DRAWDOWN: MARIN STRATEGIC PLAN

APPENDIX E: DRAWDOWN: MARIN SOLUTIONS

DETAILED SOLUTIONS INFORMATION AND COMPARISON

COMMUNITY DEVELOPMENT AGENCY
COUNTY OF MARIN

DRAWDOWN MARIN

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Prepared by County of Marin Sustainability Team

APPENDIX E DRAWDOWN: MARIN SOLUTIONS – DETAILED SOLUTIONS INFORMATION AND COMPARISON

For each solution, the following is identified:

- Lead implementer
- How equity is addressed
- Status quo/current conditions
- Benefits/risks associated with doing nothing and with implementation
- Success metrics
- Cost (if known)
- Implementation timeframe
- Estimated annual GHG emissions reductions (estimated by each Stakeholder Collaborative and may need refinement)
- Ability to scale/share solution beyond Marin County

The County cannot serve as the lead implementer nor the sole funder for all of the strategies. We have a collective responsibility to act, including the cities and towns, local agencies, non-profits, faith-based groups, and the general public. We must all allocate staff time, funding, and other resources to the development and implementation of local climate actions. This requires buy in from everyone.

The following consumption-based emissions icon used in this appendix represents measures that address consumption-based or embodied emissions in the goods and services we purchase and use.

The following solutions should be implemented between now and 2045. Recommended implementation timeframes, as described in the Section VI. of this Strategic Plan are Now (2021-2023), Then (2024-2030 years), and Next (2031-2045).

Now (2021-2023)

- Endorsed Solutions
    - Zero Emissions Vehicles – Drive Clean Bay Area
    - Marin Carbon Farming Initiative
    - Agricultural Institute of Marin (AIM) – Center for Food & Agriculture
    - Biomass Study/Recovery Pathways
    - Microgrids – Fairfax Pavilion Pilot Project
    - Community Resilience Hubs
    - Resilient Neighborhoods - Climate Protection and Resilience (CPR) for the Planet
- Additional Solutions (Existing, lead implementer identified and already implementing or New Solutions)
    - ACE Pilot
    - All-electric Shared Mobility Hub

- Blue Carbon Hog Island Oyster Company Pilot
- Load Shift Pilot Program
- Building Electrification Program
- Community-based Integrated Mobility Services
- Agricultural Community Events Farmers Markets (ACEFM) Curbside Pick-up Program
- Organic Waste Diversion & Public Compost Use
- Food Resilient Marin
- Youth Engagement – Healthy Food Videos via TikTok
- Water-Energy Nexus – Micro-hydroelectric Turbines Marin Municipal Water District (MMWD)
- Resilience Coordinating Council
- "Know Your Blue Line" Sea Level Rise Public Art Project

Additional actions that are not yet ready for implementation but should continue to be developed between now and 2023:

- Countywide Decision-Making Framework
- Transportation Ordinance and Policies
- Marin Climate Mobilization Decade
- Go100

THEN (2024-2030)

Existing solutions that need to be scaled or will not be ready for implementation by 2024.

- Transit Oriented Mixed-Use Development
- Rezoning of Single-Family Homes
- Affordable Housing on State-owned Property
- Blue Carbon Wetlands Restoration

NEXT (2031-2045)

All of the solutions listed above should continue to be implemented year-over-year or until program or project specific goals are met. There are no solutions that Drawdown: Marin should wait to implement until 2031. It is feasible that new ideas will emerge in the coming months and years. Those ideas should be considered and phased in as appropriate to the Drawdown: Marin plan to meet our 2030 and 2045 goals.

Endorsed Solutions

ZERO EMISSIONS VEHICLES – DRIVE CLEAN BAY AREA

Lead Implementer	Drive Clean Bay Area (DCBA)
Equity	DCBA has partnered with other Bay Area non-profits and companies to address equitable access to electric vehicles (EV) by offering/promoting discounts and rebates, hosting ride and drive events with used electric vehicles, and translating some of its materials to Spanish. Additional work is needed.
Status quo/current conditions	DCBA has already launched in the 9 Bay Area counties. It offered a 'preferred pricing' campaign last Fall/Winter, it hosts 'ride and drive' events, engages students and parents through school-based learning programs, and partners with large employers to educate employees on the benefits of driving an EV.
Benefits/risks – do nothing/increase implementation	50%+ of Marin Countywide GHG emissions are generated by gasoline passenger vehicles. This solution will accelerate widespread adoption of zero-emission vehicles by Marin's residents and employees through a collaborative campaign. Existing County agencies are not actively promoting electric vehicle adoption, some major employers, e.g. the County are by increasing infrastructure and offering discounted charging rates. Awareness of EV models, pricing, range, etc. remains low.
Success metrics	# of EVs purchased or leased as a result of campaign; increased awareness of EVs measured via surveys; # of low-income drivers with access to an EV because of campaign; # of student and parent pledges taken to "drive electric"; metric tons of GHG emissions reduced as a result of driving electric
Cost	Phase I (Funded): $286,000 (est. funding through 12/31/19); Phase II: Jan 2020 - Dec 2024: $675,000 annually; Phase III: Jan. 2025-Dec 2029 $410,000 annually
Recommendation	The County can support this campaign by seeking additional funding to scale DCBA's existing efforts. It can also help promote its events and programs via its own channels and by reaching out to Drawdown: Marin participants and partners.
Implementation timeframe	2020- 2029
Estimated annual GHG emissions reductions	408,000 MTCO2e annually by 2030 (25% of DDM goal)
Ability to scale/share solution beyond Marin County	Drive Clean Marin changed its name to Drive Clean Bay Area in early 2020; it implemented a preferred pricing campaign in all 9 Bay Area counties in late 2019; it plans to expand its offerings statewide in 2020 and beyond.

MARIN CARBON FARMING INITIATIVE

Lead Implementer	Marin Resource Conservation District (RCD), Carbon Cycle Institute (CCI)
Equity	Not considered
Status quo/current conditions	There are 20 existing carbon farm plans that are being implemented to varying degrees depending on funding and staff availability to assist ranchers/farmers.
Benefits/risks – do nothing/increase implementation	Fewer acres of range and farmlands are included, less carbon is sequestered now and over time. Lead implementers lose momentum and have to scale back practices due to lack of funding.
Success metrics	# of plans developed, # of practices applied on range and farmlands, tons of CO2 sequestered, savings realized/revenue generated for farmers and ranchers.
Cost	Phase 1: by 2025- $10 million; Phase 2: by 2030- $20.6 million; Phase 3: by 2045- $62.8 million
Recommendation	The County should adopt a carbon sequestration goal in its 2020 CAP update; the County should allocate $300,000 to this Initiative from its FY 2020-2022 CAP implementation budget.
Implementation timeframe	2020-2045
Estimated annual GHG emissions reductions	By 2030 – 79,336 MTCO2e (mitigation through manure management and 185,839 MT C02e across 60 farms/30,000 acres (beyond mitigation, sequestration); Phase 3: by 2045- 525,000 MT C02e (sequestration) across all 180 farms.
Ability to scale/share solution beyond Marin County	This work is already being scaled/shared; CCI is already working with other Bay Area and Central Valley Counties to develop carbon farm plans. Additionally, some funding sources support the scaling of this work/sharing of lessons learned, e.g. RestoreCA, Healthy Soils grants, etc.

AGRICULTURAL INSTITUTE OF MARIN'S (AIM) CENTER FOR FOOD AND AGRICULTURE

Lead Implementer	AIM
Equity	Underserved, marginalized, and low-income communities need access to farmers markets and locally grown, organic food. However, these communities often time do not have access to markets and/or cannot afford to purchase organic food. AIM must develop ways to expand its current customer base, e.g. marketing to CalFresh/EBT customers, offering food distribution in certain communities, and promoting the new Center through specific engagement channels that reach the communities effectively.
Status quo/current conditions	AIM is currently working with a design team to finalize site plans, conduct environmental review and break ground. Additionally, it continues to fundraise and apply for grants to cover the $10,000,000 Center cost.
Benefits/risks – do nothing/increase implementation	Without a central community gathering space and educational facility, the reach of the current farmers market may remain limited to the existing customer base. Additionally, the link between regenerative and sustainable farms in Marin and consumers can and will be strengthened through the Center. Finally, thousands of people attend the market each year and the Center would capitalize on this participation to showcase a variety of sustainable technologies that if implemented throughout the community could significantly reduce GHG emissions and increase overall community resilience.
Success metrics	Center is built by 2028.
Cost	$10,000,000
Recommendation	Expand the reach of the current farmers market to new customers including low income and marginalized communities. The County may assist AIM to identify additional funding and build partnerships that will facilitate implementation of the project. The County can also help promote the project and various site components and educate the public about the benefits of technologies demonstrated, regenerative agriculture, etc.
Implementation timeframe	2-7 years
Estimated annual GHG emissions reductions	Unknown; several project components will reduce GHG emissions but need to be quantified.
Ability to scale/share solution beyond Marin County	The Center could be an excellent example for other California and US communities. It will demonstrate multiple sustainable technologies including solar, battery back-up, bioretention gardens, use of public transit, etc. It will also educate people about the benefits of regenerative agriculture and connect people

	back to the land and the producers of that agriculture. The design and programs offered at the Center can be shared widely.

Lead Implementer	OneTAM, Zero Waste Marin, or Marin County Parks
Equity	This has yet to be addressed as part of this project idea. Potential future equity considerations include: siting of new biomass to energy facilities and local air quality impacts, access to affordable composted material and biomass that can be used in gardening, etc., creation of new jobs as a result of increased biomass collection and processing.
Status quo/current conditions	There is large amount of biomass being cleared and disposed of in and outside of Marin County. This biomass is generated all over the County, although type and quantity are unknown. Local waste haulers were able to send some of this waste to a biomass to energy facility in Woodland, CA, but that plant has since closed. There may be an opportunity to build a biomass to energy plant locally and sell energy generated to MCE Clean Energy. Additionally, the types and quantity of biomass will increase with the passage of Measure C – Wildfire Protection Tax – which will generate $19M in annual revenue for removal and processing of biomass throughout the County
Benefits/risks – do nothing/increase implementation	Without a clear understanding of the type and quantity of biomass in the County, it is difficult to determine beneficial uses of that material. Beneficial uses may include: biomass to energy, biomass to compost to range/farmland application, and biomass to biochar.
Success metrics	Completion of a Biomass Study; identification of beneficial uses of material; established partnerships to facilitate the use of biomass material.
Cost	Unknown
Recommendation	Continue working with Zero Waste Marin, OneTAM, Marin County Parks, Marin Sanitary, MCE Clean Energy, and Environmentally Sound Practices Partnership (ESP) to identify a lead implementer and funding to conduct the study.
Implementation timeframe	0-2 years; 2020, as soon as possible
Estimated annual GHG emissions reductions	Unknown
Ability to scale/share solution beyond Marin County	Managing biomass as a way to prevent wildfires is a focus of many California jurisdictions. Marin could share the process leading up to the completion of the study as well as the results/recommended actions with local, regional, and state agencies and other jurisdictions.

MICROGRIDS – FAIRFAX PAVILION PILOT PROJECT

Lead Implementer	Town of Fairfax
Equity	The Town of Fairfax is not a low-income community or a community of color, but it can use its privilege and access to resources to design an innovative project, implement that project, and share it with other Marin communities in need of similar technologies. For example, this project may inform the creation of a similar project at future Community Resilience Hubs at Albert J. Boro Community Center in the Canal District of San Rafael or at the Marin City Community Services District. Both of these potential projects would serve communities of color and those most in need of community gathering spaces during emergency events and clean, reliable energy sources.
Status quo/current conditions	Currently, the Town of Fairfax Pavilion has an existing solar photovoltaic (PV) system and serves as a community gathering space during emergency events like public safety power shut-off (PSPS) events. Several consultants have designed a project that would integrate battery back-up, a new inverter, and a bi-directional electric vehicle (EV) charger at the site. The team is currently seeking funding to develop the project.
Benefits/risks – do nothing/increase implementation	Without battery back-up, the community cannot gather to charge electronics, etc. during emergency events. Additionally, the battery back-up will provide ancillary service benefits to the Town by allowing it to store excess solar generation during the day and use it during peak times when they would otherwise draw energy from the grid. This would reduce GHG emissions and save the Town money on its electricity bill.
Success metrics	New technology installed; dollars saved; number of community members served during emergency events; reduction in kWh of energy purchased from the grid, etc.
Cost	$25,000
Recommendation	Drawdown: Marin can ensure partners are collaborating and funding is secured. Additionally, it can work with MCE Clean Energy and Fairfax to share what it learns and to identify additional sites. For example, it's possible the Fairfax project can be a model for a similar project at the Marin City Community Services District.
Implementation timeframe	0-2 years
Estimated annual GHG emissions reductions	34 MTCO2e

Ability to scale/share solution beyond Marin County	The Town of Fairfax and its partners want to demonstrate news technologies and then share lessons learned with Marin communities and MCE Clean Energy jurisdictions. Ideally, this project sets an example and jurisdictions can replicate it to create resilient community gathering hubs. Lessons will be shared with funders, at conferences, meeting, etc. and with local governments.

COMMUNITY RESILIENCE HUBS

Lead Implementer	City of San Rafael, County of Marin
Equity	Community Resilience Hubs can serve many people and communities. The proposed hub locations would directly serve one of the County's largest immigrant populations, low income communities, and non-English speakers. Empowering these communities to design and implement these hubs and access much needed resources is a step towards addressing historic and existing inequities when it comes to resource allocation and access, e.g. access to clean power, healthcare, community gathering space, job training, etc.
Status quo/current conditions	There are no existing resilience hubs in Marin County.
Benefits/risks – do nothing/increase implementation	Community resilience is incredibly important considering current circumstances and other emergencies, e.g. public safety power shut-off (PSPS) events, wildfires, etc. All communities, especially lower income communities, need spaces to gather where they can access the resources they need during emergency events. Without hubs, where these resources are coordinated, community members are forced to access resources from multiple different sources, creating additional stress.
Success metrics	Identify and secure two sites to demonstrate what are Community Resilience Hubs; identify funding to build the hubs; seek and integrate community input during design and implementation phases.
Cost	$250,000 (engagement and design concepts only); implementation of community visions, several million dollars
Recommendation	Drawdown can help form community collaboratives necessary to solicit initial community input and on-going input for design and construction of resilience hubs; Drawdown can also help identify funding needed for engagement and design phases.
Implementation timeframe	0-2 years for engagement design; 2-7 years for permitting and construction
Estimated annual GHG emissions reductions	Unknown; depends on project components
Ability to scale/share solution beyond Marin County	Resilience Hubs are a concept first developed by the Urban Sustainability Director's Network. There are several projects in initial stages around the country right now, see http://resilience-hub.org/. Their impact goes way beyond climate and they provide an opportunity to shift power to, and lift up, traditionally marginalized communities.

RESILIENT NEIGHBORHOODS - CLIMATE PROTECTION AND RESILIENCE (CPR) FOR THE PLANET

Lead Implementer	Resilient Neighborhoods
Equity	CPR for the Planet seeks to engage new audiences that have typically not participated in Resilient Neighborhoods including Spanish-speaking, low income, aging individuals, renters, and high-carbon footprint households. It also seeks to educate people about their consumption-based emissions footprint, which will shift responsibility to act to higher income households that consume more goods and services.
Status quo/current conditions	Resilient Neighborhoods has engaged thousands of Marin residents in a comprehensive program that combines mitigation and adaptation education that results in individuals acting to solve climate change. Resilient Neighborhoods wants to expand the reach of its program by building new partnerships and reaching new audiences.
Benefits/risks – do nothing/increase implementation	Resilient Neighborhoods has a proven and successful model for engaging residents. It wants to leverage this model to reach new audiences including aging population, underserved communities, high-carbon footprint households, and Spanish-speaking individuals. By increasing its reach, additional communities will gain a deeper understanding of climate change, understand their carbon footprints, increase their resilience to climate-related impacts and emergencies, and feel empowered to take daily actions. Without this program, individuals are often left feeling hopeless, unsure of what actions they can take to make a difference.
Success metrics	Empower 1,000 new residents to change their behavior and take household climate actions in all 6 of Drawdown: Marin's issue areas, reducing climate pollution and increasing climate resilience significantly; reduce 2,642 $MtCO_2e$ annually in 3 years; revised materials and online delivery method finalized; partnerships with FireSafe Marin, In-Home Supportive Services, and the Aging Action Initiative; number of pilots initiated.
Cost	$200,000 per year
Recommendation	Drawdown: Marin can continue to support Resilient Neighborhoods by working with the Marin Climate and Energy Partnership to identify funding sources that make program expansion possible. Additionally, it can promote the program to Marin County residents.
Implementation timeframe	0-2 years
Estimated annual GHG emissions reductions	2,642 $MtCO_2e$ by 2023; 9,427 $MTCO_2e$ by 2030.

Ability to scale/share solution beyond Marin County	Resilient Neighborhoods is already exploring the possibility of offering its program to other Bay Area communities; several counties, cities, businesses, etc. have expressed interest in piloting this program in their own communities.

Additional Solutions

Existing, lead implementer identified and already implementing.

ADVANCED COMMUNITY ENERGY (ACE) PILOT

Lead Implementer	Multiple – MCE Clean Energy, County of Marin, Town of Fairfax, Marin City, Marin Community Foundation (MCF)
Equity	Underserved, marginalized, and low-income communities need access to clean, reliable power. There are existing efforts to provide solar energy at no cost to qualified homeowners and renters, e.g. GRID Alternatives and to identify project locations that would serve these populations, e.g. Sheriff and Fire stations in Marin City. Both MCE and MCF are pursuing microgrid projects in "disadvantaged communities" and those communities most in-need of reliable power during public safety power shut off (PSPS) events and other emergencies.
Status quo/current conditions	There are a variety of efforts to identify ideal project sites for solar plus storage and microgrids. Additionally, there are multiple funding streams available, e.g. MCE Resilience Fund, MCF Resilience Fund, and various incentive programs such as the self-generation incentive program (SGIP). Drawdown: Marin is participating in and helping coordinate these conversations. Specifically, there are promising sites in Marin City and Fairfax.
Benefits/risks – do nothing/increase implementation	Without microgrids and solar plus storage, communities cannot be resilient to PSPS events or other emergencies. Additionally, communities may miss out on financial opportunities to sell power to utilities and community choice energy providers. Installing storage/back-up systems create more certainty for communities, increase renewable energy generation/storage/use, and reduce GHG emissions.
Success metrics	# of solar plus battery systems installed; # of microgrids; # of local generation projects installed
Cost	Unknown; project specific
Recommendation	Continue to coordinate with the above-listed entities and identify ideal sites for solar plus storage and battery back-up sites.
Implementation timeframe	2020-2022
Estimated annual GHG emissions reductions	Unknown; project specific
Ability to scale/share solution beyond Marin County	The ACE concept did not start in Marin – it was developed by the Center for Climate Protection (CCP); it is currently working at the regional and state level to advance legislation, policies, and regulations that

	would support a variety of ACE concepts and projects. If Marin moves forward with an ACE pilot project, it could share the results of it with CCP, legislators, regulatory agencies, and local governments.

ALL-ELECTRIC SHARED MOBILITY HUB (NEW SOLUTION, BUT IMPLEMENTATION STARTED)

Lead Implementer	Transportation Authority of Marin (TAM), Marin Transit, Golden Gate Bridge Highway and Transportation District (GGTD)
Equity	Equity has not explicitly been discussed although discounted bike share rate may be available. The agencies could also decide to offer a discounted charging rate at stations.
Status quo/current conditions	The County of Marin (Supervisors Kate Sears and Damon Connolly along with the Drawdown: Marin Coordinator) convened a meeting of the above-listed agencies to discuss whether this mobility hub was possible at the Larkspur Ferry Terminal. After this meeting, TAM staff coordinated with the agencies to identify what components could move forward including electric bike share, increased Level I and II electric vehicle charging stations, and option up to MCE Deep Green (100% renewable energy).
Benefits/risks – do nothing/increase implementation	If none of the above components are implemented, the parking lot will still contain 2, Level II charging stations. Those stations are currently over-subscribed and there are more EV drivers who need to charge during the day. Additionally, parking will continue to be an issue. If electric bike share is implemented, perhaps those that would drive from their homes and park all day would instead check out a bike and use it to commute.
Success metrics	Number of new EV charging stations installed; number of electric bike docking stations and number of bikes and users.
Cost	Unknown
Recommendation	Support TAM as needed so it can effectively coordinate with implementing agencies.
Implementation timeframe	Spring 2020 - ?
Estimated annual GHG emissions reductions	Unknown; could calculate by assuming a certain number of vehicle trips are replaced with electric bike trips. Would be difficult to calculate whether increasing the number of charging stations leads to additional EV purchases and displacement of gasoline vehicles.
Ability to scale/share solution beyond Marin County	There are many transportation hubs around the Bay Area, California, and the U.S. Drawdown: Marin could share lessons learned through existing local government working groups around multi-agency coordination, financing, electric bikes, etc.

Lead Implementer	Hog Island Oyster Company and Salt Point Seaweed
Equity	Equity is not a component of this project.
Status quo/current conditions	For the pilot project, the researchers grew the native red algae *Gracilariopsis andersonii* in Tomales Bay, an inlet of the Pacific Ocean 30 miles northwest of San Francisco. The research was completed in partnership with Hog Island Oyster Co., on the existing aquaculture lease and with the shellfish company's support.
Benefits/risks – do nothing/increase implementation	Without additional research, we will not know the potential benefits of seaweed aquaculture in the state. Lack of awareness to the potential benefits of seaweed aquaculture in ensuring the long-term resilience of California's coastal ecosystems.
Success metrics	Kelp is estimated to take in five times more carbon than most land-based plants. Research has also shown seaweed can help manage water quality by absorbing excess nutrient pollution from wastewater treatment facilities, storm water runoff, and farming.
Cost	Unknown
Recommendation	Monitor progress of pilot; offer assistance to Hog Island Oyster Company and Salt Point Seaweed if and when they seek additional funding for continued research; help promote the benefits of kelp farming; support relationships between Hog Island and the Marin Resource Conservation District (implementation of Carbon Farm Plans ensures reduced polluted run-off that impacts oyster farming and kelp forests).
Implementation timeframe	First phase is complete. Unsure about additional phases.
Estimated annual GHG emissions reductions	Unknown
Ability to scale/share solution beyond Marin County	The results of this pilot are already being shared beyond Marin County. Additional study results could be shared as well via academic institutions, with state and national lawmakers, and with national and international non-profits.

LOAD SHIFT PILOT PROGRAM

Lead Implementer	MCE Clean Energy and Pacific Gas & Electric Company (PG&E)
Equity	Some load shift programs, e.g. OhmConnect actively market their free programs to low-income households as an opportunity to earn extra cash. Additionally, OhmConnect offers referral bonuses to those that sign up friends and family. MCE and PG&E offer load shift programs as part of its existing low-income energy efficiency programs.
Status quo/current conditions	Per its current Energy Efficiency Business Plan, MCE will assist customers with an integrated and comprehensive approach to resource conservation– providing a one–stop–shop for everything from traditional building efficiency upgrades to solar hot water, water efficiency, battery storage, load shifting, and electric–vehicle charging. This model is seemingly simple, yet in reality requires innovative systems–thinking and a nimble approach. Promoting resource conservation through an integrated platform is a critical approach to achieving deep greenhouse gas reductions. PG&E's Business Plan indicates similar priorities.
Benefits/risks – do nothing/increase implementation	We must shift when we use energy to times when renewable power is generated and available. Without this shift and rapid advances in battery technology, evening power usage will continue to come from non-renewable sources like natural gas. There are several third-party providers that offer current platforms for load shifting, e.g. OhmConnect. MCE Clean Energy and PG&E have already allocated funding to design and implement load shift pilot programs.
Success metrics	# of customers enrolled, kWhs saved, incentives ($) paid to customers
Cost	Free to enroll; OhmConnect and other load shift programs are funded by ratepayer dollars and other sources.
Recommendation	Actively promote load shift programs; offer additional financial incentives if customers enroll.
Implementation timeframe	2015-2026 (length of existing Energy Efficiency Business Plan[14])
Estimated annual GHG emissions reductions	As an example, the most power OhmConnect generated at one particular moment has exceeded 100 Megawatts. 100 MW is the carbon dioxide (CO_2) equivalent of taking over 340,000 cars off the road.
Ability to scale/share solution beyond Marin County	These load-shift programs are already available Statewide. If MCE develops a unique approach to enrolling customers that results in increased participation and reduced energy use, it could share those approaches with other community choice energy providers, its member communities, and with the California Public Utilities Commission.

BUILDING ELECTRIFICATION PROGRAM

Lead Implementer	County of Marin
Equity	The County offers additional incentives for income qualified applicants.
Status quo/current conditions	The County of Marin received a Bay Area Air Quality Management District (BAAQMD) grant ($296,997) to implement a "building decarbonization pilot project" also known as Electrify Marin. In 2018, this program started offering rebates to single family property owners for the replacement of natural gas appliances with efficient all-electric units. More information is available at https://www.marincounty.org/depts/cd/divisions/sustainability/energy-programs/electrify.
Benefits/risks – do nothing/increase implementation	The existing grant term expires at the end of 2020. The County may continue to issue rebates using County funds post-2020.
Success metrics	# of standard and income qualified rebates issued, # of appliances installed, # of interested applicants
Cost	Rebate amounts or available at the link above; total cost of the program ($296,997) includes a County staff person for two years and funds for rebates
Recommendation	Consider continuing this program beyond 2020 depending on final results of existing effort
Implementation timeframe	2018 - 2020
Estimated annual GHG emissions reductions	705 MTCO2e between 2020-2025
Ability to scale/share solution beyond Marin County	The County is required to report program results to BAAQMD. BAAQMD will share the outcomes with other Bay Area jurisdictions and likely with the California Air Resources Board and other State agencies. Additionally, County staff presents on this program at local, regional, and state workshops/conferences.

COMMUNITY-BASED INTEGRATED MOBILITY SERVICES

Lead Implementer	Transportation Authority of Marin (TAM) and Marin Transit
Equity	Existing Marin Transit programs offer discounts for youth, seniors, and persons with disabilities. Additionally, College of Marin students have unlimited access to Marin Transit with a valid college ID. Currently, there are no discounts offered for lower income individuals. Specific fares were not assessed/developed a part of this project but should be considered when conducting user surveys/interviews.
Status quo/current conditions	Public transportation users must use multiple apps and payment systems when commuting.
Benefits/risks – do nothing/increase implementation	Over 50% of countywide GHG emissions are generated by the transportation sector. Without streamlined, easy platforms that enable use of existing public transit infrastructure, people continue to travel/commute in personal vehicles. Although Marin Transit currently offers some public transit services via phone apps, usership can and should be increased. Additionally, the existing apps do not integrate all available forms of transit or accept a single payment.
Success metrics	Number of community members participating in community surveys, number of app users, number of public transit riders, avoided vehicle trips, etc.
Cost	Expenditures: Year 1 - $4.2m, Year 2 - $2.5m, Year 3 - 2.5m; Revenues: Year 1 - $3.2m, Year 2 - $1.9m, Year 3 - $1.9m
Recommendation	Identify pilot community
Implementation timeframe	Prototype runs from 2021 to 2024; assuming success at least 2-3 new prototype programs would run from 2025-2028; by 2030 city-centered corridor programs implemented; by 2035 extended to rural and coastal regions; by 2040 multi-modal transportation system introduced Countywide
Estimated annual GHG emissions reductions	65.6 MTCO2e daily/22,850 MTCO2e annually
Ability to scale/share solution beyond Marin County	This program could be shared Countywide, with regional/state transit agencies, and with other jurisdictions across California and the US.

AGRICULTURAL COMMUNITY EVENTS FARMERS MARKETS (ACEFM) CURBSIDE PICK-UP PROGRAM

Lead Implementer	ACEFM
Equity	ACEFM currently accepts CalFresh as payment. Additionally, the expansion of this program would include additional pick-up sites in communities that do not typically have access to farmers markets, e.g. the Canal District in San Rafael, Marin City, and the San Geronimo Valley. Additionally, expansion of this program would require additional ACEFM workers and drivers and those individuals could be hired from non-white communities near existing markets.
Status quo/current conditions	ACEFM launched its curbside pick-up program in response to COVID-19 so that high risk customers and producers/vendors could still shop at and sell goods at existing farmers markets. ACEFM is currently seeking funding (applied for a United States Department of Agriculture Farmers Market Promotion grant on 5/26/20) to expand the reach of this program through streamlining of its online ordering system, additional pick-up hours, and "food hub" distribution sites in underserved, low income, and moderate income communities in Marin and Sonoma Counties.
Benefits/risks – do nothing/increase implementation	ACEFM may be able to continue the curbside pick-up program, but it is highly dependent on securing additional funding. Without this program, many high-risk customers and producers/vendors may stop shopping at their local farmers markets. This would have a negative impact on the local economy and could lead to farmers/ranchers/producers struggling financially.
Success metrics	Number of customers ordering online, numbering of farmers/ranchers/producers participating, number of low- and moderate-income customers received boxes, and number of new customers served.
Cost	$250,000
Recommendation	Drawdown: Marin assisted ACEFM to apply for the USDA grant referenced above. It will also help connect ACEFM to AIM, who also has a curbside pick-up program ("Bounty Box") so they can share lessons-learned. Drawdown: Marin can help promote ACEFM's pick-up program through social media and other channels. It can also help connect it to community-based organizations located in underserved communities, e.g. the Canal District and/or Marin City to identify potential "food hub" distribution and pick-up sites. ACEFM will continue to seek funding and report back to the ESC with updates; the ESC may offer endorsement if funding is identified and it becomes clear how ACEFM will reach non-traditional farmers market customers.
Implementation timeframe	0-2 years
Estimated annual GHG emissions reductions	Unknown; GHG emissions reductions may result from reduced food waste (home/producer-side) and reduce vehicle miles traveled (less trips to stores farther away from people's homes).

Ability to scale/share solution beyond Marin County	Many farmers markets in the Bay Area and in California began to offer curbside pick-up programs in response to COVID-19. ACEFM could share lessons learned with other smaller farmers markets and also share how it reached out and made farmers markets accessible to underserved and low- and moderate-income communities. Additionally, if awarded the USDA grant, ACEFM will partner with University of Wisconsin Madison and use the "Farm 2 Facts" platform to track program metrics. It could share lessons learned from using that platform with other farmers markets.

New Solutions (may or may not be ready for implementation)

ORGANIC WASTE DIVERSION & PUBLIC COMPOST USE

Lead Implementer	Zero Waste Marin
Equity	This effort may promote the existing efforts of communities already doing their part to reduce food waste, backyard compost, and grow food locally in community gardens. Additionally, communities living near landfills could experience improved air quality if less food and green waste is landfilled and more is composted. Additionally, general education efforts about food waste and proper second-uses of edible food could lead to decreased hunger rates in the County.
Status quo/current conditions	Marin County could be faced with increasing costs to transport organic materials outside of the county to meet state mandates. More than 50,000 tons of organic material was landfilled - 30% was food waste and 8% was green waste. By capturing this waste, there potential to decrease GHG emissions by an additional 10,640 MTCO2e. Additionally, no landfills in Marin use a depackager unit to remove food from packaging that thrown away. With full implementation of a unit, an additional 1,835 MTCO2e could be avoided.
Benefits/risks – do nothing/increase implementation	Large amounts of food waste end up in the landfill. Without additional efforts, including increased organics processing capacity, investment in a depackager unit, and scaling up exiting initiatives to increase compost use through community gardens and backyard composting, this will continue. This proposal connects people to locally produced food, improves local air quality, reduces food waste, and creates healthy soil.
Success metrics	Depackager unit purchased and operational;
Cost	$500,000 (depackager unit); $10,000 for compost diversion/distribution
Recommendation	Identify funding sources or public-private partnerships needed to purchase and operate a depackager unit.
Implementation timeframe	0-2 years
Estimated annual GHG emissions reductions	12,400 MTCO2e (food and green waste recovery and depackager unit implementation)
Ability to scale/share solution beyond Marin County	Some landfills in California already use depackager units; any landfill operator in Marin that purchases and operates a unit could share lessons learned re: funding and implementation with other California-based and national landfills.

FOOD RESILIENT MARIN

Lead Implementer	Potential lead implementers: Healthy Eating Active Living (HEAL) Task Force, HEAL Collaborative, Grown in Marin, Zero Waste Marin
Equity	1 in 5 people in Marin go hungry yet we waste huge quantities of food and much of that waste ends up in the landfill, emitting GHG emissions. These are connected problems that challenge our "food resiliency" in good times and are further magnified in hard times. Addressing food waste and better connecting organizations addressing this waste and hunger in Marin, will benefit many different communities including communities of color and lower income individuals that struggle to put food on the table.
Status quo/current conditions	There are numerous organizations across the food resiliency cycle with their own missions and marketing efforts. This effort aims to draw those good stories and initiatives together in a way that can also pull together the larger community around the importance of a resilient food system. Right now, these organizations are working on similar issues, but are not always coordinated and do not understand the synergies between their work.
Benefits/risks – do nothing/increase implementation	Without a concerted effort to join forces, each organization listed above (and others) will continue to pursue similar efforts and goals in siloes.
Success metrics	Number of organizations combining efforts, number of events/meetings/projects that happened because of the collaborative effort, dollars saved as a result of collaboration.
Cost	$80,000-500,000 depending on program components.
Recommendation	Continue to develop this idea and determine who would lead the collaboration, who are the intended beneficiaries, and how success would be measured.
Implementation timeframe	Phased; 0-2 years
Estimated annual GHG emissions reductions	Indirect - supports existing programs that can reduce approximately 54,000 MTCO2e annually, e.g. carbon farming, compost application, reduced food waste, etc.
Ability to scale/share solution beyond Marin County	Any successful collaboration or sharing of resources can be shared via existing networking circles, conferences, academic papers, newsletters, etc.

YOUTH ENGAGEMENT – HEALTHY FOOD VIDEOS VIA TIKTOK

Lead Implementer	Sanzuma and San Rafael City Schools (SRCS)
Equity	This campaign will be piloted in SRCS but could be expanded to all Marin County schools. Additionally, videos could be generated in multiple languages to reach a great audience. Additional equity opportunities and concerns will be addressed as the program is defined and developed.
Status quo/current conditions	There are no other similar efforts that empower students to create videos, share those videos with their peers, and ultimately, reduce plate food waste.
Benefits/risks – do nothing/increase implementation	The videos will help create a community of future environmentally conscious residents by educating students on the consequences of creating excessive plate waste. Right now, there are no other educational/engagement efforts that explain what plate waste is and how students can help reduce it. Reduced plate waste leads to overall reduced food waste and a reduction in GHG emissions.
Success metrics	Number of schools participating; number of students engaged; quantity of reduced food waste.
Cost	Unknown.
Recommendation	Continue to develop this idea; identify potential partners or organizations that have attempted something similar in the past. Submit solutions proposal form to the ESC for review and feedback.
Implementation timeframe	0-2 years
Estimated annual GHG emissions reductions	Unknown
Ability to scale/share solution beyond Marin County	If this effort was successful, Sanzuma and SRCS could share its approach and videos with other Marin County, Bay Area, and California school districts.

WATER-ENERGY NEXUS – MICRO-HYDRO TURBINES, MARIN MUNICIPAL WATER DISTRICT (MMWD)

Lead Implementer	MMWD, MCE Clean Energy
Equity	By installing micro-hydroelectric turbines, MMWD could decrease the amount of power it purchases from the grid thereby reducing its costs and reducing water rates. Those savings can be passed on to customers, including lower income customers.
Status quo/current conditions	MMWD is currently seeking funding to conduct a study to determine the scope of the project; MMWD is also discussing power purchase agreements with MCE Clean Energy.
Benefits/risks – do nothing/increase implementation	Increasing the security of water delivery systems is a critical part of community climate resilience. By integrating micro-hydro turbines into existing water delivery infrastructure, it would create a reliable renewable energy alternative with little to no environmental impact that provides energy independence and saves money. Without this project, Marin's water distribution network will remain dependent on energy sources that are out of its control or influence. This dependency threatens the delivery, efficiency, reliability, and sustainability of water distribution and water rates.
Success metrics	Completion of a report outlining options; MMWD Board approval to move forward with project; identification of funding for the projects.
Cost	$200,000 - $1,000,000
Recommendation	Support the Environmental Action Committee of West Marin (EAC) as it develops a project and financial portfolio report that includes a comparison of different technology for the MMWD staff and board to review. This would provide MMWD with a range of options that could be analyzed based on system capacity in order to inform the selection of shovel ready projects.
Implementation timeframe	2-7 years
Estimated annual GHG emissions reductions	Unknown; depends on the types of technologies installed/used
Ability to scale/share solution beyond Marin County	Other California water districts have already implemented this technology; MMWD could still share best practices and lessons learned through conferences, academic paper, etc.

RESILIENCE COORDINATING COUNCIL (RCC)

Lead Implementer	Unknown
Equity	Community Resilience Trainings will be offered to all Marin communities. It is imperative that these trainings reach a diverse population because everyone experiences climate-related and other traumas and may not have the tools to process resulting emotions and impacts. A major goal is that the Council is inclusive and helps build trust within communities, creating a space where everyone feels safe participating and sharing stories. The Council wants to engage frontline community leaders as part of the core Council team to learn from them and to provide additional training that may be beneficial to their communities.
Status quo/current conditions	No Council exists now; efforts to deal with traumatic experiences are ad-hoc and undertaken by a variety of different agencies and individuals; some have been trained in how to cope with climate-related stress and trauma and others have not.
Benefits/risks – do nothing/increase implementation	Without additional training and a coordinated effort, the Marin community will experience harmful psychological, emotional, and behavioral reactions that will threaten the health, safety, and wellbeing of frontline workers.
Success metrics	For a Resilience Coordinating Council to counter the adverse psychological and psycho-social-spiritual reactions to climate-enhanced traumas Council brings together a range of uncommon partners to co-create and implement innovative local networks that foster and sustain mental wellness.
Cost	$3,000 - $330,000
Recommendation	Drawdown could help form the Council by identifying and recruiting 5-10 agencies to participate initially and helping to forge necessary partnerships to create the Council structure. Could host free or low-cost webinars to increase awareness about the Council, benefits, etc. Consider supporting a Council-led assessment of the community's ability to respond to climate-related stressors, existing mental health status, etc.
Implementation timeframe	0-2 years
Estimated annual GHG emissions reductions	Unknown
Ability to scale/share solution beyond Marin County	The International Transformational Resilience Coalition has signed on to support this effort. Its reach is national and international and it could help share our story, lessons learned, etc. beyond Marin County. The Council could also share its model, etc. through existing resilience groups and conferences.

"KNOW YOUR BLUE LINE" SEA LEVEL RISE PUBLIC ART PROJECT

Lead Implementer	Unknown
Equity	Sea level rise and related flooding is already impacting and will continue to impact low income and communities of color disproportionally. Raising collective awareness about expected sea levels will hopefully lead to meaningful action that protects these communities from related impacts considering they are least responsible for climate change.
Status quo/current conditions	The County and other organizations and agencies have issued reports and maps explaining anticipated sea levels in Marin County on the bayside and coast side. However, it is uncertain if these reports are read by the public and whether the data is understood.
Benefits/risks – do nothing/increase implementation	Without increased awareness of project sea levels, the related impacts, and the options, e.g. retreat, relocate, protect, action will be delayed and the County's population will not be prepared to deal with those impacts.
Success metrics	Identify project areas; successful partnership with CalTrans District 4 to identify locations to paint the blue line; final sea level rise projections and accurate elevations from the Marin County Department of Public Works.
Cost	$15,000-$40,000
Recommendation	Drawdown can help connect the Climate Resilient Communities Collaborative to identify locations for the blue line that are not on CalTrans District 4 property. It could also help connect this small group to local artists and identify other, similar art projects that do not require CalTrans approval, but could still build awareness.
Implementation timeframe	0-2 years
Estimated annual GHG emissions reductions	Unknown
Ability to scale/share solution beyond Marin County	This type of project has already been completed in other jurisdictions; Marin County has also painted a blue line (much smaller scale). If the project is implemented, lessons learned could be shared with the 9 Bay Area Counties through existing channels, e.g. Bay Area Regional Climate Collaborative, Bay Conservation and Development Commissions, etc. Information could also be shared at regional and state conferences.

Additional potential actions – not yet ready for implementation

COUNTYWIDE DECISION-MAKING PLATFORM

Lead Implementer	County of Marin
Equity	This framework would allow the County and the cities and towns to develop social, environmental, and financial criteria to evaluate climate change-related projects countywide. A to-be-formed stakeholder group would develop the list of criteria and also assign values to that criteria. Equity criteria must be met for all climate change projects and weighted in a way that reflects the importance of including and serving marginalized and underserved communities that are least responsible for climate change.
Status quo/current conditions	Currently, county jurisdictions decide what sustainability projects to implement based on individual staff and elected officials' opinions and available funding. Projects across the county are not evaluated using similar criteria. Understanding a more coordinated approach is needed, the Drawdown: Marin Coordinator researched available platforms including: EarthShift Global's Sustainable Return on Investment (S-ROI) tool, Global Footprint Network's Net Present Value Plus (NPV+) framework, and DecisionLens Project Prioritization software/tool. The Coordinator organized a demonstration of the DecisionLens tool for a small focus group made up of city/county staff and elected officials. Then, the research and platform were presented to the Steering Committee, which wanted to move forward with a no-cost "proof of value" pilot but decided not to because of current staffing/budget issues resulting from COVID-19. Drawdown: Marin will revisit this pilot in late Fall 2020.
Benefits/risks – do nothing/increase implementation	Without countywide coordination, sustainability project implementation will be subjective and not necessarily reflective of what strategies will achieve the greatest social, environmental, and financial benefit/impact.
Success metrics	Established decision-making platform; evaluation criteria; number of jurisdictions using the tool; number of projects implemented or not based on outputs from tool
Cost	$50,000/year for multiple licenses allowing the county and jurisdictions to use the tool; other platforms may cost more
Recommendation	Revisit no-cost proof of value pilot in late Fall 2020
Implementation timeframe	2020-2022

Estimated annual GHG emissions reductions	Unknown; dependent on solutions prioritized and implemented
Ability to scale/share solution beyond Marin County	This platform and approach could be shared with other Bay Area counties and jurisdictions statewide.

TRANSPORTATION ORDINANCES AND POLICIES

Lead Implementer	County of Marin; county jurisdictions
Equity	Providing EV charging at multi-family dwellings may increase the number of individuals who are able to purchase EVs. Prohibiting new gas stations could negatively impact lower income individuals if they have to travel longer distances to find affordable gasoline. Additionally, remote communities (West Marin) do not have access to high-speed reliable internet, which may impact their ability to receive necessary health services and participate in/access online services generally.
Status quo/current conditions	A mix of Government and private sector policies are needed to lower transportation emissions. For example, electric vehicle (EV) and bus-only purchase/lease policy (needed), required EV charging for businesses of a certain size (needed), required pre-wiring for EV charging stations at renovated or new multi-family dwellings (existing), banning the issuance of business licenses for new gas stations (needed), and allowing 5G communications technology to support the interconnection and use of EV charging stations, smart phones, and other smart devices (needed).
Benefits/risks – do nothing/increase implementation	There are a variety of benefits and risks associated with each of the proposed policies above. All policies would result in reduced GHG emissions and in some instances cost savings, e.g. EVs require less maintenance than gasoline vehicles. Additionally, policies that *require* certain action ultimately lead to bigger impact than voluntary policies. Some risks include: landlords pass on additional costs related to EV chargers to tenants, drivers in Marin go outside the county to fill up their gas tanks instead of driving electric, unknown long-term health impacts of an expanded 5G network, and lack of available and affordable electric buses.
Success metrics	Number of EVs/buses per fleet; number of new gas stations permitted; number of multi-family dwelling with EV charger pre-wiring
Cost	Unknown; varies by policy
Recommendation	Identify a jurisdiction willing to develop and implement one or more of the policies above.
Implementation timeframe	Unknown
Estimated annual GHG emissions reductions	Unknown
Ability to scale/share solution beyond Marin County	Any policies developed and implemented in Marin could be shared with Bay Area and California jurisdictions.

Lead Implementer	County of Marin or non-profit/coalition of individuals/organizations
Equity	Any tax should be progressive so as not to disproportionately affect the poor. Additionally, any tax measure expenditure plan should consider historic and existing in equities related to wealth distribution and allocate measure proceeds accordingly.
Status quo/current conditions	Drawdown: Marin is currently seeking funding from multiple sources. It is clear that a diversified funding portfolio is necessary. This strategy proposes to generate public funds through one or more public funding mechanisms. Potential mechanisms include: property tax assessments, a sales tax, and/or issuing bonds. These additional revenues would allow for the implementation of a comprehensive Marin Climate Mobilization ensuring that Drawdown: Marin objectives are funded for the coming decade, in which they are most critically needed. Currently, there have been no efforts to pursue these mechanisms.
Benefits/risks – do nothing/increase implementation	Without diverse and long-term funding Drawdown: Marin will be unable to implement solutions and make meaningful progress toward its goals.
Success metrics	Dollars raised; tax measures passed; bonds issued
Cost	Unknown; depends on type of measure pursued
Recommendation	Consider when timing is right to pursue a ballot measure considering other large ballot measures, e.g. recent Measure C, Measure, etc. Identify a lead implementer and conduct polling.
Implementation timeframe	7+ years
Estimated annual GHG emissions reductions	648,000 MTCO2e emissions reduction + 50,000 MTCO2e sequestration by 2030 (Carbon neutral by 2040 if funding continued)
Ability to scale/share solution beyond Marin County	Developing and passing ballot measures is specific to individual communities, but general lessons learned could be shared with other jurisdictions.

 GO100 

Lead Implementer	MCE Clean Energy; maybe a county jurisdiction
Equity	Additional rebates and incentives should be offered to income-qualified individuals. Workforce development opportunities should be offered to local individuals in need of training/well-paying jobs – increased solar and battery installations will require additional contractors with the ability to install these new technologies.
Status quo/current conditions	MCE Clean Energy and PG&E both offer special metering (net energy metering) for solar customers. Net metering is an electricity billing mechanism that allows consumers who generate some or all of their own electricity to use that electricity anytime, instead of when it is generated and get credited for energy, they send back to the energy grid. Additionally, MCE credits its customers at the retail rate plus 1 cent per kWh. The amount of solar energy generated by electricity customers in MCE's territory is more than what is needed during the daytime yet that excess power is not available in the evening when it is needed. In November 2019, MCE set aside $3 million Resiliency fund to build solar plus storage and microgrids. There are no current incentive programs to reduce costs of installing battery back-up systems at residences. Some private companies offer discounts.
Benefits/risks – do nothing/increase implementation	Additional rooftop solar is not needed during the day. However, stored renewable energy would be beneficial in the evening hours when power often comes from natural gas power plants. Additionally, on-site back up can provide resilience benefits during public safety power shut off events (PSPS) and other emergencies. Battery technology is still expensive and without incentives, residential and commercial customers may not install these technologies. Additionally, without access to stored renewable power in the evenings, MCE and PG&E will continue to rely on dirtier energy sources to satisfy customer demand.
Success metrics	Number of battery systems installed; number of rooftop solar PV and battery systems installed; customer energy and cost savings
Cost	Unknown; depends on the technology, installation costs, etc.
Recommendation	Continue work with MCE to design and implement programs that increase the number of solar plus storage and microgrids in Marin and MCE's territory; work with PG&E to do the same
Implementation timeframe	2020 and beyond
Estimated annual GHG emissions reductions	Unknown

Ability to scale/share solution beyond Marin County	Any program or approach could be shared with our community choice energy providers and local jurisdictions in and outside of California.

THEN (2023-2030)

- Transit Oriented Mixed-Use Development
- Rezoning of Single-Family Homes
- Affordable Housing on State-owned Property
- Blue Carbon Wetlands Restoration

Existing, needs to be scaled

TRANSIT ORIENTED MIXED-USE DEVELOPMENT

Lead Implementer	Varied; each jurisdiction would have to lead
Equity	Additional housing is needed in Marin County. Many individuals commute via buses and SMART train from outside the County for a variety of jobs including lower paying service worker jobs. If housing, especially affordable housing, was built near public transit hubs this could significantly increase the quality of life for these individuals and drive down housing costs overall.
Status quo/current conditions	Over 50% of countywide emissions are attributed to the transportation sector and this development approach would decrease dependence on cars for mobility. Existing zoning may need revisions to allow for increased density and mixed-uses near transit, e.g. SMART train stations. There is an effort to identify sites near transit that could be developed and/or rezoned to accommodate mixed-used development.
Benefits/risks – do nothing/increase implementation	Without additional housing near transit, Marin residents will continue to rely on personal vehicles for in and out-of-County travel. Additionally, existing commercially zoned lots may remain vacant or underutilized, e.g. strip malls that are no longer active or ideal commercial sites. Redeveloping existing sites and allowing for mixed-use or residential zoning may result in community backlash for a variety of reasons, e.g. changes in community character, visually unappealing, traffic/congestion concerns, etc.
Success metrics	Number of potential sites near transit suitable for development; number of sites rezoned; number of mixed-used projects built
Cost	Unknown
Recommendation	Work with County staff and other jurisdictions (San Rafael, Novato, etc.) to identify potential sites

Implementation timeframe	2022 and beyond
Estimated annual GHG emissions reductions	Unknown
Ability to scale/share solution beyond Marin County	Marin County could learn from other jurisdictions that have already built mixed-use developments near transit.

REZONING OF SINGLE-FAMILY HOMES

Lead Implementer	Varied; each jurisdiction would have to rezone
Equity	Additional, affordable housing options decrease existing housing inequities. Any future ordinances should consider if any of the additional units (and what percentage of those units) should be designated as "affordable" to ensure lower income individuals have access to these additional units.
Status quo/current conditions	Rezoning of single-family homes for duplexes/triplexes/fourplexes, also known as "cottage overlays," in unincorporated Marin County could diversify the housing types available, increase available rental units, and decrease overall rental prices while utilizing existing infrastructure. This is especially relevant to Marin, home to many large homes with few occupants. Model overlay ordinance after other jurisdictions, e.g. Sonoma County. The County of Marin is currently assessing existing zoning and opportunities to change zoning to accommodate denser housing types.
Benefits/risks – do nothing/increase implementation	Without rezoning, there is limited opportunity for new housing development in Marin. Additionally, Marin's aging population is often isolated, in large homes with no support structure. This type of ordinance would have multiple benefits including increasing housing stock, connecting older individuals with others, and increasing financial health of older adults.
Success metrics	Ordinances passed; number of units available for rent; number of units rented; average cost of those units; diversified renters
Cost	Unknown; staff time and community outreach/education related to development/implementation of ordinance
Recommendation	Work with the County of Marin staff to identify geographic areas ideal for cottage overlay ordinances; develop a model ordinance that could be shared with other county jurisdictions
Implementation timeframe	2022 and beyond
Estimated annual GHG emissions reductions	Unknown
Ability to scale/share solution beyond Marin County	This work is already being done in other jurisdictions; Marin could potentially share its planning and implementation process with other jurisdictions.

AFFORDABLE HOUSING ON STATE-OWNED PROPERTY

Lead Implementer	Varied; depends on location of State-owned property
Equity	Additional affordable housing is needed for those that cannot afford market rate housing. This may reduce commute times, build new and diverse communities, and increase quality of life for lower income individuals.
Status quo/current conditions	Governor Newsom signed Executive Order (EO) N-06-19 Affordable Housing Development to address the shortage of housing for Californians. Specifically, this EO address communities that do not build their "fair share of housing" and identifies an opportunity to build additional housing on state-owned land, which is often times located in and near urban areas. Using the interactive maps developed by the State, the County, cities, and towns should understand what state-owned parcels are ideal for new housing development. The State Department of General Services will then issue Request for Proposals (RFPs) to develop priority parcels across the State.
Benefits/risks – do nothing/increase implementation	Without additional affordable housing, especially on otherwise underutilized or undeveloped land, lower income individuals will be forced to finding housing outside of Marin County, which can lead to increased GHG emissions due to commuting. Adding additional housing could drive down costs in the County, build new communities, and serve those most in need.
Success metrics	Number of housing units built; additional units available for purchase or lease; number of units occupied; reduced GHG emissions as result of shorter commute times/routes
Cost	Unknown, project specific
Recommendation	Work with the State to identify potential sites, build community support for new development, work with developers to build new housing.
Implementation timeframe	Uncertain; dependent on State RFP schedule/priority sites.
Estimated annual GHG emissions reductions	Unknown.
Ability to scale/share solution beyond Marin County	Marin County can learn from other communities that build housing on state-owned property. If projects move forward in Marin, the County could share lessons learned, its process, results, etc. with other jurisdictions that will build similar projects.

Existing, lead implementer identified and already implementing

BLUE CARBON WETLANDS RESTORATION

Lead Implementer	County of Marin Public Works Department
Equity	Preserving open space, wetlands, etc. Can and will protect Marin County's most vulnerable communities from the impacts of sea level rise. As the County chooses additional sites for restoration, it should consider what communities are benefiting most from those improvements.
Status quo/current conditions	The Marin County Public Works Department is already working to restore tidal wetlands at McInnis Marsh and the Novato Baylands. Both projects are under way - McInnis Marsh is finalizing design and environmental review and Deer Island (one of several potential Baylands projects) is in design phase. Construction funding is needed for both, and both will require significant capital. County Staff assumes both projects will seek Measure AA ($25 million available annually) and other wetlands restoration-type grant funding. After these projects are completed, there are many more restoration/nature-based solutions, hardened protection, and even retreat projects and strategies that need to be designed, built, and implemented to protect people in their communities.
Benefits/risks – do nothing/increase implementation	Without wetland restoration, the County will not be able to adapt as well to sea level rise. Increase these efforts will be expensive and additional funding is needed. Additionally, communities may need to relocate or retreat if restoration and other similar adaptation efforts are not implemented.
Success metrics	Number of restoration projects completed; measured ecosystem benefits, e.g. species in existence, water quality improvements, etc.; communities engaged and protected
Cost	Unknown; project and site specific
Recommendation	Continue to pursue a variety of funding sources to support the above-mentioned projects and other priority adaptation projects as mentioned in the BayWAVE and C-SMART plans and generated through community dialogue and planning efforts.
Implementation timeframe	Efforts are already underway and should continue between now and 2045
Estimated annual GHG emissions reductions	Novato: 155 acres x 0.8 MTCO2e/acre = 124 MTCO2e annually; McGinnis: 180 acres x 0.8 MTCO2e/acre = 144 MTCO2e annually
Ability to scale/share solution beyond Marin County	Marin County is already part of regional knowledge-sharing groups; it learns from other waterfront jurisdictions and also shares what it learns; this should continue.

New Solutions

None.

Next (2031-2045)

All of the solutions listed in the previous section should continue to be implemented year-over-year or until program or project specific goals are met. There are no solutions that Drawdown: Marin should wait to implement until 2031. It is feasible that new ideas will emerge in the coming months and years. Those ideas should be considered and phased in as appropriate to the Drawdown: Marin plan to meet our 2030 and 2045 goals.

Solutions Summary List

Solution Name	GHG Reduction Estimate	Summary of Proposal	Endorsed
Go100	Unknown; 250MW 380k MWhrs generated annually once 2045 target is reached	Increase residential (then commercial) solar and solar + storage installations countywide; increase Deep Green enrollment and MCE opt-in	
Load Shift Pilot Program	2,500-7,500 MTCO2e/year (depending on participation)	Use deployed devices to shift energy use during the day and provide grid services to reduce GHG emissions and program participant costs	
Building Electrification Program	Unknown	Electrify buildings through public education and replacement of gas usage in buildings; incentives/training. Suite of energy efficiency and fuel-switching measures. Complete a marginal abatement cost curve (MACC) to determine "big hit" measures... (overthinking in some cases; get MACC help via well-resourced non-profit committed local solutions)	
Transit Oriented Mixed-Use Development	Unknown	Transit-oriented, mixed use development; revise current mixed-use zoning to maximize, expedite, accelerate and incentivize efficient/electric homes near transit	
Rezoning of Single- Family Homes	Unknown	Rezoning of single-family homes for duplexes/triplexes/fourplexes in unincorporated Marin County	
Affordable Housing on State-owned Property	Unknown	Net zero/electrified affordable housing on State property in Marin (EO N-06-19) (there are 4 potential sites totaling 19.93 acres).	
ACE Pilot	Unknown	Proposed statewide legislative initiative and program to develop local energy resources across all CA cities and counties, addressing today's grid needs. State would provide funding, technical assistance, and other support so communities can implement ACE systems	
Countywide Decision-Making Framework	Indirect	Develop a sophisticated portfolio management framework to enable Drawdown: Marin and other Bay Area agencies to make informed decisions about what projects to implement for biggest impact	
Zero Emission Vehicles - Drive Clean Bay Area	408,000 MTCO2e annually by 2030 (25% of DDM goal)	Fuel-switching to zero-emission passenger vehicles to address 40%+ of Marin Countywide GHG emissions. This solution will accelerate widespread adoption of zero-emission vehicles by Marin's residents and employees through a new collaborative campaign, Drive Clean Marin. The campaign fundamentals are based upon proven community-based social marketing principles for behavior change	✓
Community-based Integrated Mobility Services	65.6 MTCO2e daily/22,850 MTCO2e annually	A prototype mobility system that will be designed from the bottom up with wide community involvement from the beginning, conducting a thorough needs assessment to determine the barriers to participation and the services that have the highest chance of success. It would include a mobility app with both private and public transportation options and would feature disbursement for all services with one easy payment. The program would be packaged as a "membership" program with 100% community participation to foster a culture based on sustainable travel	
All-electric Shared Mobility Hub	Unknown	Expand electric mobility services, and charging equipment at the ferry terminal, allowing for E-bikes, electric carsharing, and electric shuttles to serve commuters going to and from the ferry terminal. These electric mobility services would be integrated with infrastructure improvements to prioritize and improve transit, biking and walking to this hub	
Transportation Ordinances/Policies	Unknown	A mix of policy recommendations for Government Agencies and the Private Sector including: Electric Vehicle-only purchases/leases; Electric School and Transit Buses; Electric Vehicle Charing at Employee Parking; Required electricity at every parking space for multi-family dwellings; No new business licenses for new gas stations; Support 5G communications; ban the sale or lease of fossil fuel vehicles in Marin.	

Solution Name	GHG Reduction Estimate	Summary of Proposal	Endorsed
Biomass Study (see expanded solution below – Biomass Study/Recovery Pathways)	Unknown	Assess the biomass recovery flows in Marin County and analyze different sequestration and GHG emissions reduction potential of alternative recovery pathways. The study will inventory existing biomass flows and increased flows due to SB 1383 (2016) and Measure C (2020). Funding is needed to conduct the study.	
Marin Carbon Farming Initiative	Mitigation b 2030- 79,336 MTCO2e; Sequestration (beyond mitigation) By 2030- 185,839 MTC02e across 60 farms/30,000 acres; Phase 3: by 2045- 525,000 MT C02e across all 180 farms	Based on the proven success of the Marin Carbon Project's foundational work on agricultural lands in Marin, we are proposing an initiative to expand Carbon Farm Planning and implementation to reach a large scale of acreage and operations in Marin County. By 2030, manure management practices will mitigate farm and ranch emissions by 79,336 MTCO2e. By 2030, it would engage, 60 Marin farms and ranches across 30,000 acres, sequestering (above and beyond direct mitigation) 185,839 MTCO2e9 and by 2045, engage 180 Marin farms and ranches across 90,000 acres, sequestering over 525,000 MT C02e. We have the partnerships, models and necessary experience in place already; we need only an expanded technical support team and implementation funding to launch an expansion of the existing carbon farming work in Marin County that will help to achieve the county's goals for carbon neutrality, and net carbon drawdown, by 2045.	✓
Marin Climate Mobilization Decade	648,000 MTCO2e emissions reduction + 50,000 MTCO2e sequestration by 2030 (Carbon neutral by 2040 if funding continued)	We propose to generate public funds through one or more public funding mechanisms. Potential mechanisms include property tax assessments, a sales tax, and/or issuing bonds. These additional revenues would allow for the implementation of a comprehensive Marin Climate Mobilization ensuring that Drawdown Marin objectives are funded for the coming decade, in which they are most critically needed.	
Blue Carbon Hog Island Oyster Company Pilot	Unknown	There is a pilot project between Hog Island Oyster Company and Salt Point Seaweed for aquaculture production to grow edible seaweed in Tomales Bay. Salt Point Seaweed was founded by three Bay Area women: Tessa Emmer, Catherine O'Hare, and Avery Resor.	
Blue Carbon Wetlands Restoration	Novato: 155 acres x 0.8 t CO2e/acre = 124 t CO2e/acre; McGinnis: 180 acres x 0.8 t CO2e/acre = 144 t CO2e/acre	We propose tidal wetland restoration and the specific proposed projects planned at McInnis Marsh and the Novato Baylands. See also: https://www.sfei.org/sites/default/files/biblio_files/NovatoCkBaylandsVision_FC2pt0_SFEI_2015.pdf & https://www.marincounty.org/main/county-press-releases/press-releases/2018/dpw-deerisland-112618	
Agricultural Community Events Farmers Markets (ACEFM) - Expand Curbside Pick-up Program	Unknown	ACEFM developed an online ordering and curbside pick-up program in response to COVID-19. This program ensures high-risk producers, farmers, vendors, and customers can still sell and purchase items. The proposal is to expand this program by offering delivery options, pick-up locations in low- and moderate-income communities where access to farmers markets is low, and to track and report program and use it to continually improve the program now and in the future. This program will employ local food workers and drivers currently out of work.	
Agricultural Institute of Marin (AIM) - Center for Food and Agriculture	Unknown	The Center for Food and Agriculture and the Zero Waste Farmers Market will be the connection point between those who need quality, nutrient-dense foods and those who make their livelihood providing it in a way that regenerates healthy soils, healthy pastures and healthy seas. Our goal is to ensure small and mid-size farmers, ranchers, fishers, food producers, and artisans make a viable living at the world's most welcoming, authentic, climate-friendly farmers market and educational center. Together, we can create a healthier food culture for all.	✓
Youth Engagement - Healthy Food Videos via TikTok	Unknown	Create a fun series of TikTok videos on how students can reduce plate waste. Sanzuma and San Rafael City School (SRCS) will share the videos with all Marin County students through a variety of outlets such as: Instagram, Facebook, texting to parents, viewed in the classrooms, and while the students are in line for lunch.	
Organic Waste Diversion and Public Compost Use	10,640 MTCO2e; with depackager unit, an additional 1,835 MTCO2e	This proposal focuses on the need to prevent organic waste from being landfilled (one pillar in the resilient food system) by implementing three measures: 1) increased organics processing capacity by supporting compost facility expansion permitting, 2) investment in food scrap diversion technology, and 3) scale up existing initiatives to increase compost use through community gardens and backyard composting. We are proposing to garnish political and public support of the three areas of focus listed above. Without this collective effort, Marin County could be faced with increasing costs to transport organic materials outside of the county to meet state mandates.	
Food Resilient Marin	Indirect - supports existing programs that can reduce approximately 54,000 MTCO2e annually, e.g. carbon farming, compost, reduced food waste, etc.	Expand upon existing collaborative work to launch a county wide initiative that leverages the COVID induced food system awareness to showcase the elements of a resilient food system and ways that consumers can engage directly in solutions. We propose three components to the initiative: reporting on food resiliency statistics as part of the recovery effort, mapping where community members can "join the resilient cycle", and more effectively linking resources and marketing/outreach efforts across the Marin food network.	
Resilient Neighborhoods - Climate Protection and	2,642 MTCO2e by July 2023; 9,427 MTCO2e reduction, by 2030	CPR for the Planet will adapt the proven comprehensive behavior-change program of Resilient Neighborhood's (RN) to engage more residents, and residents of greater diversity, in reducing GHG emissions and becoming resilient to climate-linked emergencies. CPR for the Planet provides a replicable model to engage 1,000 residents to reduce Marin's annual emissions by 2,642 MTCO2e by July 2023, and to reach a total of 3,713 participants, and a 9,427 MTCO2e	✓

Solution Name	GHG Reduction Estimate	Summary of Proposal	Endorsed
Resilience (CPR) for the Planet		reduction, by 2030. This is more than double the number of participants and amount of emissions reduction that RN accomplished during its first decade. CPR for the Planet will test five pilot programs, designed with community input, to reach diverse audiences-- including Spanish speakers, low-income residents, older adults, parents, neighbors, and households with high carbon footprints--through online and face-to-face classes that include consumption, reducing climate anxiety, and engaging everyone to achieve climate responsible lifestyles.	
Water Energy Nexus - Micro-hydro turbines (Marin Municipal Water District (MMWD))	Unknown	We propose a plan to harness sustainable energy within Marin's water distribution cycle by installing micro-hydroelectric turbines within MMWD's existing water pipeline infrastructure. These turbines capture the energy produced by excess pressure in pipelines which will reduce our greenhouse gas emissions creating a resilient water supply able to weather climate related challenges in an environmentally-friendly way.	
Resilience Coordinating Council	Unknown	A Resilience Coordinating Council (RCC) would be formed to counter the adverse psychological & psycho-social-spiritual reactions to climate-enhanced traumas and toxic stresses by bringing together a wide range of uncommon partners to co- create and implement innovative local networks that foster and sustain mental wellness and resilience before, during, and after climate disasters. Using a "train the trainer" model to train frontline workers, agency staff, educators, climate activists and community leaders in mental wellness and resilience tools so they can care for themselves and help others affected by climate related toxic stresses and trauma.	
Community Resilience Hubs	Unknown	Turn a local, trusted community center in our frontline community into a Community Resilience Hub that serves more current community needs but also builds resilience by offering a protected and flexible gathering space to learn, engage, and take respite from emergencies and climate disruptions such as increased flooding due to SLR, extreme heat days, and increased smoke and particulate matter from fires. It involves adaptation actions such as protecting the facility and park to flooding, and opportunities for community members to build individual and community resilience, including healthy response to and recovery from trauma.	✓
Microgrids - Fairfax Pavilion Pilot Project	34 MTCO2e	The Fairfax Climate Action Committee seeks to develop a behind the meter microgrid located at the Fairfax Pavilion to benefit residents of Fairfax during public safety power shutoff (PSPS) events. The Town of Fairfax owns and operates the Pavilion, which serves as a vital community center, not only in its day-to-day function, but during PSPS events and other natural disasters and emergency situations. By developing battery storage at the Pavilion, Fairfax community members will be able to charge phones and other electronic devices and convene as a community. The project includes adding battery storage with an electric vehicle (EV) bi-directional inverter to an existing solar photovoltaic (PV) system. The EV inverter will also allow an EV to act as additional storage for the facility during a PSPS event or another grid shutdown.	✓
Biomass Study/Recovery Pathways	Unknown	Biomass Feasibility and Optimization Study will show how Marin biomass can be managed more sustainably, consistent with sound fire management practices and carbon emissions reduction and sequestration goals. Study will identify viable options for stakeholder consideration, drawing on a supply chain framework relating inputs to end products: mulch, compost, anaerobic digester (renewable natural gas), biopower (electricity), gasification (biochar, renewable hydrogen), and wood products. Each option will be evaluated pursuant to the outcomes listed above.	✓
"Know Your Blue Line" Sea Level Rise Public Art Project	Unknown/Indirect	We propose a public art project to raise awareness about SLR in high-traffic areas most vulnerable to SLR. This includes painting columns of Highway 101 with projected sea level in 2050 or 2100. The campaign is called "Blue Line Project".	