2008/December/081231a.htm.
Air District	Tehama	900 - land use development projects	N/A	25%	From the CAPCOA CEQA and Climate Change document. Based on general land use projects such as residential and commercial projects. [page 3-8]	2009. Tehama County APCD. Planning & Permitting Air Quality Handbook. Guidelines for Assessing Air Quality Impacts. December. Accessed online at: http://www.tehcoapcd.net/PDF/CEQA%20Handbook%20Dec%2009.pdf