

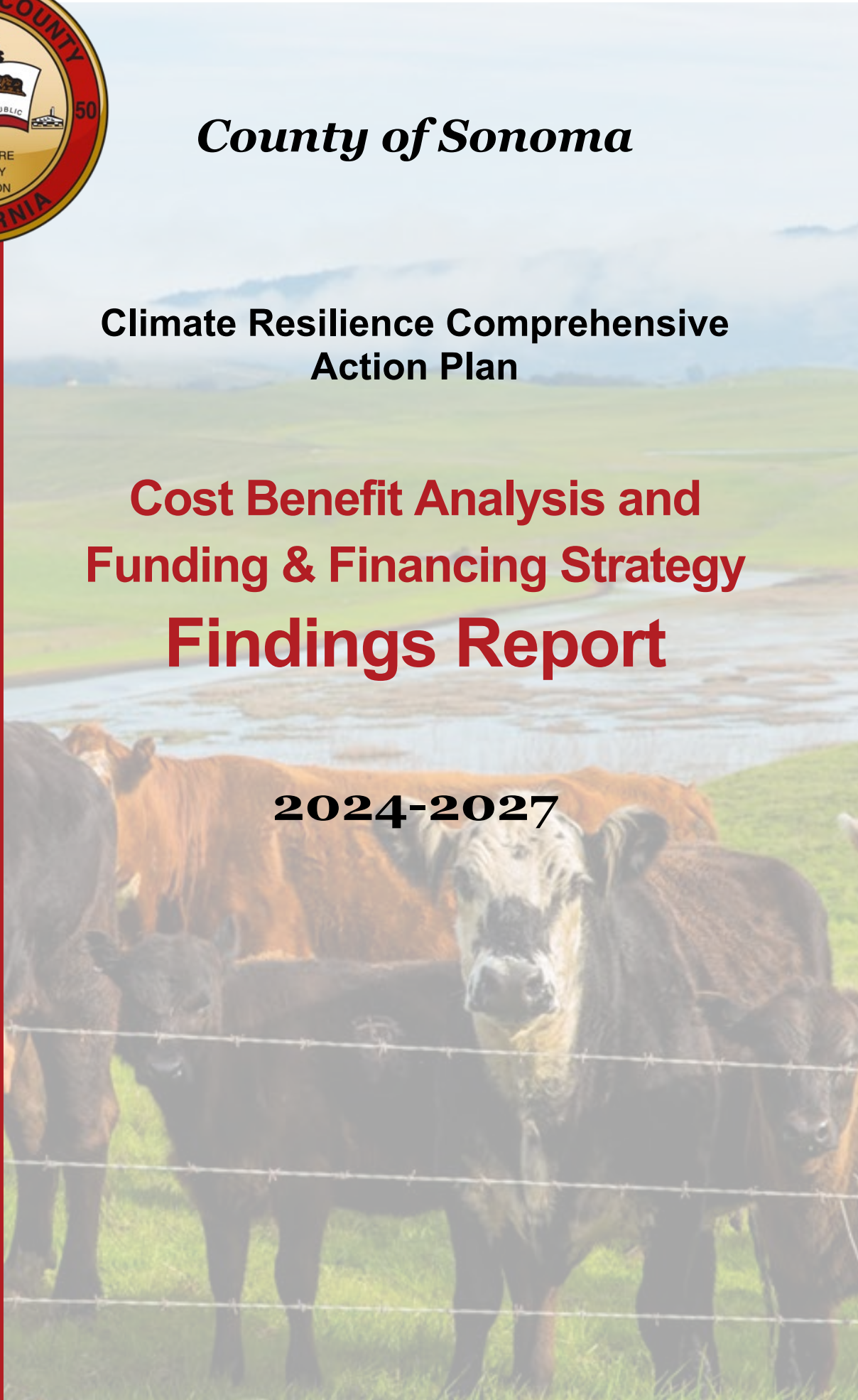


County of Sonoma

Climate Resilience Comprehensive Action Plan

Cost Benefit Analysis and Funding & Financing Strategy Findings Report

2024-2027





Summary Of Key Findings

The County of Sonoma (County) developed the Climate Resilience Comprehensive Action Plan (CR-CAP) to address the climate change impacts on municipal operations and the region, which in turn will help achieve the Board of Supervisors' vision to achieve carbon neutrality, zero waste, and climate resiliency by 2030. The CR-CAP includes specific actions to reduce municipal greenhouse gas (GHG) emissions, as well as a process to identify community priorities, barriers, and opportunities for community-wide progress towards carbon neutrality and climate resilience. To support decision-making by the Board of Supervisors and secure the significant funding needed to implement the CR-CAP, the County hired Consero Solutions and M.Cubed to work with the Climate Action Resiliency Division (CARD) to develop a high-level analysis of costs and benefits associated with 17 selected climate action measures and a multi-year funding and financing strategy for 11 selected climate action measures.

Cost-Benefit Analysis Findings

The CR-CAP Cost-Benefit Analysis estimates the GHG emissions and total social cost per ton of emissions for 17 climate action measures, listed below in order of relative benefit to society. The table below provides a qualitative summary for each measure of the relative GHG reduction or sequestration, defined as rapid payback net benefit, lifetime net benefit, moderate net benefit, societal cost-effectiveness, moderate net cost, or high net cost. The community-oriented measures have a wide range of cost effectiveness estimates and certain segments will need financial assistance to achieve County objectives. In addition, three of the County-oriented climate action measures are the most expensive measures and are in response to State mandates so they are not discretionary. The report provides more detail on individual measures and discusses the data and methodologies M.Cubed used for the analysis. (Definitions of the terms in the table are provided later in this document.)

Cost-Effectiveness of Selected Climate Action Measures		
Measure Number	Description	Cost Effectiveness Category
E-CP-3	Promote renewables and microgrids	Rapid Payback Net Benefit
T-CO-1*	Decarbonize the County fleet of light-duty vehicles (less than 8,500 lbs gross vehicular weight) by 2040	Rapid Payback Net Benefit
T-CO-5	Deploy zero emission vehicle infrastructure to ensure charging/fueling infrastructure is in place in locations to support the decarbonization schedule for light- and heavy-duty fleets	Rapid Payback Net Benefit
E-CO-1	Reduce energy use and increase resilience at existing County facilities in the near term through energy upgrades	Rapid Payback to Lifetime Net Benefit

Cost-Effectiveness of Selected Climate Action Measures		
Measure Number	Description	Cost Effectiveness Category
E-CP-7	Prioritize and support energy efficiency and renewable energy access in underserved communities	Lifetime Net Benefit to Moderate Net Cost
E-CP-6	Incentivize energy efficiency and renewable energy uptake in communities	
	<ul style="list-style-type: none"> • New construction with SCEIP/SCP on-bill financing 	Societally Cost-Effective to High Net Cost
	<ul style="list-style-type: none"> • Existing buildings retrofit & energy efficiency with SCEIP/SCP on-bill financing 	Lifetime Net Benefit to Moderate Net Cost
T-CO-3*	Decarbonize the fleet of heavy-duty vehicles (greater than 8,500 lbs gross vehicular weight) by 2042	Societally Cost-Effective
NWL-CO-2	Increase coordination with tribes and opportunities for tribal collaboration of land management on County-owned lands by 2026, based on traditional and historic stewardship practices	Societally Cost-Effective to Moderate Net Cost
NWL-CO-5	Increase carbon sequestration on County-owned lands by implementing beneficial practices described in the Carbon Stock Inventory and Potential Sequestration Study through 2030	Societally Cost-Effective to Moderate Net Cost
NWL-CP-4	Increase carbon sequestration on croplands and working lands through soil carbon amendments, hedgerow planting, grassland restoration, and implementation of other climate-smart practices	Societally Cost-Effective to Moderate Net Cost
W-CO-4	Evaluate and prioritize conservation practice projects on County-owned lands to enhance water resilience and mitigate drought, flood, and debris flows	Societally Cost-Effective to Moderate Net Cost
WF-CP-4	Reduce wildfire risk from vegetation fuels by developing and implementing a countywide grazing plan	Societally Cost-Effective to Moderate Net Cost
WF-CP-3	Reduce loss of existing carbon stocks due to wildfire through conservation of natural lands, conservation easements, new policies, and land acquisition	Societally Cost-Effective to Moderate Net Cost
E-CO-2	Reduce energy use and increase resilience at existing County facilities in the mid term	Societally Cost-Effective to High Net Cost
T-CO-4*	Decarbonize the transit bus fleet by 2040	High Net Cost
T-CO-13*	Decarbonize small offroad engines beginning in 2024 by requiring replacements and new purchases be zero-emission equipment	High Net Cost
T-CO-6*	Decarbonize non-road heavy duty equipment by 2042	High Net Cost

*Implementation required by State regulations.

Multi-Year Funding and Financing Strategy Findings

The following is a summary of 30 climate action funding opportunities for which the County will consider applying between 2024 and 2026. The table serves as a quick reference guide organized by the fiscal year in which Consero Solutions recommends the County apply and identifies the applicable climate action measure or measures matched to the funding opportunity. Consero Solutions reviewed over 50 state, federal, and regional grants to develop these recommendations. In addition, M.Cubed suggests three options for further exploration in the financing strategy: 1) utilize taxing authority of the existing Climate Resilience District; 2) implement innovative financing programs tied to direct actions; and 3) and expand funding for existing successful community financing mechanisms.

Fiscal Year	Grant Program	Climate Action Measure
2024-25	Congressional Directed Funding (recommended because no grant opportunities)	E-CP-7
2024-25	Metropolitan Transportation Commission One Bay Area Grant Regional Program Climate Initiatives Program (Transportation Electrification) Multiple Programs	E-CO-2, T-CO-1, T-CO-3, T-CO-4, T-CO-5
2024-25	California Air Resources Board California Hybrid and Zero Emission Truck and Bus Voucher Incentive Project	T-CO-3, T-CO-4
2024-25	Bay Area Quality Management District Transportation Fund for Clean Air	T-CO-1, T-CO-3, T-CO-4
2024-25	Sonoma County Transportation Authority Transportation Fund for Clean Air 40 Percent Program	T-CO-1, T-CO-3, T-CO-4
2024-25	San Joaquin Valley Air Pollution Control District California Volkswagen Mitigation Trust Funds for Transit, School, and Shuttle Bus	T-CO-4
2024-25	CalTrans Sustainable Transportation Planning Grants	T-CO-5
2024-25	Metropolitan Transportation Commission Transportation Development Act, Article 3	T-CO-12
2024-25	National Fish and Wildlife Foundation & National Oceanic and Atmospheric Administration National Coastal Resilience Fund	W-CO-8
2024-25	California Ocean Protection Council Sea Level Rise Adaptation Program	W-CO-4, W-CO-8
2024-25	CalFire Wildfire Prevention Grant Program	WF-CO-5
2025-26	Bay Area Quality Management District Transportation Fund for Clean Air	T-CO-5
2025-26	Sonoma County Transportation Authority Transportation Fund for Clean Air 40 Percent Program	T-CO-5
2025-26	California Energy Commission Community Energy Reliability and Resilience Investment	E-CO-2
2025-26	U.S. Department of Transportation Charging and Fueling Infrastructure Grant Program (Community Program)	E-CO-2
2025-26	California Transportation Commission Local Partnership Program	T-CO-4, T-CO-12

Fiscal Year	Grant Program	Climate Action Measure
2025-26	Metropolitan Transportation Commission One Bay Area Grant Program	T-CO-12
2025-26	State of California Ocean Protection Council Sea Level Rise Adaptation Planning Grant Program	W-CO-8
2025-26	State of California Coastal Conservancy Multiple Programs	NWL-CO-5, W-CO-4, WF-CO-5, W-CO-8
2025-26	California Department of Food and Agriculture Multiple Programs	NWL CO-5
2025-26	Wildlife Conservation Board Multiple Programs	NWL-CO-5
2025-26	California Transportation Commission Active Transportation Program	T-CO-12
2025-26	Metropolitan Transportation Commission Active Transportation Program (Regional)	T-CO-12
2025-26	California State Parks Land and Water Conservation Fund	T-CO-12
2025-26	Bay Area AQMD Carl Moyer Voucher Incentive Program (Agricultural Equipment and Heavy-Duty On-Road Vehicles and Buses)	T-CO-3, T-CO-4
2025-26	Northern Sonoma County Air Pollution Control District Carl Moyer Program	T-CO-3, T-CO-4
2026-27	North Coast Resource Partnership CalFire Forestry Health Implementation Program	WF-CO-5
2026-27	California Department of Food and Agriculture Multiple Programs	NWL-CO-5
2026-27	Wildlife Conservation Board Multiple Programs	NWL-CO-5
2026-27	State of California Coastal Conservancy Multiple Programs	NWL-CO-5
<p>Note: The team sometimes estimated the deadline based on conversations with grant managers or the history of the program. The funding strategy requires regular updates to maintain usefulness.</p>		



Cost-Benefit Analysis Findings

In addition to informing decisionmakers about the economic consequences of climate action measures for which there is sufficient information, helping to prioritize climate action measures, and guiding budgeting processes, the County can use the CR-CAP Cost-Benefit Analysis as a baseline to manage and measure economic and financial performance of CR-CAP implementation. The Cost-Benefit Analysis estimated the GHG emissions and total social cost per ton of emissions for 17 climate action measures selected by the County. M.Cubed used the following terms to describe the results of the Cost-Benefit Analysis of the selected climate action measures:

- **Relative community GHG reduction** is the relative magnitude of GHG emission reductions compared to the overall community inventory.¹ The terms “small”, “medium”, and “large” describe how noticeable the expected reductions would be in the future GHG emission inventory.
- **Rapid payback net benefit** refers to the relative likelihood the measure will result in both private and social negative costs per ton of GHG reduction, resulting in a net benefit to Sonoma County while recovering initial investment costs quickly. The net benefit is calculated to be greater than \$1,000 per CO₂e ton.
- **Lifetime benefit** refers to the relative likelihood the measure will result in both private and social negative costs per ton of GHG reduction, resulting in a net benefit to the County over the life of the measure. The net benefit is expected to range between \$100 to \$1,000 per CO₂e ton.
- **Societally cost-effective** refers to the likelihood the measure will result in positive net private costs that are offset by the collection of social benefits identified in the analysis. The private costs are typically less than \$100 per CO₂e ton and the social value benefits are larger than \$100 per ton.
- **Moderate net cost** refers to the likelihood the measure will result in positive net private costs that are not offset by the collection of social benefits identified in the analysis. The net costs range from \$100 to \$1,000 per ton.
- **High net cost** refers to the likelihood the measure will result in substantial private costs well beyond the collection of social benefits identified in the analysis. The costs for these measures exceed \$1,000 per ton. However, each of the measures considered in this range are mandated by State regulations and the County has little or no discretion on implementation.

The Cost-Benefit Analysis resulted in the following findings, organized from most to least cost-effectiveness:

- **E-CP-3 Promote Renewables and Microgrids (Rapid Payback Net Benefit):** E-CP-3 is cost-effective relative to other climate action measures because renewables and microgrids can displace PG&E’s proposed powerline undergrounding program thus significantly lowering electric rates and hastening electrification. Installing community

¹ “Community” is defined as individuals, households, businesses and institutions involved in the County economy.

and individual microgrids, combined with the already existing fast-trip system also would reduce wildfire risk an equivalent amount while maintaining the same level of service reliability. The community reduction benefit is small as the total amount of GHG emissions this measure is expected to reduce and is small relative to other measures.

- **T-CO-1 and T-CO-5 Electrifying the County Light-Duty Vehicles with Charging Infrastructure (Rapid Payback Net Benefit):** Electrifying the County on-road, off-road, and transit fleets is required under State regulation. Converting the County's light-duty vehicle fleet to electric is highly beneficial. (The charging infrastructure costs (T-CO-5) are included in the overall fleet conversion costs). The relative community GHG reduction is moderate as the fleet is a small portion of the total County vehicle population.
- **E-CO-1 and E-CO2: County Building Energy Measures (Rapid Payback Net Benefits to High Net Cost):** These are aimed at upgrading and electrifying County facilities and the individual components shows a mix of net benefits and costs per CO₂e ton. The first phase covered by E-CO-1 shows net benefits, with a range influenced by PG&E's electric and natural gas rates. The second phase covered by E-CO-2 focused more on electrification which shows net costs due to higher PG&E electricity rates. The energy efficiency activities are generally more cost-effective than those aimed at electrification of buildings energy uses. The total emission reductions would be small to moderate on the community scale, but large for County operations.
- **E-CP-7 Prioritize Energy Efficiency in Underserved Communities (Lifetime Net Benefit to Moderate Net Cost):** Targeting low-income communities shows a wide cost range that depends on application and setting. Multi-family electrification retrofits show the largest net benefits; retrofits of single-family residences are the highest net cost. Emission reductions could be large if a sufficient portion of the housing stock receives upgrades.
- **E-CP-6 Incentivize Energy Efficiency Uptake (Lifetime Net Benefit to High Net Cost):** The financing programs to incentivize electrification and energy efficiency also show a wide cost range that depends on application and setting. Residential customers are more likely to see lower costs than commercial non-residential. Multi-family electrification retrofits show the largest net benefits; new construction of certain types of commercial space is the costliest option. New construction could provide a moderate emission reduction while widespread retrofits could result in a large reduction.
- **T-CO-3 Electrify Light- and Medium-Duty Trucks (Societally Cost-Effective):** The high upfront costs are offset by fuel savings over the life of the equipment. The total emission reductions would be moderate on the community scale, but large for County operations.
- **NWL-CO-2, NWL-CO-5, NWL-CP-4 plus W-CO-4 Natural and Working Lands Carbon Sequestration (Societally Cost-Effective to Moderate Net Cost):** The four measures generally range in cost from near zero to less than \$300 per metric ton. Sequestering about 300,000 metric tons annually would cost about \$280 per ton

before deducting the social value of carbon reductions of \$110 per ton. The potential amount of sequestered carbon could be a substantial offset of the County's total inventory.

- **WF-CP-2, WF-CP-3 Land Conservation and Implement County-Wide Grazing Plan (Societally Cost-Effective to Moderate Net Cost):** The two wildfire mitigation measures have significant carbon sequestration value which makes them relatively inexpensive.
- **T-CO-4 Decarbonize the Transit Fleet (High Net Cost):** This has a high net cost as Sonoma County Transit Agency's bus fleet already uses compressed natural gas (CNG) which already delivers lower fuel cost than diesel and has lower emissions. Emission reductions would be moderate due to the higher miles travelled for the entire fleet.
- **T-CO-6 and T-CO-13 Decarbonizing the County's Off-Road and Small Engine Equipment Fleet (High Net Cost):** These are expensive now because there is little experience in the market with electric vehicles and mobile equipment and manufacturers are not yet offering more than a few specialized models. GHG emission reductions would be small as this equipment does not burn much fuel, but criteria pollutant emissions would be relatively larger as this equipment uses diesel fuel and emission controls are not as effective as on-road due to rougher duty cycles.



Funding Strategy Findings

Consero Solutions identified potential State, regional, and federal funding opportunities for 11 selected climate action measures to create the funding strategy. The strategy is a living document and does not commit the County to apply for any opportunity, rather to carefully consider whether to apply with sufficient time to develop competitive proposals. The table in the summary of key findings section of this report lists these funding opportunities.

Climate Action Measures in Funding Strategy			
Measure Number	Sector	Description	No. of Opportunities
E-CP-7	Energy	Prioritize and support energy efficiency and renewable energy access in underserved communities.	1
E-CO-2	Energy	Reduce energy use and increase resilience at existing County facilities in the mid-term through energy upgrades.	3
NWL-CO-5	Lands	Increase carbon sequestration on County-owned lands by implementing beneficial practices described in the Carbon Stock Inventory and Potential Sequestration Study through 2030.	6
T-CO-1	Transportation	Decarbonize the County fleet of light duty vehicles by 2040	3
T-CO-3	Transportation	Decarbonize the fleet of Medium and Heavy Duty vehicles (greater than 8,500 lbs gross vehicular weight) by 2042.	6
T-CO-4	Transportation	Decarbonize the transit bus fleet by 2040	8
T-CO-5	Transportation	Deploy zero emission vehicle infrastructure in number and locations to support the decarbonization schedule for light and heavy duty fleets.	4
T-CO-12	Transportation	Create and connect to an interconnected system of Class 1 Bikeways through partnerships, acquisitions, and collaborative efforts.	6
W-CO-4	Water	Evaluate and prioritize conservation practice projects on County-owned lands to enhance water resilience and mitigate drought, flood, and debris flows.	2
W-CO-8	Water	Conduct a vulnerability assessment/feasibility study by 2027 for County-owned infrastructure and lands that are at-risk for near term sea level rise and riverine-related flooding and/or erosion to identify protect, accommodate, and/or retreat strategies.	4
WF-CO-5	Wildfire	Implement fire-safe landscape practices, tree care, and protection on County-owned lands.	3



Financing Strategy Findings

Financing options will help the County fund implementation of the CR-CAP, especially climate action measures which require ongoing funding, as well as supplement the County of Sonoma's General Fund investment and State, regional, and federal grants. While financing mechanisms are available to locally fund capital investments and ongoing expenditures, each has specific requirements and key hurdles to overcome. The choice of mechanism will depend on both political considerations and fiscal capacity to raise revenue. The following are specific financing mechanisms for the County to consider.

#1: Partner with the Regional Climate Protection Authority (RCPA), which has taxing authority as a Climate Resilience District. Sonoma County has the first Climate Resilience District in California, established by the State Legislature and governed by the RCPA. The RCPA can propose different taxes and fees for voter approval to raise revenue for the Climate Resilience District. The RCPA examined one scenario that would use a half dozen of these options to generate \$45 million annually. Funds raised by the RCPA would not be County funds, however they could support measures that are a priority for the County, depending on the specifics of the revenue package approved by the voters.

#2: Implement innovative financing programs tied to direct actions. Building on the County's past groundbreaking implementation of financing options, the County could implement options modeled on successful habitat management programs but not implemented elsewhere before: 1) a working lands carbon mitigation bank program could fund carbon sequestration on natural and working lands by selling credits to other jurisdictions to assist in meeting their climate action plan goals; and 2) a residential retrofit offset reverse auction program could collect emission offset payments from developers to achieve net zero emission levels and then pay contractors through a reverse auction to retrofit low-income housing for electrification.

#3: Expand funding for existing successful community financing mechanisms. The County already has implemented one of the two preferred community financing mechanisms, the Sonoma County Energy Independent Program. The Sonoma County Energy Independence Program has financed \$109 million in projects through its revolving loans and is backed by \$60 million in bonds. The other preferred mechanism, on-bill financing, is available through Sonoma Clean Power. Along with on-bill financing, the Sonoma Clean Power Authority issues rebates for households and businesses to purchase electrification technologies. There are also incentives offered through the Bay Area Regional Energy Network (BayREN) and Pay As You Save (PAYS) programs from utilities.



Methodology

Cost-Benefit Analysis

For the Cost-Benefit Analysis, M.Cubed applied a cost-effectiveness approach focused on tons of reduced GHG emissions instead of a cost-benefit analysis because a cost-benefit analysis does not allow for easy comparison among options unless they are commensurate in all dimensions, which is not the case with measures proposed for the CR-CAP. Cost-benefit and cost-effectiveness analyses are closely related with different perspectives on the same question, so the terminology may be used interchangeably. M.Cubed used the cost-effectiveness approach because information about the emission inventory and projected reductions from proposed climate action measures necessary for a cost-benefit approach are not yet available. For more information about the cost-benefit analysis methodology, see the full report.

Multi-Year Funding and Financing Strategy

To develop the funding strategy, the team identified, researched, and matched State, federal, and regional grants over a three-year period to each of the 11 selected climate action measures. The team worked with the County's grant analyst to research funding opportunities, conducted extensive outreach to grant managers, and tracked the development of the 2024-2025 State budget and the proposed 2024 climate bond to identify additional funding opportunities. For the financing strategy, the team reviewed the characteristics and limitations on potential financing mechanisms such as property-related, utility, and development taxes, fees, and charges. In addition, the team identified opportunities to use market-based mechanisms to link potential revenue sources to direct expenditures to reduce and sequester GHG emissions.

