RePower Humboldt

The Redwood Coast Energy Authority's Comprehensive Action Plan for Energy

2019 UPDATE

12-12-19

REDWOOD COAST
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Modification History

Date	Reso. No.	Modification
9/17/12	Board action	Humboldt County Comprehensive Action Plan for Energy (CAPE) adopted by Board of Directors.
12/19/19	Board action	The 2019 RePower Humboldt Comprehensive Action Plan for Energy, a revision of the CAPE informed by public input received through a series of countywide workshops in August, September and October 2019, adopted by Board of Directors.
6/26/25	2025-4	Goal of a 100% renewable electricity mix by 2030 and Addendum 2025-A, amending RCEA's local procurement goal, adopted.

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Executive Summary

Consistent with Humboldt County's General Plan, the County of Humboldt recognizes the Redwood Coast Energy Authority (RCEA) as the regional energy authority to foster, coordinate, and facilitate countywide strategic energy planning, implementation, and education through RePower Humboldt, RCEA's comprehensive action plan for energy. This action plan consists of implementation measures specific to the functions of RCEA as the regional energy authority for Humboldt County and in alignment with the mission and purpose in RCEA's Joint Powers Agreement, which is to:

> Develop and implement sustainable energy initiatives that reduce energy demand, increase energy efficiency, and advance the use of clean, efficient and renewable resources available in the region.

The strategies within this 2019 update of the RePower Humboldt strategic plan will be implemented between 2020-2030 to achieve the goals listed below. Reduction targets are from a baseline year of 2018, unless otherwise stated. While this plan has a ten-year time horizon, RCEA will revisit it regularly during that period to keep it updated and reflective of changes to our community's needs and energy market trends.

Regional Planning and Coordination

RCEA will take a leadership role to develop and advance strategic regional energy goals through economic development, funding, planning efforts, and education. This work will be done in coordination with RCEA's member governments, other local public agencies, local tribes, and other public and private stakeholders.

Goals: **Achieve net-zero greenhouse gas emissions county-wide by 2030.**

> **By 2030 fully establish Humboldt County as an energy secure community that can affordably and reliably meet its local energy needs with local renewable resources and has the robust local capabilities and infrastructure necessary to effectively respond to energy emergencies or disruptions in energy supply.**
>
> **Build the clean energy sector into a cornerstone of the local economy through a breadth of strategies that include innovation, research and development, local energy-related business development, and establishing Humboldt Bay as the primary west coast hub for the offshore wind energy industry.**

Integrated Demand Side Management

RCEA will use an Integrated Demand Side Management approach to develop distributed energy resources and reduce energy consumption in the residential, commercial, industrial, agricultural, and government sectors and to align customer energy use with variable clean and renewable energy supplies. RCEA will prioritize efforts that enhance local energy resiliency and independence.

Goals: **Support the wide-spread installation of customer solar photovoltaic energy systems, with a target to increase installations to a rate of one system every day for the next decade and reach 30MW of customer solar installed by 2025 and 50MW installed by 2030.**

Make energy efficiency and conservation services available to every household and business in the county by 2030.

Expand existing energy efficiency, conservation and electrification programs to reduce greenhouse gas emissions from fossil fuel use in buildings by 20% by 2030 and maintain a trajectory to reduce emission from natural gas by 90% by 2050.

Develop a network of community microgrids and renewable-energy back-up power systems across the county to reduce greenhouse gas emissions and to provide energy resiliency and long-duration emergency energy supply at all critical facilities by 2030.

Low-Carbon Transportation

RCEA will decarbonize regional transportation through efforts to reduce vehicle miles travelled, increase advanced fuel vehicles adoption and fuel efficiency, and expand advanced fuel infrastructure.

Goals: **Accelerate the adoption of electric vehicles, with a target of over 6,000 electric vehicles on the road in Humboldt County by 2025 and 22,000 vehicles by 2030. Develop public, workplace, and residential electric vehicle charging infrastructure necessary to support these county-wide electric vehicle targets.**

Work with other local public entities to reduce vehicle miles traveled in Humboldt County by at least 25% by 2030.

By 2030 reduce greenhouse gas emissions from transportation by over 65% through reductions in vehicle miles traveled, improved vehicle efficiency, the adoption of electric vehicles, and, where determined to be an effective emissions-reduction strategy, the use of biofuels as a bridge to a full transition to zero-emissions vehicles. Maintain a trajectory of emissions reduction to eliminate the use of fossil fuels by 2050.

Energy Generation and Utility Services

RCEA will address Humboldt County's supply-side energy needs through its existing Community Choice Energy (CCE) program and development of new programs and initiatives.

[1]**Goals**: **By 2025 100% of RCEA's power mix will be from a combination of state-designated renewable energy sources—solar, wind, biomass, small hydroelectric, and geothermal—and state-designated net-zero-carbon-emission existing large hydroelectric facilities.**

By 2030 Humboldt County will be a net exporter of renewable electricity and RCEA's power mix will consist of 100% local, net-zero-carbon-emission renewable sources.

Humboldt County can effectively respond to regional and local disruptions to energy supply and distribution systems through modernization of the local electric grid, the deployment of local distributed energy resources, and the development of community microgrids.

[1] Modified; see Addendum 2025-A.

Introduction

Energy Fuels Our Everyday Lives

With the impending consequences of global climate change on the horizon, it's never been a more important time to significantly reduce greenhouse gas emissions. It's imperative that Humboldt County does its part to reduce emissions within the next ten years as the world strives to keep global warming at or below 1.5 °C above pre-industrial levels. The effects of climate change will impact Northern California by increasing annual maximum temperatures, altering stream flows, lengthening the fire season, sea level rise, and increased risk of flooding, as well as increasing the likelihood of intense storms within a shorter wet season and a prolonged dry season. The surest way to take action to reduce emissions and lessen the effects of climate change is by targeting the biggest source of emissions, the energy sector.

In Humboldt County, each of us depends on energy 24 hours a day, and we continuously benefit from the direct and indirect use of energy resources. Energy is ever present in our daily lives and much of the time it's taken for granted. From the sun we draw heat, light, and solar power; while it works to grow our food, forests, flowers, and more. We depend on fossil fuels to get us to work, school, local shops, as well as to transport our food, commodities, mail, and garbage. Electricity enables us to work after the sun goes down; we depend on it to light our offices, classrooms, and streets; to keep our food cold and our ice cream frozen; to pump water through pipes; to transmit information and keep in touch. Energy in a diversity of forms fuels our industries and business ventures: from powering lumber mills to dairy farms; from firing ceramics to pizzas, and from brewing beer to baking bread. It's clear that reliance on energy resources characterizes a large part of our everyday lives.

The production and consumption of energy also affects our daily lives in more indirect ways, particularly with regard to the environment. The burning of fossil fuels has led to damaging environmental effects such as acid rain, smog, water pollution, and global warming. Exploratory drilling and extraction of non-renewable energy sources (such as coal, petroleum, and natural gas), and their attendant infrastructure, has resulted in the degradation of other natural resources, for example forests, coastal communities, and rainforests. Although these areas may be far away, the environmental impacts can reach Humboldt County. The fact is, all forms of energy production, including renewable energy, have environmental and social impacts, and responsible energy planning seeks to minimize negative impacts while maximizing community benefits.

The original RePower Humboldt strategic plan published in 2013 showed that Humboldt County has hundreds of megawatts of untapped renewable energy potential from a variety of sources, including solar, wind, wave, and biomass. With a population of less than 140,000 and a limited industrial base, electric loads in Humboldt are light. In contrast, California's urban counties have much larger loads and little potential for renewable energy generation other than rooftop solar. For example, in 2018 San Francisco consumed seven times as much electricity as Humboldt

County, and Los Angeles County used 85 times Humboldt's load. If California as a whole is to meet its renewable energy and greenhouse gas reduction goals, resource-rich counties like Humboldt will need to export a portion of their energy wealth to these urban load centers.

In Humboldt County, energy is used as a transportation fuel and as electrical and heat energy in homes, businesses, industries, and agriculture. In 2015 it is estimated that Humboldt County spent over $400 million to meet local energy demands, the majority of which left the county. A major portion of the energy was used as transportation fuel (gasoline and diesel), with large amounts also used to meet end use electrical demands and end-use natural gas heating demands. Primary energy sources were comprised mainly of natural gas, gasoline, diesel, and propane.

Defining "Clean" Energy

On March 28, 2019, the RCEA Board of Directors, acting on a recommendation from RCEA's Community Advisory Committee (CAC) and with support from many community members, adopted a policy calling for RCEA to provide a 100% clean and renewable electricity portfolio by 2025. Subsequent to this, the CAC took up discussion of how "clean and renewable" should be defined. The committee agreed that it would be unwise to depart from the State of California's definition of "renewable," as embodied in the Renewable Portfolio Standard that governs renewable energy procurement by RCEA and other load-serving entities in the state.

Defining "clean" energy is more problematic, as this is a value-laden term that has no strict or consistent definition applied by energy markets or regulators. It is however a relevant topic for RCEA's planning purposes, given that the organization's mission statement in its Joint Powers Agreement calls for RCEA to "advance the use of clean, efficient and renewable resources."

In its final review of this update to RCEA's RePower Humboldt plan, the CAC revisited the question of defining "clean." After receiving public comments and discussing the matter at length, the CAC members generally agreed that the term is too subjective to be used as a litmus test for making specific energy procurement decisions. In lieu of an explicit definition of "clean," the CAC endorses the goals stated in the Power Resources section of this plan that call for minimizing greenhouse gas emissions and maximizing renewable energy content of RCEA's CCE program, while also taking into consideration other environmental or public health impacts.

Redwood Coast Energy Authority
Mission and Purpose

The purpose of the Redwood Coast Energy Authority is to develop and implement sustainable energy initiatives that reduce energy demand, increase energy efficiency, and advance the use of clean, efficient and renewable resources available in the region for the benefit of the Member agencies and their constituents. To further that purpose, the Redwood Coast Energy Authority will work toward the following goals, as enumerated in our Joint Powers Agreement:

A. To lead, coordinate and integrate regional efforts that advance secure, sustainable, clean and affordable energy resources.

B. To develop a long-term sustainable energy strategy and implementation plan.

C. To increase awareness of, and enhance access to, energy conservation, energy efficiency, and renewable energy opportunities available to the region.

D. To add value to, but not duplicate, energy services offered by utilities and others serving the region in a manner that does not conflict with acting as a community choice aggregator.

E. To keep key decision makers and stakeholders informed of policy, regulatory, and market changes that are likely to impact the region.

F. To support research, development, demonstration, innovation, and commercialization of sustainable energy technologies by public and private entities operating in Humboldt County.

G. To develop regional capabilities to respond to energy emergencies and short-term disruptions in energy supply, infrastructure, or markets that could adversely affect Humboldt residents and businesses.

In striving to achieve the above goals, RCEA will ensure that environmental and social impacts associated with production and consumption of energy are minimized, and that any unavoidable impacts are borne to the extent possible within Humboldt County rather than by other communities, and will seek to maximize social, economic, and environmental benefits to Humboldt County associated with local energy production

The RePower Humboldt plan is intended to support achieving these goals through strategies that specifically address: Regional Energy Planning & Coordination, Integrated Demand Side Management, Low-Carbon Transportation, and Energy Generation & Utility Services.

Vision Statement

The below vision statement was developed in 2005 through the public comment process for the original draft of the Humboldt County General Plan Energy Element prepared by RCEA. It expresses the community qualities and characteristics that the RePower Humboldt plan aspires to achieve, expressed as how Humboldt County could be described in 2030. Minor modifications have been made to the original vision statement to reflect recent changes to the state and local energy economies, as well as community input gathered in developing this 2019 RePower Humboldt update.

In 2030…

Humboldt County has achieved the goal of net-zero greenhouse gas emissions and is a net exporter of renewable energy. We achieve energy independence and self-sufficiency through high levels of energy conservation, efficiency, and electrification combined with locally-produced and -managed energy generation. Our energy comes from renewable sources. Money spent on energy stays in the county.

Individual communities have developed greater energy self-sufficiency and independence as has the county overall. Citizens have a diversity of choices for how to meet their energy needs. We have local control over energy prices. We readily adapt to any major external changes in energy supply or technology.

Our energy consumption is level from year to year, due to increasing conservation and efficiency to offset increases in growth-related demand.

Our overall quality of life is better than it was in 2005. The population is healthier as a result of leading energy-conserving lifestyles. It is common, safe, pleasant, and economically favorable to have a lifestyle that doesn't consume much energy.

Energy conservation education has reached, and continues to reach, effectively, everyone in the county. Energy considerations and decisions are integrated with all other decision-making arenas.

The county has minimized negative environmental, social, and economic impacts associated with meeting its energy needs, while ensuring any unavoidable impacts are borne locally rather than by other communities

The County is energy efficient through neighborhood design. Good community planning has reduced sprawl. There are fewer automobiles used for travel; people depend more on transit, bikes, walking, and shared-use automobiles than they depend on private automobiles. Public transportation is conveniently available and well utilized. There is much less consumption of energy from non-renewable sources for transportation.

All buildings are energy efficient. All new construction is all-electric and done in the most energy efficient manner, starting with building design. All existing buildings have been upgraded to be more efficient and many have converted their previous uses of natural gas and propane to electricity. Energy efficiency is integral to locally adopted building standards, which have

flexibility and include meaningful incentives. Many homes and businesses produce more energy than they consume.

The County is a thriving research and development center and incubator for energy technology and related manufacturing, which is a stable source of local jobs.

Strategies

1. Regional Energy Planning & Coordination

RCEA will take a leadership role to develop and advance strategic regional energy goals through economic development, funding, planning efforts, and education. This work will be done in coordination with RCEA's member governments, other local public agencies, local tribes, and other public and private stakeholders.

Goals: Achieve net-zero greenhouse gas emissions county-wide by 2030.

> **By 2030 fully establish Humboldt County as an energy secure community that can affordably and reliably meet its local energy needs with local renewable resources and has the robust local capabilities and infrastructure necessary to effectively respond to any energy emergencies or disruptions in energy supply.**
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> **Build the clean energy sector into a cornerstone of the local economy through a breadth of strategies that include innovation, research and development, local energy-related business development, and establishing Humboldt Bay as the primary west coast hub for the offshore wind energy industry.**

1.1 Economic Development

1.1.1 Attract Energy-related Business. Collaborate with local economic development entities to attract technology developers, manufacturers, and energy service providers to locate operations in the County when appropriate.

1.1.2 Support Proactive Energy-related Business Development. Collaborate with local jurisdictions to identify and pre-assess locations and facilities for energy-related business ventures.

1.1.3 Support Energy-sector Workforce Development. Work with other local entities to provide training and continuing education that develops and maintains a qualified local workforce available to implement energy efficiency upgrades, renewable energy projects, and advanced-vehicle technology deployment.

1.2 Energy-Related Emergency Response

1.2.1 Develop Emergency Response Capabilities. Coordinate with other local entities to develop regional capabilities to respond to energy emergencies and disruptions impacting energy supply, infrastructure, or energy markets. Incorporate efforts to enhance emergency response capabilities across all of RCEA's customer programs.

1.2.2 Assist with Energy Emergency Response Procedures. Assist the Humboldt County Office of Emergency Services in the preparation of energy response procedures for the Humboldt County Emergency Response Plan.

1.2.3 Support Climate Change Adaptation. Work with other local entities to conduct a climate change risk assessment and develop an adaptation plan consistent with the best-practices guidance provided by the California Natural Resources Agency and California Office of Emergency Services.

1.3 Funding

1.3.1 Develop Regional Energy Funding Mechanisms. Offer support and act as the fiscal agent and funding clearinghouse for countywide energy programs.

1.3.2 Pursue Cap and Trade Auction Proceeds. Work regionally to access Cap and Trade auction proceeds and other State funding mechanisms to ensure effective, efficient, coordinated, and equitable resource allocation in the North Coast Region.

1.3.3 Develop Job Development Incentives. Collaborate with local economic development entities to identify funding opportunities for developing jobs in the field of energy conservation, efficiency, and renewable sources.

1.3.4 Implement Energy Project Financing. Work with local economic development entities and/or financial institutions to develop and implement financing programs that enable residents and businesses to implement energy efficiency and renewable energy projects. Facilitate Property Assessed Clean Energy (PACE) and other financing programs that access the needed capital to deploy regional energy independence strategies.

1.3.5 Develop Local Energy Investment Programs. Work with local economic development entities and financial institutions to develop programs and resources that facilitate local community investment in and/or ownership of energy efficiency and renewable energy projects.

1.3.6 Pursue an Investment Grade Credit Rating for RCEA's Community Choice Energy Program. Through building program reserves and responsible program management, secure an investment grade credit rating from a major financial services company to support long-term energy transactions.

1.4 Planning

1.4.1 Support Renewable Energy Permitting. Support the County in streamlining permitting for renewable energy generation including updating zoning codes and creating wind energy GIS overlays.

1.4.2 Support Carbon Sequestration. Support the development and deployment of mechanisms for retaining carbon in the region's abundant natural areas and working lands.

1.4.3 Assist with Climate Action Planning. Work with local jurisdictions to regularly complete greenhouse gas inventories, set greenhouse gas reduction targets, and develop climate action plans.

1.4.4 Support Countywide Strategic Energy Planning. Coordinate an effective energy strategy based on self-sufficiency, development of renewable energy resources, energy conservation, and electrification that is actively implemented countywide through Climate Action Plans, General Plans and the Redwood Coast Energy Authority's RePower Humboldt plan.

1.4.5 Encourage Adoption of Energy Elements. Encourage and assist with the adoption of energy elements by other local and regional jurisdictions. Periodically review local energy elements and recommend updates, as necessary, to reflect changing technologies for the generation, transmission, and efficient use of energy.

1.4.6 Encourage Energy Policies and Plans. Encourage other jurisdictions and entities, including the cities in Humboldt County, to adopt and implement sound energy plans and policies, to include energy elements and/or energy policies in their general plans and ordinances. Advocate and disseminate energy planning strategies, policies, and other information.

1.4.7 Promote Energy Efficiency, Renewable Energy, and Storage Permitting. Support local ordinances that streamline permitting processes for energy efficiency, renewable energy, and storage technologies.

1.4.8 Develop Programs that Foster Social Equity. Identify, fund, and establish new programs that address the energy needs of the least advantaged and underserved members of our community.

1.4.9 Embrace Public Health and Environmental Quality as Key Objectives of Energy Planning. Seek to maximize public health and environmental benefits and minimize negative impacts in selecting, planning, and implementing energy policies, programs, and projects.

1.5 Education

1.5.1 Maintain an Energy Resource Center. Operate an energy resource center open to the public and provide information on energy conservation, energy planning, renewable energy, energy storage, low-carbon transportation, all-electric buildings, and energy-efficient building design and retrofits.

1.5.2 Hold Regional Energy Forums. Serve as a forum for addressing countywide energy issues.

1.5.3 Develop Public Displays. Encourage and assist development of educational displays for exemplary renewable energy and distributed energy systems installed throughout Humboldt County. Displays should provide county residents and businesses with information on how the systems work and how well they perform and should inform county residents about the importance, benefits, and associated impacts of developing local energy resources.

1.5.4 Provide Energy Efficiency, Conservation and Electrification Education and Training. Provide community education, information, and resources on energy issues to support informed decision making related to customer energy use, including the benefits of conservation, electrification and increased energy efficiency. Collaborate with schools and colleges for energy-related research, education, and conservation practices.

1.5.5 Provide Energy Professional Education and Training. Provide and encourage training for local contractors and energy professionals on energy-related topics such as: energy code, energy efficiency, demand response, zero net energy retrofits and construction, electrification, heat pumps, battery storage and solar.

2. Integrated Demand Side Management

RCEA will use an Integrated Demand Side Management approach to develop distributed energy resources and reduce energy consumption in the residential, commercial, industrial, agricultural, and government sectors and to align customer energy use with variable clean and renewable energy supplies. RCEA will prioritize efforts that enhance local energy resiliency and independence.

Goals: **Support the wide-spread installation of customer solar energy systems, with a target to increase installations to a rate of one system every day for the next decade and reach 30MW of customer solar installed by 2025 and 50MW installed by 2030.**

Make energy efficiency and conservation services available to every household and business in the county by 2030.

Expand existing energy efficiency, conservation and electrification programs to reduce greenhouse gas emissions from fossil fuel use in buildings by 20% by 2030 and maintain a trajectory to reduce emission from natural gas by 90% by 2050.

Develop a network of community microgrids and renewable-energy back-up power systems across the county to reduce greenhouse gas emissions and to provide energy resiliency and long-duration emergency energy supply at all critical facilities by 2030.

2.1 Integrated Demand Side Management Strategies

2.1.1 Support Member Agency and Local Government Energy Management. Support member agencies in managing their energy usage. RCEA will support activities that reduce and align energy use with available clean and renewable supplies to reduce costs while being consistent with state energy goals and Greenhouse Gas Emission Reduction goals. Additional activities will be prioritized where they support energy resiliency and independence.

2.1.2 Support Implementation of Codes and Standards. Support the State's goals related to residential and commercial net-zero-energy and zero-net carbon standards along with other green building standards, including the local implementation of Title 24 building energy codes, Title 20 appliance efficiency standards and individual projects that strive to achieve energy efficiencies that exceed state and local requirements. Support the consideration, adoption, and implementation of above code energy ordinances.

2.1.3 Assist with Facility Benchmarking. Assist local governments and businesses with facility benchmarking to evaluate and track the energy performance of non-residential buildings.

2.1.4 Perform Energy Assessments. Advise building owners on the life cycle costs and benefits of energy efficiency, conservation, demand response, generation, electrification and storage opportunities through assessments. Assessments will be followed with comprehensive reports detailing an integrated strategy for energy management.

2.1.5 Integrate Distributed Energy Resources. Develop and implement customer programs that support, promote and integrate distributed energy resources, including but not limited to grid-connected generation, energy storage, energy efficiency, electric vehicle and demand response technologies.

2.1.6 Integrate a Distributed Energy Resource Management System. Support the development and installation of systems needed for effective and responsive management of distributed energy resources. Evaluate the potential integration of distributed energy resources into a unified system that would allow RCEA to aggregate and automate demand response activities.

2.1.7 Support and Deploy Microgrids. Support and deploy energy microgrids, focusing on critical infrastructure and community facilities, that combine onsite generation, energy storage, and advanced control systems to provide energy resiliency and maintain emergency-response capabilities as well as ongoing economic and environmental benefits.

2.1.8 Use Advanced Metering Infrastructure. Support advanced metering infrastructure to expand every customer's visibility into their energy usage for more ownership and control of their energy related behavior and decisions. Use advanced metering data to make informed program decisions.

2.2 Energy Efficiency & Conservation

2.2.1 Maximize the Efficiency of Buildings. Support energy efficiency and conservation as core strategies toward achieving environmental, economic, and community goals. Promote the whole-house approach to energy efficiency using the latest building science and incorporating interactive effects between passive and active energy systems in a home. First reduce the need to use energy and then use energy efficiently where it is required. An example would be to air seal and insulate the home and furnace ductwork to reduce heat loss before upgrading the furnace. Support programs that increase building shell efficiency through air sealing, insulation, and window upgrades while improving comfort and indoor air quality.

2.2.2 Support Electrification. Prioritize the development and implementation of programs and services that promote the replacement of fossil fuel burning appliances with the most energy-efficient electric equipment including heat pump hot water and space heaters and the electrification of commercial and industrial processes.

2.2.3 Increase Equipment Efficiency through Market Transformation. Prioritize the development and implementation of programs and services that promote the use of the most energy-efficient equipment for space and water heating, ventilation, lighting, refrigeration, and air conditioning in all buildings, including residential, commercial and industrial facilities.

2.2.4 Promote Performance Contracting. Promote residential and commercial performance contracting that is consistent with current best practices for energy efficiency and environmentally sound construction techniques.

2.2.5 Develop and Support Behavioral, Retro-Commissioning and Operations Programs. Promote, develop, and implement programs that enable energy conservation and load-shifting through customer behavior changes, building system retro-commissioning, and operational changes.

2.2.6 Promote Smart Technologies and Smart Controls. Support the replacement of existing plug load devices with smart technology devices that are programmed to save energy, shift energy use outside of peak hours, and/or provide automated demand response using utility signaling. Examples include internet-of-things enabled lighting, water and space conditioning, dish and clothes washing, and refrigeration. Promote control technologies that adjust the use of equipment based on environmental input or demand. Examples include variable speed fans and ventilation, variable speed pumps and motors, daylighting controls, occupancy sensor controls, smart thermostats, and building management systems.

2.3 Demand Response

2.3.1 Implement Demand Response and Distributed Energy Resource Programs. Support and prioritize demand response programs that offer customers a role in balancing energy usage with the availability of electricity on the grid. Demand response programs and offerings will, where possible, integrate with distribution-connected efficiency systems and controls, renewable energy generation, and energy storage measures. Where feasible, energy technologies will be controllable and integrated as a distributed resource; any such efforts will require customer education and approval and will be implemented with a commitment to respecting and protecting customers' rights to privacy.

2.3.2 Support Reduced Energy Use During Peak Hours and Peak Event Days. Notify, support, and enable action from customers who choose to participate by shifting energy usage to off-peak hours, reduce daily energy usage during peak hours, and/or reduce energy usage during peak event days.

2.3.3 Enable Automated Demand Response. Install communicable controls with electrification, efficiency, and storage technologies that automatically reduce energy use during demand response events. Implement building demand response systems that allow for the curtailment of loads without major impacts to occupants and operations.

2.4 Customer Distributed Generation & Storage

2.4.1 Support Customer Installation of Distributed Generation. Support the deployment of behind-the-meter grid-connected renewable energy and storage systems as core strategies toward achieving environmental, economic, and community stability/resilience goals.

2.4.2 Implement the Public Agency Solar Program. Continue to implement the solar and energy-storage technical assistance program for public agencies; integrate grid-connected resources, efficiency, electrification and microgrids as feasible.

2.4.3 Implement a Community Solar and Storage Program. Evaluate, design and launch community solar and storage program services that support the increased adoption of grid-connected solar and storage technologies.

2.4.4 Integrate Vehicle to Grid Storage. Integrate vehicle to grid storage solutions with transportation and demand side management goals and objectives.

3. Low-Carbon Transportation

RCEA will decarbonize regional transportation through efforts to reduce vehicle miles travelled, increase advanced fuel vehicles adoption and fuel efficiency, and expand advanced fuel infrastructure.

Goals: **Accelerate the adoption of electric vehicles, with a target of over 6,000 electric vehicles on the road in Humboldt County by 2025 and 22,000 vehicles by 2030. Develop public, workplace, and residential electric vehicle charging infrastructure necessary to support these county-wide electric vehicle targets.**

Work with other local public entities to reduce vehicle miles traveled in Humboldt County by at least 25% by 2030.

By 2030 reduce greenhouse gas emission from transportation by over 65% through reductions in vehicle miles traveled, improved vehicle efficiency, the adoption of electric vehicles, and, where determined to be an effective emissions-reduction strategy, the use of biofuels as a bridge to a full transition to zero-emissions vehicles. Maintain a trajectory of emissions reduction to eliminate the use of fossil fuels by 2050.

3.1 Reduce Vehicle Miles Traveled

3.1.1 Strengthen Broadband Infrastructure. Support efforts to strengthen rural regional broadband infrastructure to facilitate remote access to educational and business opportunities, and deploy advanced, resilient grid management technology and integrated energy efficiency and demand response solutions.

3.1.2 Encourage Transportation-efficient Land Use Planning. Encourage infill, transit-oriented development, and walkable and bikeable communities through thoughtful zoning and land-use planning processes.

3.1.3 Facilitate Multi-modal Transportation Infrastructure. Support improving multi-modal transportation options through regional trail networks, transit infrastructure, and complete streets infrastructure strategies that support walking, biking, carsharing, ridesharing, and the use of public transportation.

3.2 Increase Advanced Fuel Vehicle Adoption & Fuel Efficiency

3.2.1 Support Local Vehicle Fleet Owners Leading by Example. Encourage local government and private fleets to maximize the use of low-carbon vehicles and support low-carbon transportation initiatives at other agencies.

3.2.2 Promote Advanced Fuels. Equitably promote, support and incentivize low carbon vehicle and fuel adoption by local governments, commercial fleets, and the public. Encourage the use of non-fossil sources of advanced fuels that reduce greenhouse gas emissions, which may include electricity, hydrogen, biodiesel, ethanol, and renewable diesel.

3.2.3 Support Electric Vehicle Adoption. Conduct public outreach campaigns to promote electric vehicles. Offer electric vehicle incentives and provide customers with web and in-person decision support when considering the purchase of an electric vehicle. Conduct leadership by example among government agencies.

3.2.4 Promote Efficient Driving Practices. Promote the use of energy-efficient driving practices that improve fuel efficiency, such as moderate speed changes and legal speeds, anti-idling, and traffic-calming features.

3.2.5 Support Shipping Efficiency. Support the implementation of trucking efficiency technologies and best-practices, including idle-reduction technologies, aerodynamic retrofits, and low rolling resistance tires. Support the analysis of other potential transportation modes that could provide efficient shipping alternatives such as barge and rail.

3.3 Expand Fueling Infrastructure

3.3.1 Develop Transportation Electrification Infrastructure. Develop and implement Electric Vehicle charging stations. Provide local incentives for electric vehicle charging infrastructure and prioritize technologies that align with integrated demand-side management goals.

3.3.2 Utilize Biofuels. Promote use of biofuels with low California Low Carbon Fuel Standard (LCFS) scores, particularly those produced with local waste feedstocks.

3.3.3 Streamline Permitting for Electric Vehicle Charging Infrastructure. Encourage local jurisdictions to list vehicle charging as a permitted use across a broad range of zoning classifications. If a zoning review is triggered, consider vehicle charging as an accessory use to another permitted use whenever possible. Develop a standard vehicle charging permitting process.

3.3.4 Promote Vehicle-to-Grid Connection. Promote integration of electric vehicles with the electric grid. Evaluate the development status of vehicle-to-grid interconnect standards and the use of grid-connected or building-connected vehicles for short-term, on-site energy storage, particularly where this can enable islanded operation of critical facilities during grid power outages.

4. Energy Generation & Utility Services

RCEA will address Humboldt County's supply-side energy needs through its existing Community Choice Energy (CCE) program and development of new programs and initiatives.

[2]**Goals**: **By 2025 100% of RCEA's power mix will be from a combination of state-designated renewable energy sources—solar, wind, biomass, small-hydroelectric, and geothermal—and state-designated net zero carbon emission existing large hydroelectric facilities.**

By 2030 Humboldt County will be a net exporter of renewable electricity and RCEA's power mix will consist of 100% local, net-zero-carbon-emission renewable sources.

Humboldt County can effectively respond to regional and local disruptions to energy supply and distribution systems through modernization of the local electric grid, the deployment of local distributed energy resources, and the development of community microgrids.

4.1 Power Resources

4.1.1 Maximize the Use of Local Renewable Energy to the Extent Technically and Economically Feasible and Prudent. Use the CCE program with its renewable energy targets, and programs supporting distributed energy resources, to achieve this goal.

4.1.2 Minimize Greenhouse Gas Emissions Associated with RCEA's CCE Program. Procure a power mix that by 2025 has zero greenhouse gas emissions as counted under the California Air Resources Board's Regulation for the Mandatory Reporting of Greenhouse Gas Emissions, other than emissions from resources meeting California's Renewable Portfolio Standard. Assess, evaluate, and monitor the short-term and lifecycle emissions from all generation sources to ensure power resources align with RCEA's greenhouse gas emissions goals.

4.1.3 Act as Community Liaison to Renewable Energy Developers. Using RCEA's position as a wholesale power purchaser, work with developers on proactive strategies to reduce and mitigate the environmental and community impacts of potential energy projects. Ensure that local projects are developed in such a way that prioritizes community benefits.

4.1.4 Maximize Renewable Energy Content of RCEA's CCE Program. Procure a power mix that reaches 100% clean and renewable content by 2025.

[2] Modified; see Addendum 2025-A.

4.1.5 Ensure Diversity in Local Sources. Pursue development of a diverse, locally produced renewable electricity supply that is price-competitive in the California power market and that can be generated in a way that minimizes adverse environmental and community impacts.

4.1.6 Promote Energy Feasibility Studies. Encourage and support feasibility studies of local wind, solar, hydropower, and ocean energy resources. Make recommendations on preferred alternatives that are consistent with community goals for energy security and sustainability.

4.1.7 Power Resources: Distributed Generation

4.1.7.1 Designate "Renewable Energy Parks." Work with County and City planning departments to designate areas of the county preferred for renewable energy development.

4.1.7.2 Develop Distributed Generation. Encourage studies to identify key locations throughout the county that would benefit from distributed generation systems. Encourage development of responsive distributed generation demonstration sites

4.1.7.3 Provide Feed-In-Tariff Power Procurement Program for Small Generators. Offer long-term contracts at a market-adjusting rate for Renewable Portfolio Standard eligible renewable energy generators.

4.1.8 Power Resources: Solar

4.1.8.1 Support Utility Scale Solar Energy Development. Support local efforts to develop solar electric systems in the county. Support development of local training programs for solar contractors and installers. Educate the public about the benefits of solar energy systems. Develop programs that facilitate an increase in the number of solar energy systems in the county.

4.1.8.2 Procure Local Solar Energy. Contract for local onshore solar energy as part of RCEA's community choice energy portfolio to the extent economically feasible and compatible with portfolio diversity needs.

4.1.9 Power Resources: Offshore Wind

4.1.9.1 Develop Offshore Wind Energy. Work with public and private entities to develop offshore wind energy off of the north coast region's coastline, and support establishing Humboldt Bay as a west-coast hub for the offshore wind industry.

4.1.9.2 Procure Local Offshore Wind Energy. Contract for local offshore wind energy as part of RCEA's community choice energy portfolio to the extent economically feasible and compatible with portfolio diversity needs.

4.1.10 Power Resources: Onshore Wind

4.1.10.1 Promote Large-Scale Wind Energy. Provide information about the potential for cost-effective, commercial-scale wind farms in the county. Educate the public

about the benefits and impacts of wind energy systems. Work with utilities, local government, and private companies to develop onshore wind energy projects.

4.1.10.2 Procure Local Onshore Wind Energy. Contract for local onshore wind energy as part of RCEA's community choice energy portfolio to the extent economically feasible and compatible with portfolio diversity needs.

4.1.11. Power Resources: Bioenergy

4.1.11.1 Support Biomass Fuels Reduction and Utilization. Develop strategies and technologies for improved biomass utilization in ways that effectively support restoration objectives and fire management priorities. Coordinate with local agencies, communities, and landowners to develop biomass energy plans that are consistent with sustainable forest management, hazardous fuels reduction, fire safety, and restoration needs.

4.1.11.2 Procure Local Biomass Energy. Contract with local biomass facilities as a means of providing locally generated renewable power and managing wood waste from mills and, when feasible and appropriate, from forest management and restoration activities. Require and support a high standard of environmental performance from RCEA's biomass suppliers. Support the deployment of the best-available emissions control technologies, recognizing that power producers' ability to implement such technologies is affected by the price they are paid for their power and term length of contracts.

4.1.11.3 Investigate the Impacts of Biomass Emissions. Support research and quantification of the gross and net emissions of greenhouse gases and criteria pollutants associated with local biomass energy production, and the potential emissions reductions associated with disposing of biomass feedstocks by other means. Support development of a locally specific model to estimate human exposure to criteria pollutants from biomass power plants under different operating scenarios. Adjust RCEA's biomass power procurement strategy as appropriate based on these findings and power producers' progress in limiting emissions, and in keeping with achieving RCEA's power mix goals for 2025 and 2030. Consider power producers' historic emissions performance in making procurement decisions.

4.1.11.4 Establish a Biomass Technical Advisory Committee. Create a technical advisory committee made up of local government representatives; state and federal natural resource agencies; and subject matter experts on biomass energy, public health, the local forest products industry, and environmental impacts associated with biomass energy. The committee shall meet periodically and provide a quarterly report to the RCEA Board of Directors on technical feasibility and financial, environmental, and health implications of biomass use alternatives.

4.1.11.5 Promote Small-Scale Biomass Generation Sites. Monitor feasibility of smaller and/or mobile biomass electric generators fed with wood waste and very small diameter logs (e.g., from thinning for fire safety and timber harvest slash). If/when technology proves feasible and cost effective, promote its use in county areas where appropriate.

4.1.11.6 Plan for a Long-Term Transition Away from Direct Combustion of Forest-Derived Biomass and Toward Lower-Impact Uses of this Material. Investigate and pursue development funding for alternative pathways that could address local forest products industry biowaste management needs, including:

- Repowering of the existing biomass plants to substantially reduce emissions and/or improve efficiency
- Emerging biomass energy technologies, including but not limited to gasification, torrefaction, and briquetting
- Non-energy products, including but not limited to biochar and durable goods

Limit procurement of biomass power from existing direct combustion plants to short-to-mid-term contracts, recognizing that power producers' ability to reduce their emission output is affected by the price they are paid for their power and term length of contracts. Pursue partnerships with others, including research organizations and interested public agencies, in development of pilot projects to produce low-emissions energy as a means of treating mill waste and where feasible sequestering the carbon in this material; where potential non-energy products are identified, refer potential pilot projects to appropriate stakeholders.

4.1.11.7 Pursue Biogas Development. Support HWMA and others with the evaluation and development of organic waste digesters. Develop and publicize dairy biogas demonstration sites and work with local farm organizations to promote dairy biogas energy systems where appropriate. Publicize the use of biogas at existing local wastewater treatment facilities and encourage its use at additional facilities where appropriate. Encourage biogas use to produce electricity onsite rather than pipeline injection to support long-term phaseout of natural gas distribution infrastructure and avoid the potential greenhouse gas emission impacts of pipeline leaks. Seek opportunities to aggregate feedstock from dairies, wastewater plants, and food waste streams to achieve economies of scale in developing cost-effective local biogas facilities.

4.1.12 Power Resources: Wave and Tidal

4.1.12.1 Pursue Wave and Tidal Energy Development. Build on the previous WaveConnect and CalWave projects to explore and evaluate opportunities for local wave and tidal energy research, development, and pilot deployment.

4.1.13 Power Resources: Hydro

4.1.13.1 Support Existing and New Local Small-scale Hydroelectric Power. Evaluate options for contracting with existing small hydroelectric projects as well as the development of new run-of-river hydroelectric projects that would be eligible for Renewable Portfolio Standard designation and compatible with environmental and cultural priorities. Update the Oscar Larson and Associates' 1982 assessment of small hydroelectric resource potential in the county.

4.2 Utility Energy Service

4.2.1 Minimize Energy Interruptions. Work with local utility providers to minimize the impact of power outages and improve the reliability and resiliency of the local electricity delivery service.

4.2.2 Provide Energy via Direct Access. Explore the feasibility of RCEA acting as an electricity provider through direct access.

4.2.3 Review Utility Options. Review the effectiveness of the incumbent utility in meeting Humboldt County's long-term energy needs and evaluate the feasibility of establishing a local municipal electric utility or joining a new regional public power entity.

4.2.4 Provide Outstanding Customer Service to RCEA Customers. Ensure that participants in RCEA's community choice energy program receive high-quality customer service related to enrollment, rates, billing, and customer programs supported by CCE program customer funds.

4.3 Rates & Tariffs

4.3.1 Provide Community Choice Energy Program Customer Rate Savings. Provide customer rates that are affordable and price-competitive with customers' other electric supply options.

4.3.2 Provide Electricity Buyback from Self Generators. Provide a net energy metering program that encourages more distributed local generation and more equitably compensates such generation.

4.3.3 Retain and/or Redirect Rate-Payer Dollars Back into Humboldt County. Work to maximize the amount of ratepayer dollars retained in Humboldt County when taking into consideration local power procurement, electricity rates, local program spending, and allocations toward building the reserve fund for RCEA's Community Choice Energy program.

4.3.4 Provide Match Funding for State, Federal, and Foundation Energy Grants. Support bringing resources into Humboldt County to pursue CCE community energy goals.

4.3.5 Support Transition to Time of Use Rates. Inform and educate CCE customers on CPUC transition to default Time Of Use rates. Support customer adoption and transition to time of use electricity rates.

4.3.6 Provide Education on all Electric Rate Schedule Options. Provide information on all available electric rate schedules including Net Energy Metering, Time Of Use, and RePower+ (100% renewable energy). Offer electric rate analysis to estimate financial impacts of different rate schedules. Inform and educate the community of the California Public Utilities Commission's transition to default Time Of Use rate schedules.

4.3.7 Provide a 100% Carbon-Free Service Option for CCE Customers. Develop an additional opt-up choice for CCE customers consisting of solar energy and other emissions-free resources, with a portion of the incremental revenues used to underwrite energy programs benefitting community non-profits and/or low income residential CCE participants.

4.4 Transmission & Distribution Infrastructure

4.4.1 Facilitate Transmission Assessments and Monitoring. Encourage development of long-term transmission assessments and, if necessary, electrical transmission grid upgrade and/or expansion plans. Monitor local electricity transmission system planning to ensure that projected growth areas are adequately served and to support the development of local renewable energy projects.

4.4.2 Support Upgrade of the Electricity Transmission and Distribution System. Collaborate with PG&E, the California Independent System Operator, and renewable energy developers to upgrade the regional transmission and distribution electrical grid to enable increased development of both utility-scale renewable energy projects and community-scale distributed generation systems, including capability to export surplus renewable electricity from Humboldt County to other areas of the state and to operate Humboldt County's grid independently during regional emergencies.

Addenda

Addendum 2025-A

Adopted June 26, 2026

RCEA will address Humboldt County's supply-side energy needs through its existing Community Choice Energy (CCE) program and development of new programs and initiatives.

Goals: **By 2025, 100% of RCEA's power mix will be from a combination of state-designated renewable energy sources—solar, wind, biomass, small hydroelectric, and geothermal—and state-designated net-zero-carbon-emission existing large hydroelectric facilities.**

By 2030 Humboldt County will be a net exporter of renewable electricity and RCEA's power mix will consist of 100% net-zero-carbon-emission renewable sources.

RCEA will develop local renewable energy resources and advocate for transmission capacity to deliver these resources to the rest of the state where they exceed local need.

Humboldt County can effectively respond to regional and local disruptions to energy supply and distribution systems through modernization of the local electric grid, the deployment of local distributed energy resources, and the development of community microgrids.

Appendices

Appendix A: Quantitative Targets

This appendix articulates the targets for Humboldt County's electricity generation and use on the ten-year horizon that is outlined in RCEA's RePower Strategic Plan. The following sections lay out anticipated changes to electricity supply and demand due to buildout of new renewable energy resources, electrification of transportation and building energy use, and increased adoption of distributed energy.

Power Resources

The portfolio of local generation sources anticipated to meet Humboldt County's electricity demand in 2030 includes new and existing resources, as seen in Table 1. In addition to existing small hydroelectric and biomass facilities, two utility scale wind projects, one small hydroelectric facility, and several solar generators are considered feasibly developable without requiring the buildout of additional transmission capacity[3].

Table 1: Local Generation Sources Anticipated to Meet Humboldt County's Electricity Demand in 2030

Generator Name	Resource	Location	Operational Capacity (MW)	Potential Capacity (MW)
DG Fairhaven Power	Biomass	Humboldt	15	15
Humboldt Sawmill Cogeneration	Biomass	Humboldt	25	32.5
Baker Station Hydro Plant	Hydro	Humboldt	1.5	1.5
Big Creek Water Works	Hydro	Trinity	5	5
Gosselin Hydroelectric Plant	Hydro	Trinity	2	2
Kekawaka Hydro Plant	Hydro	Trinity	5	5
Three Forks Waterpower Project	Hydro	Trinity	1	1
Boulder Creek Hydro Plant	Hydro	Humboldt	not built, unplanned	8
Redwood Coast Airport Microgrid	Solar	Humboldt	not built, planned	2
RCEA Feed-In Tariff Projects	Solar	Humboldt	not built, planned	6
Humboldt Onshore Wind[4]	Wind	Humboldt	not built, unplanned	125
Redwood Coast Offshore Wind	Wind	Offshore	not built, planned	120
Total			**54.5**	**323**

Table 1 Nameplate capacities of operational and potential renewable energy generators in the Humboldt Local Reliability Area.

[3] Whether the Redwood Coast Offshore Wind Project would require transmission infrastructure upgrades is currently being analyzed by the California Independent System Operator via an interconnection study.
[4] Onshore wind is still considered a viable renewable resource but is not currently under development.

Figure 1 shows a comparison of RCEA's power mix, comprised of local biomass power and other non-local sources, and the potential renewable power supply for the entire county in 2030[5], comprised of local resources, most of which have yet to be built.

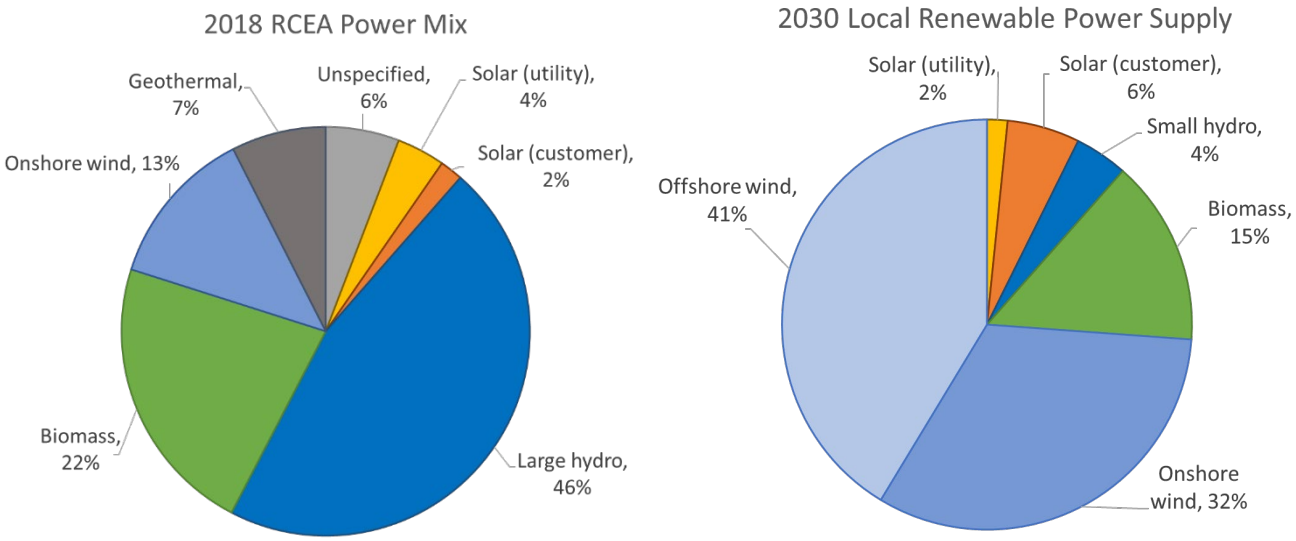

Figure 1 RCEA's 2018 power mix for Community Choice Energy customers and the potential renewable power mix for Humboldt County in 2030.

Figure 1 Data Table: 2018 RCEA Power Mix

Power Source	Percentage
Large Hydro	46%
Biomass	22%
Onshore Wind	13%
Unspecified	6%
Geothermal	7%
Solar (utility)	4%

Figure 1 Data Table: 2030 Local Renewable Power Supply

Power Source	Percentage
Offshore Wind	41%
Onshore Wind	32%
Biomass	15%
Solar (customer)	6%
Small Hydro	4%
Solar (utility)	2%

[5] RCEA's power mix in 2030 may not exactly mirror the local renewable power supply, as it depends on what contractual power purchases are executed between now and then.

Figure 2 shows how average generation and load are projected to line up each hour of the day during each season in 2030, with the Humboldt Onshore Wind project included (left) and excluded (right). The stacked areas show how much the resource mix would generate each hour of the day, while the lines show forecasted load each hour of the day. The augmented load (red line) accounts for increased electricity demand due to electrification of vehicles and building energy use, while the business-as-usual (BAU) load (blue line) shows the demand without the additional electrification. The customer solar (orange dashed line) shows how much load would be served in the middle of the day by net energy metered (NEM) systems, assuming RCEA's aggressive NEM targets are achieved. The charts on the right show projected electricity shortfalls due to the removal of the Humboldt Onshore Wind project from the portfolio, which is demonstrated by the white space between the customer demand lines and the stacked area resources. The charts on the left contemplate Humboldt County as a net exporter of renewable electricity. The resource mix is intended to advise RCEA's 2020 Integrated Resource Plan to be submitted to the California Public Utilities Commission.

Figure 2: Projected 2030 Electricity Supply and Demand with Humboldt Onshore Wind

Figure 2: Projected 2030 Electricity Supply and Demand without Humboldt Onshore Wind

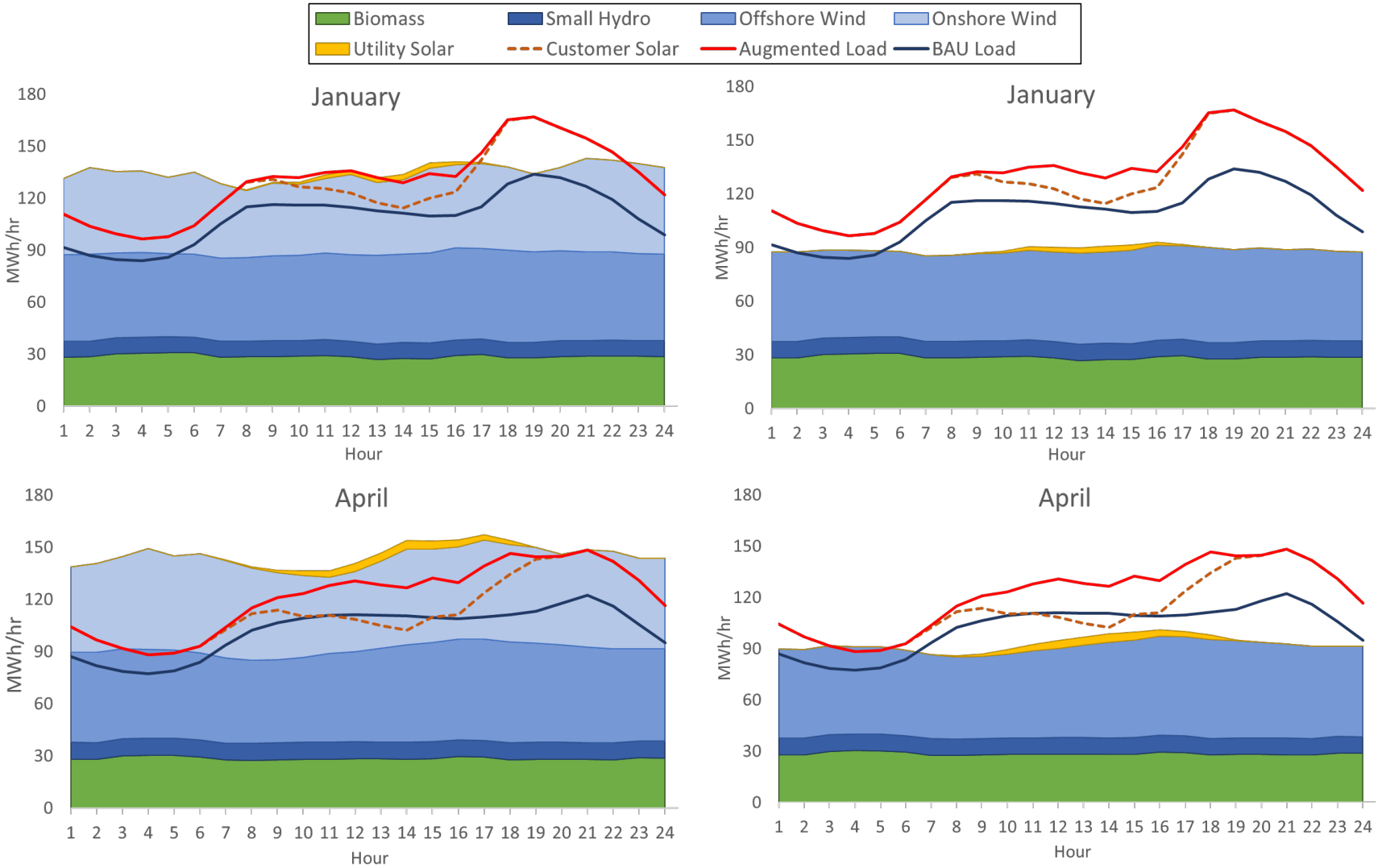

Figure 2 Comparison of projected 2030 power supply and customer electricity demand by season and time of day with (left) and without (right) the Humboldt Onshore Wind project.

Figure 2: Projected 2030 Electricity Supply and Demand with Humboldt Onshore Wind

Figure 2: Projected 2030 Electricity Supply and Demand without Humboldt Onshore Wind

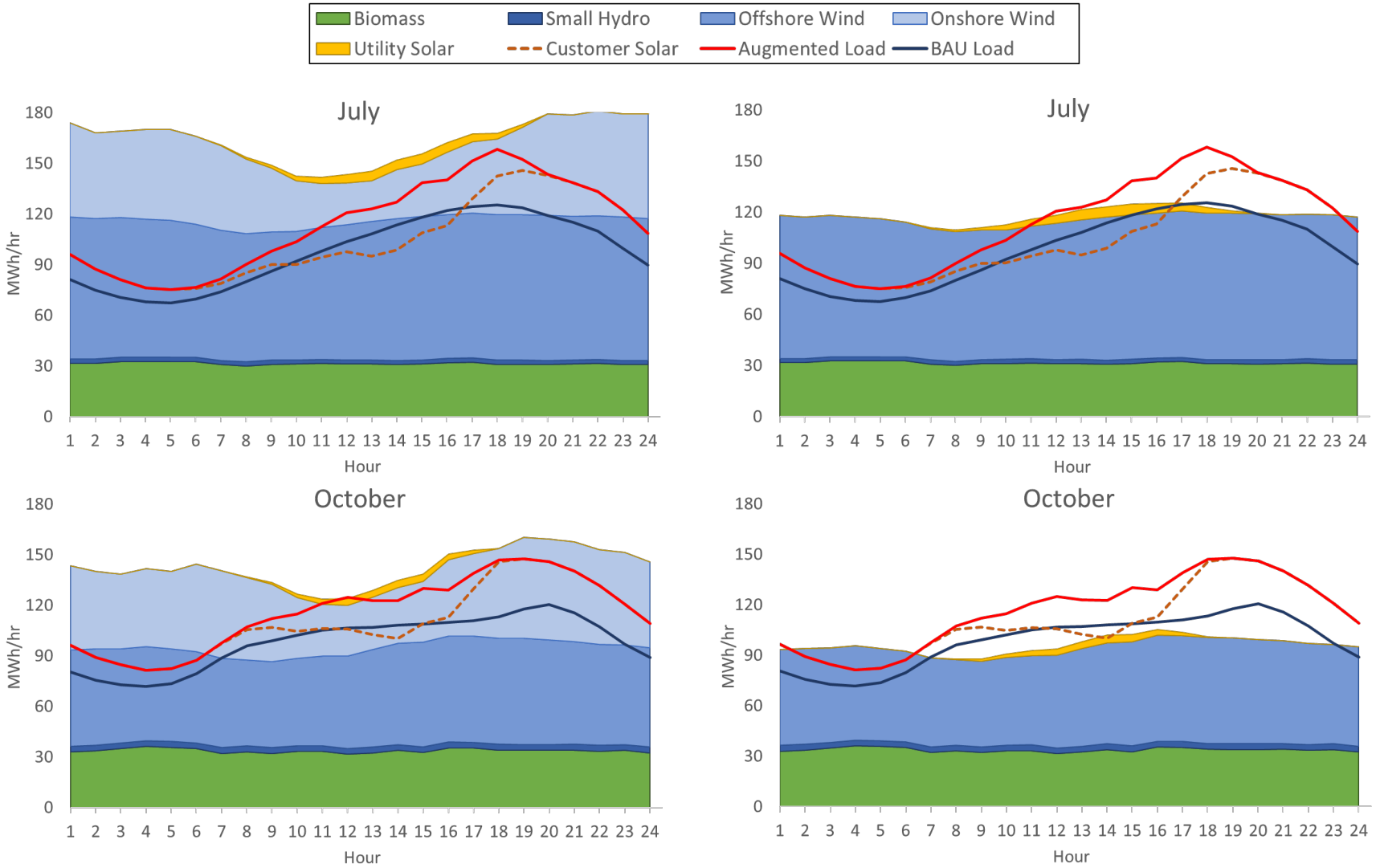

Figure 2 Comparison of projected 2030 power supply and customer electricity demand by season and time of day with (left) and without (right) the Humboldt Onshore Wind project.

Figure 2 Data Tables: January (in MWh)

Business-as-Usual (BAU) Load

Hour	2030 County Load
1	91.54
2	86.94
3	84.44
4	83.91
5	85.87
6	93.15
7	105.11
8	115.08
9	116.31
10	116.08
11	115.83
12	114.54
13	112.66
14	111.28
15	109.67
16	110.04
17	115.00
18	128.32
19	133.91
20	131.91
21	126.97
22	119.44
23	108.10
24	98.80

Net Energy Metering

Hour	Customer Solar
1	0.00
2	0.00
3	0.00
4	0.00
5	0.00
6	0.00
7	0.00
8	0.13
9	1.53
10	5.00
11	9.19
12	12.84
13	14.46
14	14.51
15	14.18
16	9.00
17	3.92
18	0.20
19	0.00
20	0.00
21	0.00
22	0.00
23	0.00
24	0.00

2030 Total

Hour	2030 Total Augmented Load
1	110.54
2	103.62
3	99.36
4	96.51
5	97.82
6	104.11
7	116.96
8	129.24
9	130.96
10	126.71
11	125.61
12	122.99
13	117.22
14	114.48
15	120.00
16	123.46
17	142.25
18	165.05
19	166.97
20	160.55
21	154.74
22	146.88
23	134.99
24	122.05

Generation Data

Hour	Biomass	Small Hydro	Utility Solar
1	12.27	9.17	0.00
2	12.38	9.17	0.00
3	13.58	9.17	0.00
4	13.93	9.17	0.00
5	14.10	9.17	0.00
6	13.73	9.17	0.00
7	12.31	9.17	0.00
8	12.43	9.17	0.05
9	12.61	9.17	0.54
10	12.62	9.17	1.77
11	12.70	9.17	3.26
12	12.35	9.17	4.55
13	12.27	9.17	5.13
14	12.34	9.17	5.14
15	12.19	9.17	5.03
16	13.34	9.17	3.19
17	13.45	9.17	1.39
18	11.83	9.17	0.07
19	11.79	9.17	0.00
20	11.97	9.17	0.00
21	12.00	9.17	0.00
22	12.12	9.17	0.00
23	12.13	9.17	0.00
24	12.13	9.17	0.00

Figure 2 Data Tables: April (in MWh)

Business-as-Usual (BAU) Load

Hour	2030 County Load
1	87.11
2	81.76
3	78.44
4	77.36
5	78.83
6	83.75
7	93.62
8	102.42
9	106.47
10	109.31
11	110.68
12	111.13
13	110.84
14	110.61
15	109.50
16	108.97
17	109.73
18	111.27
19	113.06
20	117.79
21	122.24
22	116.08
23	105.68
24	94.95

Net Energy Metering

Hour	Customer Solar
1	0.00
2	0.00
3	0.00
4	0.00
5	0.00
6	0.01
7	1.30
8	3.18
9	7.19
10	12.98
11	17.11
12	22.28
13	23.26
14	24.26
15	22.39
16	18.64
17	15.44
18	11.95
19	1.29
20	0.00
21	0.00
22	0.00
23	0.00
24	0.00

2030 Total

Hour	2030 Total Augmented Load
1	104.40
2	96.73
3	91.65
4	88.25
5	89.07
6	92.99
7	102.46
8	111.83
9	113.75
10	110.26
11	110.82
12	108.43
13	104.90
14	102.35
15	109.92
16	111.04
17	123.75
18	134.55
19	143.12
20	144.73
21	148.30
22	141.81
23	130.86
24	116.49

Generation Data

Hour	Biomass	Small Hydro	Utility Solar
1	5.56	9.72	0.00
2	6.02	9.72	0.00
3	7.19	9.72	0.00
4	7.32	9.72	0.00
5	7.26	9.72	0.00
6	6.81	9.72	0.00
7	5.00	9.72	0.46
8	4.77	9.72	1.13
9	4.72	9.72	2.55
10	4.88	9.72	4.60
11	5.03	9.72	6.07
12	4.97	9.72	7.90
13	4.96	9.72	8.24
14	4.74	9.72	8.60
15	4.94	9.72	7.93
16	6.16	9.72	6.61
17	6.56	9.72	5.47
18	5.24	9.72	4.23
19	5.27	9.72	0.46
20	5.64	9.72	0.00
21	5.67	9.72	0.00
22	5.80	9.72	0.00
23	5.58	9.72	0.00
24	5.10	9.72	0.00

Figure 2 Data Tables: July (in MWh)

Business-as-Usual (BAU) Load

Hour	2030 County Load
1	81.13
2	74.90
3	70.44
4	67.96
5	67.44
6	69.64
7	73.72
8	79.88
9	85.99
10	92.03
11	97.87
12	103.55
13	108.05
14	113.52
15	118.09
16	121.92
17	124.47
18	125.44
19	123.56
20	119.02
21	115.11
22	109.91
23	99.70
24	89.54

Net Energy Metering

Hour	Customer Solar
1	0.00
2	0.00
3	0.00
4	0.00
5	0.00
6	0.59
7	2.49
8	4.72
9	7.98
10	13.29
11	18.40
12	22.89
13	28.02
14	28.35
15	29.61
16	27.00
17	22.62
18	15.62
19	6.73
20	0.57
21	0.00
22	0.00
23	0.00
24	0.00

2030 Total

Hour	2030 Total Augmented Load
1	95.89
2	87.35
3	81.13
4	76.33
5	75.15
6	75.78
7	78.85
8	85.22
9	89.95
10	90.14
11	94.20
12	97.71
13	94.83
14	98.64
15	108.76
16	113.11
17	128.79
18	142.52
19	145.66
20	142.86
21	138.64
22	133.12
23	122.35
24	108.55

Generation Data

Hour	Biomass	Small Hydro	Utility Solar
1	14.66	2.45	0.00
2	14.82	2.45	0.00
3	15.53	2.45	0.00
4	15.73	2.45	0.00
5	15.67	2.45	0.00
6	15.45	2.45	0.21
7	14.19	2.45	0.88
8	13.56	2.45	1.67
9	14.12	2.45	2.83
10	14.11	2.45	4.71
11	14.29	2.45	6.52
12	14.16	2.45	8.11
13	14.16	2.45	9.93
14	13.67	2.45	10.05
15	13.98	2.45	10.49
16	14.75	2.45	9.57
17	14.93	2.45	8.02
18	13.88	2.45	5.54
19	13.81	2.45	2.39
20	13.95	2.45	0.20
21	14.23	2.45	0.00
22	14.43	2.45	0.00
23	14.42	2.45	0.00
24	14.45	2.45	0.00

Figure 2 Data Tables: October (in MWh)

Business-as-Usual (BAU) Load

Hour	2030 County Load
1	80.51
2	75.55
3	72.76
4	71.79
5	73.54
6	79.43
7	88.74
8	96.04
9	98.97
10	102.15
11	105.08
12	106.56
13	106.84
14	108.04
15	108.74
16	109.68
17	110.90
18	113.16
19	117.71
20	120.47
21	115.54
22	107.22
23	97.01
24	88.86

Net Energy Metering

Hour	Customer Solar
1	0.00
2	0.00
3	0.00
4	0.00
5	0.00
6	0.00
7	0.21
8	1.76
9	5.19
10	10.09
11	14.68
12	18.98
13	20.30
14	22.55
15	21.00
16	16.31
17	9.41
18	1.27
19	0.00
20	0.00
21	0.00
22	0.00
23	0.00
24	0.00

2030 Total

Hour	2030 Total Augmented Load
1	96.37
2	89.10
3	84.54
4	81.26
5	82.35
6	87.25
7	97.25
8	105.44
9	106.82
10	104.56
11	106.23
12	105.74
13	102.43
14	100.06
15	109.12
16	112.65
17	129.53
18	145.69
19	147.64
20	145.98
21	140.17
22	131.52
23	120.76
24	108.97

Generation Data

Hour	Biomass	Small Hydro	Utility Solar
1	13.22	3.43	0.00
2	13.52	3.43	0.00
3	14.63	3.43	0.00
4	15.05	3.43	0.00
5	14.76	3.43	0.00
6	15.16	3.43	0.00
7	13.86	3.43	0.07
8	13.53	3.43	0.62
9	13.57	3.43	1.84
10	13.61	3.43	3.58
11	13.69	3.43	5.20
12	13.72	3.43	6.73
13	13.59	3.43	7.19
14	13.47	3.43	7.99
15	13.13	3.43	7.44
16	14.86	3.43	5.78
17	15.17	3.43	3.33
18	13.62	3.43	0.45
19	13.50	3.43	0.00
20	13.55	3.43	0.00
21	13.75	3.43	0.00
22	13.14	3.43	0.00
23	13.52	3.43	0.00
24	12.89	3.43	0.00

Electricity Load

Transportation

According to Humboldt County's 2015 greenhouse gas inventory, the transportation sector is one of the greatest local sources of greenhouse gases, with most of the emissions coming from single-passenger vehicles. Light-duty vehicles are about 80% off all vehicles in the county. To support state and local GHG-reduction goals, RCEA is adopting the following targets for reducing transportation emissions. The two strategies identified are in vehicle miles traveled (VMT) reduction and electric vehicle (EV) adoption.

Vehicle Miles Traveled Reduction

The most effective way to reduce emissions from transportation is simply to reduce the number of miles traveled. Although other agencies such as Humboldt County Association of Governments and Humboldt Transit Authority will lead this effort, RCEA will facilitate a decrease in VMT using 2020 as a baseline. If these targets are met, annual VMT will be reduced by 400 million by 2030, equating to a 25% reduction from 2020 VMT levels.

Table 2: Target Reduction in Vehicle Miles Travelled (VMT)

Year	% VMT Reduction	VMT Reduced	Annual VMT with Reduction
2025	10%	170 Million	1.5 Billion
2030	25%	420 Million	1.2 Billion

Table 2 Vehicle miles travelled reduction targets for 2025 and 2030.

Electric Vehicle Adoption

The following table shows RCEA's five- and ten-year targets for facilitating the adoption of over 22,000 EVs, which should make up 19% of all light duty transportation in Humboldt County by 2030.

Table 3: Target Electric Vehicle (EV) Adoption

Year	Business-as-Usual (BAU) Light Duty EVs	RCEA Targets for Light Duty EVs	Additional Load (MWh/year)
2025	2,000	6,000	15,400
2030	3,700	22,000	57,400

Table 3 Current estimates and RCEA targets for electric vehicle adoption, and the annual electric load increase associated with the latter.

Building Energy Use

According to Humboldt County's 2015 greenhouse gas inventory, the second largest emitter after transportation is stationary combustion. This includes natural gas, propane, and wood fuel for both residential and non-residential energy users. RCEA is adopting the following targets to electrify natural gas and propane technologies associated with space heating, water heating, cooking, and other residential and commercial uses. Shifting homes and businesses from fossil fuels to electricity is known as fuel substitution.

Table 4: Target Gas and Propane Reduction

Year	% Reduction in Natural Gas and Propane	Additional Load (MWh/year)
2025	10%	9,000
2030	20%	18,000

Table 2 RCEA's reduction targets for natural gas and propane[6] from electrification, along with the associated increases in electric load.

Customer Solar (NEM)

Grid-tied solar arrays that are interconnected on the customer side of the meter as opposed to the utility side are often referred to as net energy metered (NEM) systems. RCEA's 10-year plan aims to accelerate the NEM adoption rate and greatly increase the number of solar electric systems in Humboldt County. This includes systems installed under California Title 24 Building Code, which requires solar PV systems on all new residential construction under 3 stories starting in 2020.

RCEA's aims to accelerate the rate of NEM system installation to an annual average of 365 systems per year between 2020 and 2030, adding about 40 megawatts of additional solar capacity by the end of the decade. Roughly 90% of these systems are anticipated to be residential installations and 10% non-residential.

Table 5: Target Customer Solar Installations

Year	Additional Solar Arrays	Added Capacity (MW)	Annual Generation (MWh/year)	Cumulative Added Generation (MWh)
2025	1,825	19.75	32,000	160,000
2030	3,650	39.50	64,000	320,000

Table 3 Number of additional solar electric systems installed per year by 2025 and 2030 along with their associated capacity and energy production.

[6] Percent reduction is based on residential and commercial natural gas and propane use and does not include use of those fuels for industrial processes and electric power generation.

Appendix B: Assumptions and Methodologies

The RePower Strategic Plan is intended to be a comprehensive plan for all of Humboldt County, not just for customers served by RCEA's CCE program or for generators who currently supply power that serves those customers. Thus, the analysis attempts to account for all anticipated electricity supply and demand[7] within our community's reliability area of the electricity grid.

Power Resources

The Humboldt Local Reliability Area[8] (see Figure 3) and thirty miles off the Humboldt Coast are the geographic boundaries used to count existing and anticipated energy resources. The new resources are modelled at capacities that are feasibly developable by 2030 and don't require significant buildout of new transmission infrastructure. Below is a list of assumptions that are specific to certain resource types and facilities.

Resource-specific assumptions:

- Existing biomass and hydroelectric facilities are repowered and continue to operate at similar capacities to today's
- The annual generation profiles of all hydroelectric facilities are similar, scaled by their nameplate capacities, and are consistent hour by hour within a given month
- RCEA's Feed-in Tariff program is completely subscribed, and all projects are solar photovoltaic with similar hourly generation profiles to that of the Redwood Coast Airport Microgrid project, scaled by their nameplate capacities

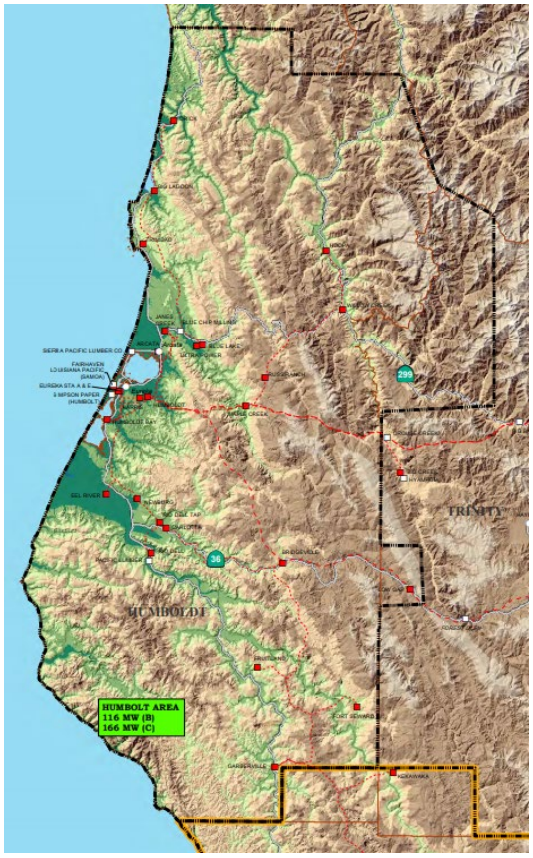

Figure 3 Humboldt Local Reliability Area

[7] This includes customers served by RCEA, PG&E, and Direct Access providers
[8] Humboldt Local Reliability Area as defined by the California Energy Commission includes some areas outside of Humboldt County's boundaries: https://ww2.energy.ca.gov/maps/reliability/LRA_Northern.html

- The operational offshore wind capacity in 2030 is limited to one project within the Bureau of Ocean Energy Management's 2018 Humboldt Call Area
- Humboldt Onshore Wind and Boulder Creek Hydro are included despite no current development plans, in keeping with language in this plan calling for development of onshore wind and small hydro resources

Table 6: Sources of Generation Data

Generator Name	Data Source
DG Fairhaven Power	Actual generation
Humboldt Sawmill Cogeneration	Actual generation
Baker Station Hydro Plant	CEC QFER Database
Big Creek Water Works	CEC QFER Database
Gosselin Hydroelectric Plant	CEC QFER Database
Kekawaka Hydro Plant	CEC QFER Database
Three Forks Waterpower Project	CEC QFER Database
Boulder Creek Hydro Plant	Oscar Larson & Associates Report[9]
Redwood Coast Airport Microgrid	Schatz Energy Research Center
RCEA Feed-In Tariff Projects	Schatz Energy Research Center
Humboldt Onshore Wind	Estimated from proprietary data
Redwood Coast Offshore Wind	Estimated from proprietary data

Electricity Load

Hourly Load Forecast

RCEA's hourly load forecast generated by The Energy Authority (TEA) is used as the business-as-usual (BAU) load forecast. A load factor of 1.18 is applied to include opted out and Direct Access customers, those who are not currently served by RCEA's CCE Program.

Transportation Load

Reduction in Vehicle Miles Traveled

Although RCEA won't be the main agency driving VMT reduction, reduction targets are set across all vehicle and fuel types. The 2017 mobile source emissions model from California Air Resources Board's EMFAC database[10] is used to project VMT for 2020. The forecast provides a baseline to calculate a 10% and 20% VMT reduction for years 2025 and 2030, respectively.

[9] Larson, O. & Associates. (1982). "An Analysis of Small Hydroelectric Planning Strategies." A Report to the Humboldt County Board of Supervisors.
[10] https://www.arb.ca.gov/emfac/2014/?_ga=2.114116750.862177112.1570490806-866086873.1536797044

Calculations for reductions in VMT:

$$VMT\ Per\ Vehicle\ Type\ and\ Fuel\ Type = \left(\frac{BAU\ VMT\ per\ Vehicle\ and\ Fuel\ Type}{Total\ VMT}\right) * RCEA\ VMT\ Reduction\ Goal$$

Electric Vehicle Adoption

The 2017 mobile source emission model by EMFAC[11] is used to forecast vehicle population, vehicle type, and fossil fuel consumption for 2020, 2025, and 2030. Light-duty (LD) electric vehicle (EV) kWh consumption is provided by Humboldt County's 2015 greenhouse gas inventory[12] and assumes that EVs will make efficiency gains at the same rate as fossil fuel vehicles. Efficiency gains for medium- and heavy-duty EVs are not accounted for.

RCEA EV adoption goals are determined using the BAU EV forecasts and the California State goal to reach 80% below 1990 emissions by 2050. These targets will place Humboldt County on a trajectory to replace all light-duty gasoline vehicles with EVs by 2050. The difference between the BAU forecast and RCEA's goal is the additional electric load attributed to the significant increase in electric vehicles. It is assumed that the additional EVs will replace gasoline light-duty vehicles.

Calculations for RCEA's EV Adoption Goals:

$$Number\ of\ added\ EVs = BAU\ EV\ Pop - (\ LD\ Vehicle\ Pop\ * RCEA's\ EV\ \%\ Goal)$$

$$Annual\ MWHs\ per\ EV = \frac{\left(VMT\ per\ day * \frac{kwh}{mile} * 365\ days\right)}{EV\ Pop}$$

$$Annual\ MWHs\ added\ from\ RCEA's\ EV\ Goal = Number\ of\ added\ EVs * Annual\ MWH\ per\ EV$$

Electric Vehicle Load Curve

The Humboldt weekday load profile from the CEC Infrastructure Projection EVI-Pro Tool[13] is used to estimate future electric vehicle charging times. Potential load shifting due to future time-of-use incentives or demand response is not modelled.

[11] https://www.arb.ca.gov/emfac/2014/?_ga=2.114116750.862177112.1570490806-866086873.1536797044

[12] 2015 Humboldt County Emissions Inventory will be made available to the public early 2020

[13] https://maps.nrel.gov/cec/

Building Energy Use

Residential Fuel Substitution

An average household's gas-based heating fuel usage in Humboldt County is estimated using the CEC's natural gas consumption data[14] and Census Bureau data on House Heating Fuel[15]. Data collected from RCEA's home energy assessments[16] is used to estimate the usage by other appliances and fuels across the County.

The electricity use of household air- and water-source heat pumps is calculated using the formulas below. A conversion factor for gas (expressed in kWh) consumption to heat pump kWh of approximately 1/3 was calculated for fuel substitution.

Calculation for heat output of an 80% efficient natural gas furnace expressed in kWh:

$$kWh(out) = NG\ Therms\ (in) \times 29.3 \frac{kWh}{Therm} \times 80\%\ Efficiency$$

Calculation for heat pump electricity usage equivalent to 80% efficient furnace output, with coefficient of performance (COP) of 4.0:

$$HP\ kWh\ (in) = \frac{kWh\ (out)}{4.0\ COP}$$

Calculation for kWh of natural gas (NG) input converted to kWh of electricity through fuel substitution:

$$Heat\ Pump\ kWh\ (in) = NG\ kWh\ (in) \times 80\% \div 4.0 = NG\ kWh\ (in) \times 0.2$$

$$Heat\ Pump\ kWh\ (in) \approx \frac{NG\ kWh(in)}{5}$$

Residential Load Curves

To estimate the seasonal load increase due to residential fuel substitution, the load curves are based on annual usage calculated for each appliance-fuel combination and PG&E's heating degree days for climate zone 1. Hourly load curves for lighting are adapted from scientific papers by the National Renewable Energy Laboratory (NREL) and the U.S. Department of Energy[17] , as well as articles published in the journal *Applied Energy*[18]

Non-Residential Fuel Substitution

Due to a lack of data on space and water heating in the non-residential sector and the wide variety of end-uses for natural gas and propane, non-residential fuel is modeled with a flat

[14] https://ecdms.energy.ca.gov/
[15] https://factfinder.census.gov/
[16]Residential assessment data from 2012 to present collected by the Redwood Coast Energy Authority and compiled in the Energy Assessment Survey Tool (EAST). 4279 data points.
[17] https://www.nrel.gov/docs/fy16osti/64904.pdf
[18] https://www.sciencedirect.com/science/article/pii/S0306261917308954

seasonal load curve using the annual fuel consumption from the CEC's data on energy consumption in Humboldt County[19]. Propane consumption is estimated using the percentages from the 2005 Humboldt County General Plan Energy Element.

[19] https://ecdms.energy.ca.gov/

Customer Solar (NEM)

The NEM Currently Interconnected Data Set from the California Solar Initiative (CSI) Database[20] provides historic solar PV installation rates that advise RCEA's NEM adoption targets. In 2018, around 280 new solar NEM systems were interconnected in Humboldt County. Of those 280 systems, 270 were residential installations and 10 were non-residential. RCEA's target increases the annual number of interconnected PV systems to 365 per year, or a rate of 1 system installed per day, with similar proportions of residential and non-residential adoption as historical rates.

Using the average system size for residential and non-residential PV arrays, system size of future installations is anticipated to be slightly larger due to assumed increases in solar cell efficiencies and building electricity usage due to EV charging. The anticipated system size is 6 kW for residential and 50 kW for non-residential. A solar calculator designed for RCEA's Public Agency Solar Program using solar insolation data from NREL[21] provides estimates for 2025 and 2030 electricity generation at the anticipated total NEM adoption capacity. Decommissioning of NEM systems and degradation of photovoltaic cell efficiency over time is not accounted for in the analysis.

The generation profile of NEM systems is assumed to be similar to that of the Redwood Coast Airport Microgrid project, scaled by nameplate capacity. The production of these additional NEM systems will decrease the electric load in the middle of the day.

[20] https://www.californiadgstats.ca.gov/downloads/
[21] https://pvwatts.nrel.gov/